STROKE PERFORMANCE MEASURES

Note: Stroke Performance Measure Set following harmonization of measure specifications with the Paul Coverdell National Acute Stroke Registry and American Heart Association / American Stroke Association GET WITH THE GUIDELINES, and after endorsement by NQF.

This measure set is applicable to patients with diagnoses of ischemic stroke and hemorrhagic stroke, and TIA. Each measure includes patients from one or more categories. The final clinical diagnosis is used to identify the measure population. Measure 6a is new and is being pilot tested in 2009. The following table identifies the population included in each measure:

Measure No.	Measure Name	Ischemic Stroke	TIA	Hemorrhagic Stroke	Ill-Defined Stroke
		AdmDxIS	AdmDxTIA	AdmDxSH AdmDxIH	AdmDxSNS
1	VTE Prophylaxis	X		X	X
2	Discharged on antithrombotic therapy	X	X		
3	Anticoagulation for AF	X	X		
4	t-PA administered	X			
5	Antithrombotic therapy by end of day 2	X	X		
6	Discharged on cholesterol reducing medication	X	X		
6a	Discharged on statin medication	X	X		
7	Dysphagia screening	X		X	X
8	Stroke education	X	X	X	X
9	Smoking cessation counseling	X	X	X	X
10	Assessed for rehabilitation	X		X	X

Performance Measure Name: Venous Thromboembolism (VTE)-Prophylaxis

Patients with an ischemic stroke or a hemorrhagic stroke who received VTE prophylaxis or have documentation why no VTE prophylaxis was given the day of or the day after hospital admission.

Rationale: Stroke patients are at increased risk of developing venous thromboembolism (VTE). 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 VTE, through the use of prophylactic therapies, in at risk patients is a noted recommendation in numerous clinical practice guidelines. For acutely ill stroke patients who are confined to bed, thromboprophylaxis with low-molecular-weight heparin (LMWH), low-dose unfractionated heparin (LDUH), or fondaparinux is recommended if there are no contraindications. Aspirin alone is not recommended as an agent to prevent VTE.

Clinical Practice Guidelines Supporting Measure:

Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, ; Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Duncan et al, Stroke Rehabilitation Clinical Practice Guidelines (Stroke. 2005;36:e100-e143.)

Geerts WH, Pineo GF, Heit JA, et al. Prevention of venous thromboembolism: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest. Sep 2004;126(3 Suppl):338S-400S.

Post-Stroke Rehabilitation Guideline No.16, Agency for Healthcare Policy and Research (Now known as Agency for Healthcare Research and Quality), 1995

Type of Measure: Process

Numerator Statement: Ischemic or hemorrhagic stroke patients who-received VTE prophylaxis or have documentation why no VTE prophylaxis was given on the day of or the day after hospital admission.

Denominator Statement: Ischemic or hemorrhagic stroke patients

Included Populations:

Patients with a diagnosis of ischemic or hemorrhagic stroke.

Excluded Populations:

Patients who are discharged prior to end of hospital day 2

Patients receiving comfort measures only on day of or day after admission

Patients less than 18 years of age

Selected References:

Gregory W. Albers, Pierre Amarenco, J. Donald Easton, Ralph L. Sacco, and Philip Teal Antithrombotic and Thrombolytic Therapy for Ischemic Stroke. Chest Vol. 119, 2001: 300-320

Coull BM, Williams LS, Goldstein LB, et al. Anticoagulants and Antiplatelet Agents in Acute Ischemic Stroke. Report of the Joint Stroke Guideline Development Committee of the American Academy of Neurology and the American Stroke Association (a Division of the American Heart Association) Stroke. 2002;33:1934 -1942.

Desmukh M., Bisignami M, Landau P, Orchard TJ. Deep vein thrombosis in rehabilitating stroke patients: incidence, risk factors and prophylaxis. American Journal Physical Medicine Rehabilitation. 1991; 70:313-316.

Performance Measure Name: Discharged on Antithrombotic Therapy

Patients with an ischemic stroke prescribed antithrombotic therapy at discharge

Rationale: 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.

Clinical Practice Guidelines Supporting Measure:

Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Gregory W. Albers, Pierre Amarenco, J. Donald Easton, Ralph L. Sacco, and Philip Teal Antithrombotic and Thrombolytic Therapy for Ischemic Stroke. Chest Vol. 119 2001: 300-320

Harold Adams, Robert Adams, Gregory Del Zoppo and Larry B. Goldstein. Guidelines for the Early Management of Patients With Ischemic Stroke: Guidelines Update A Scientific Statement From the Stroke Council of the American Heart Association/American Stroke Association. Stroke Vol. 36, 2005: 916:923

Coull BM, Williams LS, Goldstein LB, et al. Anticoagulants and Antiplatelet Agents in Acute Ischemic Stroke. Report of the Joint Stroke Guideline Development Committee of the American Academy of Neurology and the American Stroke Association (a Division of the American Heart Association) Stroke. 2002;33:1934 -1942.

Guideline on the Use of Aspirin as Secondary Prophylaxis for Vascular Disease in Primary Care, Centre for Health Services Research University of Newcastle upon Tyne, & Centre for Health Economics of York, 1998

Type of Measure: Process

Numerator Statement: Number of patients prescribed antithrombotic therapy at hospital discharge.

Denominator Statement: Number of patients with ischemic stroke.

Included Populations: Ischemic Stroke, TIA

Excluded Populations:
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 (home or facility)
Patients receiving comfort measures only
Patients for whom discharge destination cannot be determined or unknown
Patients less than 18 years of age
Patients with a documented Reason for Not Prescribing Antithrombotic Therapy at Discharge

Selected References:

Harold Adams, Robert Adams, Gregory Del Zoppo and Larry B. Goldstein. Guidelines for the Early Management of Patients With Ischemic Stroke: Guidelines Update A Scientific Statement From the Stroke Council of the American Heart Association/American Stroke Association. Stroke Vol. 36, 2005: 916:923

Brott TG, Clark WM, Grotta JC, et al. Stroke the first hours. Guidelines for acute treatment. Consensus Statement. National Stoke Association. 2000.

Chen ZM, Sandercock P, Pan HC, et al. Indications for early aspirin use in acute ischemic stroke: a combined analysis of 40,000 randomized patients from the Chinese acute stroke trial and the international stroke trial. On behalf of the CAST and IST collaborative groups, Stroke 2000;31:1240-1249

Coull BM, Williams LS, Goldstein LB, et al. Anticoagulants and Antiplatelet Agents in Acute Ischemic Stroke. Report of the Joint Stroke Guideline Development Committee of the American Academy of Neurology and the American Stroke Association (a Division of the American Heart Association) Stroke. 2002;33:1934 -1942.

Performance Measure Name: Patients with Atrial Fibrillation/Flutter Receiving Anticoagulation Therapy
Patients with an ischemic stroke with atrial fibrillation/flutter discharged on anticoagulation therapy.

Rationale: 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. 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.

Clinical Practice Guidelines Supporting Measure:
Fuster et al., ACC/AHA/ESC Guidelines for the Management of Patients with Atrial Fibrillation, JACC Vol.38, August 2001:1231-6

Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Larry B. Goldstein, Chair; Robert Adams; Mark J. Albert; Lawrence J. Appel; Lawrence M. Brass; Cheryl D. Bushnell; Antonio Culebras; Thomas J. DeGraba; Philip B. Gorelick; John R. Guyton; Robert G. Hart; George Howard; Margaret Kelly-Hayes; J.V. (Ian) Nixon; Ralph L. Sacco. Primary Prevention of Ischemic Stroke: A Guideline From the American Heart Association/American Stroke Association Stroke Council: Cosponsored by the Atherosclerotic Peripheral Vascular Disease Interdisciplinary Working Group; Cardiovascular Nursing Council; Clinical Cardiology Council; Nutrition, Physical Activity, and Metabolism Council; and the Quality of Care and Outcomes Research Interdisciplinary Working Group: The American Academy of

Neurology affirms the value of this guideline. Stroke. 2006;37:1583

Type of Measure: Process

Numerator Statement: Patients discharged on anticoagulation therapy

Denominator Statement: Patients with a diagnosis of ischemic stroke with documented atrial fibrillation/flutter.

Excluded Populations:
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 (home or facility)
Patients receiving comfort measures only
Patients for whom discharge destination cannot be determined or unknown
Patients less than 18 years of age
Patients with a documented reason for not prescribing anticoagulation therapy

Selected References:

Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, ; Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Prevention of a First Stroke: A Review of Guidelines and a Multidisciplinary Consensus Statement from the National Stroke Association. National Stroke Association. JAMA. 1999;281:1112-1120.

Larry B. Goldstein, Chair; Robert Adams; Mark J. Albert; Lawrence J. Appel; Lawrence M. Brass; Cheryl D. Bushnell; Antonio Culebras; Thomas J. DeGraba; Philip B. Gorelick; John R. Guyton; Robert G. Hart; George Howard; Margaret Kelly-Hayes; J.V. (Ian) Nixon; Ralph L. Sacco. Primary Prevention of Ischemic Stroke: A Guideline From the American Heart Association/American Stroke Association Stroke Council: Cosponsored by the Atherosclerotic Peripheral Vascular Disease Interdisciplinary Working Group; Cardiovascular Nursing Council; Clinical Cardiology Council; Nutrition, Physical Activity, and Metabolism Council; and the Quality of Care and Outcomes Research Interdisciplinary Working Group: The American Academy of Neurology affirms the value of this guideline. Stroke. 2006;37:1583

Performance Measure Name: Thrombolytic Therapy Administered
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.

Rationale: 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 tPA 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.

Clinical Practice Guidelines Supporting Measure:
Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Harold Adams, Robert Adams, Gregory Del Zoppo and Larry B. Goldstein. American Heart Association/American Stroke Association Guidelines Update A Scientific Statement From the Stroke Council of the Guidelines for the Early Management of Patients With Ischemic Stroke: 2005, Stroke 2005;36;916-923.

Diagnosis and Initial Treatment of Ischemic Stroke, Institute for Clinical Systems Improvement (ICSI), 2001.

Management of Patients with Stroke. Assessment, investigation, immediate management and secondary prevention, Scottish Intercollegiate Guidelines Network, 1997.

STROKE the First Hours Guidelines for Acute Treatment, National Stroke Association, 2000.

Antithrombotic and Thrombolytic Therapy for Ischemic Stroke The Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Gregory W. Albers, MD,

Chair; Pierre Amarenco, MD; J. Donald Easton, MD; Ralph L. Sacco, MD; and Philip Teal, MD (CHEST 2004; 126:483S–512S)

Numerator Statement: The number of patients for whom IV thrombolytic therapy was initiated at this hospital within 3 hours (≤ 180 minutes) of time last known well.

Denominator Statement: All patients with acute ischemic stroke whose time of arrival is within 2 hours (120 minutes) of time last known well.

Excluded Populations:
Patients admitted for the performance of elective carotid intervention
Patients less than 18 years of age
Time last known well to arrival in the emergency department greater than (>) 2 hours or unknown

Selected References:

Hacke W, Kaste M, Fieschi C, et al. Intravenous thrombolysis with recombinant tissue plasminogen activator for acute hemispheric stroke. The European Cooperative Acute Stroke Study (ECASS). JAMA 1995;274:1017-1025.

Marler JR, Tilley BC, Lu M, Brott TG, Lyden PC, Grotta JC, Broderick JP, Levine SR, Frankel MP, Horowitz SH, Haley EC, Lewandowski CA, Kwiatkowski TP. Early Stroke treatment associated with better outcome The NINDS rt-PA Stroke Study. Neurology 2000;55:1649-1655.

The ATLANTIS, ECASS, and NINDS rt-PA Study Group Investigators. Association of Outcome with early stroke treatment: pooled analysis of ATLANTIS, ECASS, and NINDS rt-PA stroke Trials. Lancet 2004;363:768-774.

The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. New England Journal of Medicine 1995;333:1581-1587.

Performance Measure Name: Antithrombotic Therapy by End of Hospital Day Two

Patients with ischemic stroke who receive antithrombotic therapy by the end of hospital day two.

Rationale: 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.

Clinical Practice Guidelines Supporting Measure:

Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Gregory W. Albers, Pierre Amarenco, J. Donald Easton, Ralph L. Sacco, and Philip Teal Antithrombotic and Thrombolytic Therapy for Ischemic Stroke. Chest Vol. 119 2001: 300-320

Harold Adams, Robert Adams, Gregory Del Zoppo and Larry B. Goldstein. American Heart Association/American Stroke Association Guidelines Update A Scientific Statement From the Stroke Council of the Guidelines for the Early Management of Patients With Ischemic Stroke: 2005, Stroke 2005;36;916-923.

Coull BM, Williams LS, Goldstein LB, et al. Anticoagulants and Antiplatelet Agents in Acute Ischemic Stroke. Report of the Joint Stroke Guideline Development Committee of the American Academy of Neurology and the American Stroke Association (a Division of the American Heart Association) Stroke. 2002;33:1934 -1942.

Guideline on the Use of Aspirin as Secondary Prophylaxis for Vascular Disease in Primary Care, Centre for Health Services Research University of Newcastle upon Tyne, & Centre for Health Economics of York, 1998

Type of Measure: Process

Numerator Statement: Patients with ischemic stroke who receive antithrombotic therapy by end of hospital day two

Denominator Statement: All patients with ischemic stroke

Excluded Populations:
Patients who received IV or IA thrombolytic therapy at your hospital or within 24 hours prior to arrival
Patients discharged before the end of hospital day 2
Patients receiving comfort measures only by end of hospital day 2
Patients less than 18 years of age
Patients with a documented reason for not administering antithrombotic therapy by end of hospital day 2

Selected References:

Harold Adams, Robert Adams, Gregory Del Zoppo and Larry B. Goldstein. Guidelines for the Early Management of Patients With Ischemic Stroke: Guidelines Update A Scientific Statement From the Stroke Council of the American Heart Association/American Stroke Association. Stroke Vol. 36, 2005: 916:923

Brott TG, Clark WM, Grotta JC, et al. Stroke the first hours. Guidelines for acute treatment. Consensus Statement. National Stoke Association. 2000.

Chen ZM, Sandercock P, Pan HC, et al. Indications for early aspirin use in acute ischemic stroke: a combined analysis of 40,000 randomized patients from the Chinese acute stroke trial and the international stroke trial. On behalf of the CAST and IST collaborative groups, Stroke 2000;31:1240-1249

Coull BM, Williams LS, Goldstein LB, et al. Anticoagulants and Antiplatelet Agents in Acute Ischemic Stroke. Report of the Joint Stroke Guideline Development Committee of the American Academy of Neurology and the American Stroke Association (a Division of the American Heart Association) Stroke. 2002;33:1934 -1942.

Performance Measure Name: Discharged on Cholesterol Reducing Medication

Ischemic stroke patients with LDL>100, or LDL not measured, or on cholesterol-reducer prior to admission, who are discharged on cholesterol reducing drugs.

Rationale: An elevated serum lipid level has been a well-documented risk factor for coronary artery disease (CAD). Recently, there has been an increased focus on examining the relationship between elevated lipid levels and the incidence of stroke. In particular, some recent clinical trials have analyzed the association between lipids and non-hemorrhagic stroke. The reduction of LDL cholesterol, through lifestyle modification and drug therapy, for the prevention of strokes and other vascular events is recommended for patients with CAD in the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) Guidelines. In addition, recent evidence from the Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) trial supports the use of statins to lower LDL cholesterol in stroke patients without prior CAD and a fasting LDL > 100 mg/dL.

Based on these guidelines, all patients with ischemic stroke should have lipid profile measurement performed within 48 hours of admission unless outpatient results are available from within the past 30 days. Treatment for secondary prevention should be initiated in patients who meet NCEP ATP III criteria in the presence of LDL> 100 mg/dL, or continued for patients who were previously on lipid-lowering therapy and have an LDL< 100 mg/dL.

Clinical Practice Guideline Supporting Measure:
Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Final Report Circulation Vol. 106 2002: 3143-3421

High-Dose Atorvastatin after Stroke or Transient Ischemic Attack. (New England Journal of Medicine. NEJM Vol. 355 2006:549-559,

Type of Measure: Process

Numerator Statement: Patients who were prescribed cholesterol reducing therapy at hospital discharge

Denominator Statement: All Ischemic stroke patients with an LDL ≥ 100 mg/dL OR who were on cholesterol reducing therapy prior to hospitalization OR LDL not measured

Excluded Populations:

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 with documented reasons for not receiving statin or other lipid lowering medication

Selected References:

Feinberg WM, Albers GW, Barnett HJM, et al. Guidelines for the Management of Transient Ischemic Attacks. From the Ad Hoc Committee on Guidelines for the Management of Transient Ischemic Attacks of the Stroke Council if the American Heart Association. 1994.

National Institutes of Health. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Final Report. National Cholesterol Education Program National Heart, Ling, and Blood Institute National Institutes of Health. NIH Publication No. 12-5215. 2002

Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, ; Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Performance Measure Name: Discharged on Statin Medication

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.

Rationale: 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 ATPIII guidelines. While symptomatic carotid artery disease is one of the recognized coronary disease risk equivalents that qualify patients for treatment under ATPIII, 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 ATPIII. 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).

Clinical Practice Guideline Supporting Measure:
Robert J. Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Kenton EJ, Michael Marks, Ralph L. Sacco, Lee H. Schwamm. Update to the AHA/ASA recommendations for the prevention of stroke in patients with stroke and transient ischemic attack. Stroke. 2008;39(5).

Ralph L. Sacco, Robert Adams, Greg Albers, Mark J. Alberts, Oscar Benavente, Karen Furie, Larry B. Goldstein, Philip Gorelick, Jonathan Halperin, Robert Harbaugh, S. Claiborne Johnston, Irene Katzan, Margaret Kelly-Hayes, Edgar J. Kenton, Michael Marks, Lee H. Schwamm, Thomas Tomsick. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention. Stroke Vol. 37, 2006:577

Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Final Report Circulation Vol. 106 2002: 3143-3421

High-Dose Atorvastatin after Stroke or Transient Ischemic Attack. (New England Journal of Medicine. NEJM Vol. 355 2006:549-559.

Update to the AHA/ASA Recommendations for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack. Stroke Vol. 39, 2008.

Type of Measure: Process

Numerator Statement: Patients who were prescribed statin medication at hospital discharge

Denominator Statement: All patients with an LDL ≥ 100 mg/dL, OR LDL not measured, OR who were on cholesterol reducing therapy prior to hospitalization

Excluded Populations:
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 (home or facility)
Patients receiving comfort measures only
Patients for whom discharge destination cannot be determined or unknown
Patients less than 18 years of age
Patients with spontaneous LDL < 100 mg/dL
Patients without evidence of atherosclerosis

Patients with documented reasons for not receiving statins

Selected References:

Craig SR, Amin RV, Russell DW, Paradise NF. Blood cholesterol screening influence of fasting state on cholesterol results and management decisions. J Gen Intern Med. 2000 Jun;15(6):395-9.

Feinberg WM, Albers GW, Barnett HJM, et al. Guidelines for the Management of Transient Ischemic Attacks. From the Ad Hoc Committee on Guidelines for the Management of Transient Ischemic Attacks of the Stroke Council if the American Heart Association. 1994.

Gore JM, Goldberg RJ, Matsumoto AS, et al. Validity of serum total cholesterol level obtained within 24 hours of acute myocardial infarction. Am J Cardiol. 1984;54:722-725.

National Institutes of Health. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Final Report. National Cholesterol Education Program National Heart, Ling, and Blood Institute National Institutes of Health. NIH Publication No. 12-5215. 2002.

Pitt B, Loscalzo, Ycas J, Raichlen JS. Lipid Levels After Acute Coronary Syndromes. J Am Coll Cardiol 2008;51;1440-1445.

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Van Dis FJ, Keilson LM, Rundell CA, et al. Direct measurement of serum low-density lipoprotein cholesterol in patients with acute myocardial infarction on admission to the emergency room. Am J Cardiol. 1996;77:1232-1234.

Weiss R, Harder M, Rowe J. The relationship between nonfasting and fasting lipid measurements in patients with or without type 2 diabetes mellitus receiving treatment

with 3-hydroxy-3-methylglutaryl-coenzyme A reductase inhibitors. Clin Ther. 2003 May;25(5):1490-7.

Performance Measure Name: Dysphagia Screening
Patients with ischemic or hemorrhagic stroke who undergo screening for dysphagia with an evidence-based bedside testing protocol before being given any food, fluids, or medication by mouth.

Rationale: Dysphagia is a potentially serious complication of stroke. The importance of assessing a patient's ability to swallow, before approving the oral intake of fluids, food or medication, has been noted in multiple practice guidelines including the Agency for Healthcare Research and Quality (AHRQ) Post-Stroke Rehabilitation guideline. It has been estimated that 27-50% of stroke patients develop dysphagia. Furthermore, 43-54% of stroke patients with dysphagia will experience aspiration and of those patients 37% will develop pneumonia. Dysphagia may contribute to malnutrition and increased length of hospital stay. Most guidelines include a recommendation that all patients be screened for their ability to swallow and those with abnormal results be referred for a complete examination by a speech and language pathologist or other qualified individual. Recent evidence suggests that pneumonia rates in this population may be reduced when a systematic program of diagnosis and treatment of dysphagia is included in an ischemic stroke management plan.

Clinical Practice Guideline Supporting Measure:
Post-Stroke Rehabilitation Guideline, Agency for Healthcare Research and Quality (formerly Agency for Health Care Policy and Research), 1995

Management of Patients with Stroke, Identification and Management of Dysphagia Scottish Intercollegiate Guideline Network, 1997

Duncan et al, Stroke Rehabilitation Clinical Practice Guidelines (Stroke. 2005;36:e100-e143.)

Kaiser Permanente Clinical Practice Guidelines for Acute Stroke Quartet III Inpatient Management, 1998

VA/DoD Clinical Practice Guideline for the Management of Stroke Rehabilitation in the Primary Care Setting, Department of Veteran Affairs Department of Defense, 2003

Numerator Statement: Patients who were screened for dysphagia before taking any food, fluids, or medications by mouth

Denominator Statement: All patients with acute ischemic or hemorrhagic stroke

Excluded Populations:
Patients less than 18 years of age
Patients who are NPO throughout the hospital stay

ECRI Investigators. Diagnosis and treatment of swallowing disorders (dysphagia) in acute-care stroke. Agency for Health Care Policy and Research. Evidence

Report/Technology Assessment: Number 8. 1999.

Performance Measure Name: Stroke Education
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.

Rationale: 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, as well as 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.

Clinical Practice Guideline Supporting Measure:
Kaiser Permanente Clinical Practice Guidelines for Acute Stroke, Kaiser Permanente Medical Group, 1998

Duncan et al, Stroke Rehabilitation Clinical Practice Guidelines (Stroke. 2005;36:e100-e143.)

Post Stroke Rehabilitation, Clinical Practice Guideline No.16, Agency for Health Care Policy and Research (now known as Agency for Healthcare Research and Quality), 1995

Type of Measure: Process

Numerator Statement: Stroke patients with documentation that they or their caregivers were given education and/or educational material addressing **all** of the following:

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 at discharge

Please Note: The data elements for each of the 5 education components provide the opportunity to assess each component individually. However, completion of all 5 education categories is required for this composite measure.

Denominator Statement: Patients with ischemic stroke or hemorrhagic stroke

Excluded Populations:
Patients discharged/transferred to another short term hospital for inpatient care
Patients who expired
Patients discharged against medical advice
Patients discharged to hospice (home or facility)
Patients discharged to a location other than home, home care, or law enforcement
Patients receiving comfort measures only
Patients for whom discharge destination cannot be determined or unknown
Patients less than 18 years of age

Selected References:

Evans RL, Matlock AL, Bishop DS, Stranahan S, Pederson C. Family intervention after stroke: Does counseling or education help? Stroke 1988;19:1243-1249.

Lorig KR, Sobel DS, Stewart AL, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: A randomized trial. Medical Care 1999;37:5-14.

Smoking Cessation Performance Measure Name: Smoking Cessation/ Advice/Counseling

Patients with ischemic or hemorrhagic stroke with a history of smoking cigarettes, who are, or whose caregivers are, given smoking cessation advice or counseling during hospital stay. For the purposes of this measure, a smoker is defined as someone who has smoked cigarettes anytime during the year prior to hospital arrival.

Rationale: Cigarette smoking is the single most alterable risk factor contributing to premature morbidity and mortality, accounting for approximately 430,000 deaths in the United States. Smoking nearly doubles the risk of ischemic stroke. Numerous prospective investigations have demonstrated substantial decrease in coronary heart disease mortality for former smokers, and similar rapid decreases in risk with smoking are seen for ischemic stroke. The Framingham Heart Study concluded that smoking made a significant independent contribution to the risk of stroke. Although no randomized controlled trials have been performed, there is very strong consensus that patients who smoke should be counseled to stop smoking to decrease the risk of stroke. Research indicates that patients who receive even brief smoking cessation advice from their physicians are more likely to quit than those receiving no counseling at all. Addressing smoking habits and initiating cessation efforts are reasonable interventions during hospitalization for acute stroke and may promote the patient's medical recovery.

Clinical Practice Guideline Supporting Measure:

Biller, J., et. al. Guidelines for Carotid Endarterectomy: A statement of healthcare professionals from a special writing group of the stroke council, American Heart Association, Circulation. 1998 Feb 10;97(5):501-9

Management of Patients with Stroke. Rehabilitation, Prevention and Management of Complications and Discharge Planning, Scottish Intercollegiate Guidelines network, 2002

Smoking Cessation. Clinical Practice Guideline No. 18. U.S. Department of Health and Human Services and Public Health Service, Agency for Health Care Policy and Research, 1996

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Ira S. Ockene and Nancy Houston Miller, Cigarette Smoking, Cardiovascular Disease, and Stroke : A Statement for Healthcare Professionals From the American Heart Association Circulation, Nov 1997; 96: 3243 - 3247.

Type of Measure: Process

Numerator Statement: Stroke patients (cigarette smokers) who receive smoking cessation advice or counseling during hospital stay, or documentation that patient's caregiver was given smoking cessation advice or counseling during hospital stay.

Denominator Statement: Ischemic stroke or hemorrhagic stroke patients with a history of smoking cigarettes anytime during the year prior to hospital arrival

Excluded Populations:

Patients discharged/transferred to another short term hospital for inpatient care
Patients who expired
Patients who left against medical advice
Patients discharged to hospice (home or facility)
Patients receiving comfort measures only
Patients for whom discharge destination cannot be determined or unknown
Patients less than 18 years of age

Selected References:

Ockene IS, Miller NH. Cigarette Smoking, Cardiovascular Disease and Stroke. Circulation 1997;96:3243-3247.

Smith, PEM. Smoking and stroke: a causative role. (Editorial) Br Med J 1998;317:962-3

Wolf P, Kannel W, Bonita R, Belanger A. Cigarette smoking as a risk factor for stroke: The Framingham Study. JAMA 1988;259:1025-1029.

Performance Measure Name: Assessed for Rehabilitation
Patients with an ischemic stroke or hemorrhagic stroke who were assessed for rehabilitation services.

Rationale: 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 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.

Clinical Practice Guidelines Supporting Measure:
VA/DoD Clinical Practice Guideline for the Management of Stroke Rehabilitation in the Primary Care Setting, 2003

Post Stroke Rehabilitation, Clinical Practice Guideline No.16, Agency for Health Care Policy and Research (now known as Agency for Healthcare Research and Quality), 1995

Management of patients with stroke. Rehabilitation, prevention and management of complications, and discharge planning, Scottish Intercollegiate network Guidelines Network (SIGN), 2002

Type of Measure: Process

Numerator Statement: Patients assessed for or who received rehabilitation services

Denominator Statement: All patients with ischemic stroke, or hemorrhagic stroke

Excluded Populations:
Patients discharged/transferred to another short term hospital for inpatient care
Patients who expired
Patients who left against medical advice
Patients discharged to hospice (home or facility)
Patients receiving comfort measures only
Patients for whom discharge destination cannot be determined or unknown

Patients less than 18 years of age

Selected References:

American Academy of Physical Medicine and Rehabilitation. Rehabilitation Helps Stroke Patients Recover Skills. AAPM&R Chicago, IL Office: Author. Retrieved July 7, 2004 from World Wide Web: http://www.aapmr.org/condtreat/rehab/recover.htm .

American Academy of Physical Medicine and Rehabilitation. Urgency Key But Perseverance Pays Off. AAPM&R Chicago, IL Office: Author. Retrieved July 7, 2004 from World Wide Web: http://www.aapmr.org/condtreat/rehab/recover.htm .

American Academy of Physical Medicine and Rehabilitation. Rehabilitation Helps Stroke Patients Recover Skills Therapy Helps in Regaining Coordination, Full Speech, and Other Abilities. AAPM&R Chicago, IL Office: Author. Retrieved July 7, 2004 from World Wide Web: http://www.aapmr.org/condtreat/rehab/recover.htm .

National Institute of Neurological Disorders. Post-Stroke Rehabilitation Fact Sheet. National Institute of Neurological Disorders Bethesda, MD Office: Author. Retrieved July 7, 2004 from World Wide Web: http://www.ninds.nih.gov/health_and_medical/pubs/poststrokerehab.htm .

Zorowitz RD , et al, the Post-Stroke Rehabilitation Outcomes Project (PSROP), Top Stroke Rehabil. 2005 Fall;12(4).