Overview

The CVA/TIA condition consists of four parts. Part 1 (Case ID = 105000) is built as a chronic condition and addresses care for any patient diagnosed with CVA/TIA. Part 2 (Case ID = 203800), built as multiple events for acute ischemic episodes, identifies head CT/MRI tests performed soon after the event. Part 3 (Case ID = 203900), built as multiple events for TIA emergency room encounters, identifies follow up care after the event. Part 4 (Case ID = 204000), built as multiple events for acute ischemic episode hospitalizations, identifies follow up care after hospital discharge.

Part 1: CVA/TIA as a Chronic Condition (Case ID 105000)

Disease Management

Evaluation for hyperlipidemia in a person with cerebral ischemic disease is recommended (1). The goal of therapy in persons with cerebral ischemic disease, a coronary heart disease (CHD) risk equivalent, is a LDL cholesterol <100 mg/dL (2,3).

The National Cholesterol Education Program (NCEP) III guideline identifies three categories of risk that modify the LDL cholesterol goal. The category of highest risk consists of persons with coronary heart disease (CHD) or CHD risk equivalents. CHD equivalents include diabetes mellitus (DM), other clinical forms of atherosclerotic disease (such as cerebral ischemic disease), and multiple risk factors that confer a 10-year risk for CHD greater than 20% (2,3). The goal of therapy for persons with CHD or CHD risk equivalents should be a LDL-cholesterol <100mg/dL (2,3). The AHA/American Stroke Association Council stoke guidelines recommend that patients with ischemic stroke or TIA and elevated cholesterol or coronary artery disease be managed according to the NCEP III guideline; this is a Class I* recommendation (4). A 50 percent reduction in the LDL-cholesterol or a target LDL-cholesterol <70mg/dL is considered reasonable in patients with ischemic stroke or TIA and without know CHD; this is a Class IIa* recommendation (4).

Although the current NCEP III guidelines recommend a LDL-cholesterol <100mg/dL, an LDL-cholesterol <70mg/dL is a therapeutic option for very high risk patients (3).

Claims data that reports cholesterol test results will not distinguish between fasting and non-fasting specimen collection. The test result thresholds summarized above assume appropriate specimen collection.

*The AHA/American Stroke Association Council on Stoke guideline format for classifying indications and summarizing both the evidence and expert opinions is as follows (4):

Class I: Conditions for which there is evidence for and/or general agreement that the procedure or treatment is useful and effective.
Class II: Conditions for which there is conflicting evidence and/or divergence of opinion about the usefulness/efficacy of a procedure or treatment.
Class IIa: The weight of evidence or opinion is in favor of the procedure or treatment.
Class IIb: Usefulness/efficacy is less well established by evidence or opinion.
Class III: Conditions for which there is evidence and/or general agreement that the procedure or treatment is not useful/effective and in some cases may be harmful.

Medication Adherence (Minimum compliance 80%)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9000002</td>
<td>Patient(s) compliant with prescribed clopidogrel.</td>
</tr>
<tr>
<td>9000003</td>
<td>Patient(s) compliant with prescribed extended release aspirin/dipyridamole.</td>
</tr>
<tr>
<td>9000012</td>
<td>Patient(s) compliant with prescribed statin-containing medication.</td>
</tr>
</tbody>
</table>

Adherence to a prescribed medication regimen is essential for treatment success. Although no clear threshold of sub-optimal medication adherence is defined for most medications, many studies use a threshold of 80 percent and higher to define adherence (1-4). Approximately 75 percent of all claims-based analysis of individuals with chronic diseases uses an 80 percent or higher threshold (4). In addition, studies have demonstrated improved outcomes (e.g., decreased hospital rates) when using a threshold of 80 percent and higher to define adherence (1-3).

Given this information, we use an 80 percent or higher threshold to define medication adherence. This 80 percent threshold is used for all medications, except antiretroviral medications (see HIV/AIDS condition) that use a threshold of 85 percent.

Different approaches have been used to measure adherence (1, 4-5). Although adherence cannot be measured directly from claims information, it can be measured indirectly by evaluating prescription filling patterns and computing a possession ratio (PR). Possession ratio is defined as the ratio of days supplied to days elapsed. Days supplied is computed by summing the days supplied field for a series of prescriptions, excluding the days supplied from the last prescription in the series (the last prescription is used only to establish the end date). Days elapsed is computed by subtracting the earliest fill date from the latest fill date and then subtracting any overlapping days of confinement. The PR assumes that the patient is, on average, refilling prescriptions at or close to the time that the previous prescription is exhausted. PR uses prescriptions filled during the last 180 days of the reporting period through 90 days after the end of the reporting period (provided claims incurred after the reporting period are included in the input data set). A minimum of two prescriptions is required to compute PR. The following figure illustrates how PR is computed.
The majority of patients with a CVA/TIA will have a medication prescribed for secondary prevention. Antiplatelet agents are typically the treatment of choice for prevention of a future cerebral ischemic event in patients who have experienced a CVA/TIA of presumed atherothrombotic origin; aspirin continues to be the most economical and frequently chosen antiplatelet agent in this situation (6,7). Since aspirin is an over the counter medication, claims data does not allow us to identify the use of this medication.

**Patient Safety**

<table>
<thead>
<tr>
<th>S-M 9000005</th>
<th>Patient(s) taking warfarin that had three or more prothrombin time tests in last 6 reported months.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>The international normalization ratio (INR) should be determined at least weekly during the initiation of warfarin therapy and monthly when the patient is stable (1). For the purpose of this rule, it is assumed that all patients receiving warfarin therapy are taking maintenance therapy; monthly INR determination at minimum would be recommended. This is a Class I* recommendation from the ACC/AHA/ESC Guidelines for the Management of Patients with Atrial Fibrillation (1). The consensus opinion of experts was the primary source of our recommendation for three or more prothrombin time tests at minimum every 6 months for patients taking warfarin.</td>
</tr>
</tbody>
</table>

*The ACC/AHA guideline recommendation format for classifying indications and summarizing both the evidence and expert opinions is as follows (1):*  
Class I: Conditions for which there is evidence for and/or general agreement that the procedure or treatment is useful and effective.  
Class II: Conditions for which there is conflicting evidence and/or divergence of opinion about the usefulness/efficacy of a procedure or treatment.  
Class IIa: The weight of evidence or opinion is in favor of the procedure or treatment.  
Class IIb: Usefulness/efficacy is less well established by evidence or opinion.  
Class III: Conditions for which there is evidence and/or general agreement that the procedure or treatment is not useful/effective and in some cases may be harmful.


**Care Pattern**

<table>
<thead>
<tr>
<th>CP-I 9000006</th>
<th>Patient(s) with a LDL cholesterol test in last 12 reported months.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Evaluation for hyperlipidemia in a person with cerebral ischemic disease is recommended (1). The consensus opinion of experts was the primary source of our recommendation for an annual LDL at minimum since the frequency of assessment for patients with known cerebral ischemic disease is not clearly defined in the literature.</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>CP-O 9000013</th>
<th>Patient(s) with most recent LDL result &lt; 70mg/dL.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The goal of therapy in persons with cerebral ischemic disease, a coronary heart disease (CHD) risk equivalent, is a LDL cholesterol &lt;100 mg/dL (1,2). An LDL-cholesterol &lt;70mg/dL is a therapeutic option for very high risk patients (2).</td>
</tr>
</tbody>
</table>

The AHA/American Stroke Association Council stoke guidelines recommend that patients with ischemic stroke or TIA and elevated cholesterol or coronary artery disease be managed according to the NCEP III guideline; this is a Class I* recommendation (3). A 50 percent reduction in the LDL-cholesterol or a target LDL-cholesterol <70mg/dL is considered
reasonable in patients with ischemic stroke or TIA and without know CHD; this is a Class IIa* recommendation (3).

The EBM Connect CVA/TIA case includes a rule that identifies persons with CVA/TIA whose most recent LDL result value is <70mg/dL. Of note, a Category II code for LDL cholesterol level < 70 mg/dL does not currently exist. Therefore, the most recent record used to evaluate LDL cholesterol in this rule may not be the same record used to evaluate LDL cholesterol values in other rules.

Claims data that reports cholesterol test results will not distinguish between fasting and non-fasting specimen collection. The test result thresholds summarized above assume appropriate specimen collection.

*The AHA/American Stroke Association Council on Stoke guideline format for classifying indications and summarizing both the evidence and expert opinions is as follows (3):

Class I: Conditions for which there is evidence for and/or general agreement that the procedure or treatment is useful and effective.
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CP-I 9000008 Patient(s) with a recent acute cerebral ischemic event that had a carotid doppler OR head/neck angiography test in last 12 reported months.
A full medical assessment is recommended for all acute stroke patients to define the nature of the event and need for further investigation, management, and rehabilitation (1-3). In this measure, an acute ischemic event was defined as either a hospitalization or emergency room (ER) encounter within the last 12 months of the report period with a diagnosis of one of the following: occlusive vascular disease, non-hemorrhagic stroke, or TIA.

Vascular imaging of large cervicocephalic vessels is recommended for patients who have sustained a carotid territory TIA or CVA and who are considered suitable for surgery (1-3). ICSI stroke guidelines recommend rapid carotid evaluation (e.g., ultrasound, computed tomographic angiography, magnetic resonance angiography) after any acute ischemic event (3). The Scottish Intercollegiate Guidelines Network recommends carotid imaging in patients with evidence of carotid territory disease or a retinal event (1). Results from these tests may assist in decisions regarding antihypertensive, anticoagulant, and antiplatelet therapy (1,3). These guideline recommendations were considered by the EBM Connect consultant panel when this measure was developed. This measure identifies evidence of a vascular
imaging test of large cervicocephalic vessels (carotid doppler, magnetic resonance angiography, computed tomographic angiography, or other angiography) in patients with an emergency room encounter or hospitalization for an acute ischemic event within the past year. A person was adherent to this measure if the vascular imaging test was obtained within the last 12 months of the report period including 90 days after the end of the report period.


CP-1 Patient(s) with a recent hospitalization for an acute cerebral ischemic event that had neurology, neurosurgery, vascular surgery or thoracic surgery consultation during the hospitalization or within 30 days of discharge.

Several studies have demonstrated that stroke patients treated by neurologists achieve better outcomes. In a study by Mitchell et. al., these outcome differences persisted even after adjustment for patient age, comorbidity, hospital teaching status, and other characteristics (1). Improved outcomes were also investigated in the study by Kaste and colleagues, a benefit that remained after controlling for stroke severity and comorbidities (2). Finally, Smith et. al., demonstrated that stroke patients seen by neurologists had lower 30-day mortality and lower risk of rehospitalization for infections and aspiration pneumonia (3). Guided by these published results, the EBM Connect consultant panel process was used to develop this measure.

Patients hospitalized with an acute ischemic event (occlusive vascular disease, non-hemorrhagic stroke, or TIA) would benefit from specialty consultative services, specifically services from a neurologist, neurosurgeon, or vascular surgeon.

For this measure, patients were identified if they were hospitalized with an acute ischemic event (occlusive vascular disease, non-hemorrhagic stroke, or TIA) within the last 12 months of the report period (last 30 days of the report period excluded). A person was adherence to this measure if a professional encounter with a neurologist, neurosurgeon, or vascular surgeon occurred during the hospitalization for the acute ischemic event or within 30 days of discharge. If a patient had more than one acute ischemic event hospitalization during the time frame of interest, then they are adherent to this measure if they met the intervention criteria (a provider encounter with a specialist during the hospitalization for the acute ischemic event or within 30 days of discharge) at least once.

It is acknowledged that specialty services may not be available in some communities and certain providers, such as Internal Medicine physicians, may provide appropriate specialty services in some settings.


Part 2: CVA/TIA as Multiple Events, Head CT/MRI (Case ID 203800)

Care Pattern

<table>
<thead>
<tr>
<th>CP-I 9000001</th>
<th>Patient(s) with a recent acute cerebral ischemic event that had a head computerized axial tomography (CT) scan or magnetic resonance imaging (MRI) test soon after the acute event.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A full medical assessment is recommended for all acute stroke patients to define the nature of the event and need for further investigation, management, and rehabilitation (1,2). In this measure, an acute ischemic event was defined as either a hospitalization or emergency room (ER) encounter within the last 12 months of the report period (last 7 days of the report period excluded) with a diagnosis of one of the following: occlusive vascular disease, non-hemorrhagic stroke, or TIA.</td>
</tr>
<tr>
<td></td>
<td>Patients with a recent acute ischemic event should have a head computerized tomography (CT) or magnetic resonance imaging (MRI) test (1-3). This testing should be obtained as soon as possible, preferably within 48 hours and no later than 7 days (1,3). A person was adherent to this measure if a head CT or MRI test was obtained during the hospitalization or ER encounter for the acute ischemic event or within 7 days of discharge from the hospital or ER. If a patient had more than one acute ischemic event during the time frame of interest, then each individual encounter was evaluated for intervention compliance (i.e., a head CT or MRI test).</td>
</tr>
</tbody>
</table>

Part 3: TIA as Multiple Events, ER follow up (Case ID 203900)

Care Pattern

<table>
<thead>
<tr>
<th>CP-I 9000001</th>
<th>Patient(s) with a recent emergency room encounter for a transient cerebral ischemic event that had any physician visit within 14 days of the acute event.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients diagnosed with a TIA during an ER encounter would benefit from an outpatient follow-up assessment. Multiple strategies including medications, diet, exercise, and smoking cessation may significantly reduce cardiovascular disease in patients with an initial cerebrovascular event (1). The SIGN guidelines recommend rapid assessment of patients following a TIA or minor stroke (1). ICSI stroke guidelines recommend an outpatient follow-up evaluation within seven days (2). These guideline recommendations were considered by the EBM Connect consultant panel when this measure was developed. For this measure, patients were identified if they were diagnosed with a TIA during an ER encounter within the last 12 months of the report period (last 14 days of the report period excluded). A person was adherent to this measure if there was a follow-up provider encounter within 14 days of the ER encounter with any one of the following diagnosis: occlusive vascular disease, non-hemorrhagic stroke, or TIA. If a patient had more than one TIA ER encounter during the time frame of interest, then each individual encounter was evaluated for intervention compliance (i.e., a provider encounter within 14 days of the ER encounter).</td>
</tr>
</tbody>
</table>
| 1. | Scottish Intercollegiate Guidelines Network. Management of patients with stroke or TIA: assessment, investigation, immediate management and secondary prevention. A
Part 4:  CVA/TIA as Multiple Events, Hospital follow up (Case ID 204000)

<table>
<thead>
<tr>
<th>Care Pattern</th>
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</thead>
<tbody>
<tr>
<td>CP-I 9000001</td>
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</table>

Patient(s) with a recent hospitalization for an acute cerebral ischemic event that had any provider visit within 30 days of hospital discharge.

Patients hospitalized with an acute ischemic event would benefit from follow up care after hospital discharge. The consensus opinion of EBM Connect panel experts was the primary source for this measure.

For this measure, patients were identified if they were hospitalized with an acute cerebral ischemic event (occlusive vascular disease, non-hemorrhagic stroke, or TIA) as the primary diagnosis within the last 12 months of the report period (last 30 days of the report period excluded). A person was adherent to this measure if there was a follow-up provider encounter within 30 days of hospital discharge with any one of the following diagnosis: occlusive vascular disease, non-hemorrhagic stroke, or TIA. If a patient had more than one acute ischemic event hospitalization during the time frame of interest, then each individual encounter was evaluated for intervention compliance (i.e., a provider encounter within 30 days of discharge).