NATIONAL QUALITY FORUM

Measure Information

This document contains the information submitted by measure developers/stewards, but is organized according to NQF's measure evaluation criteria and process. The item numbers refer to those in the submission form but may be in a slightly different order here. In general, the item numbers also reference the related criteria (e.g., item 1b.1 relates to sub criterion 1b).

Brief Measure Information

NQF #: 0661
Corresponding Measures:
De.2. Measure Title: Head CT or MRI Scan Results for Acute Ischemic Stroke or Hemorrhagic Stroke Patients who Received Head CT or MRI Scan Interpretation within 45 minutes of ED Arrival
Co.1.1. Measure Steward: Centers for Medicare & Medicaid Services
De.3. Brief Description of Measure: This measure calculates the percentage of acute ischemic stroke or hemorrhagic stroke patients who arrive at the emergency department (ED) within two hours of the onset of symptoms and have a head computed tomography (CT) or magnetic resonance imaging (MRI) scan interpreted within 45 minutes of ED arrival. The measure is calculated using chart-abstracted data, on a rolling, quarterly basis and is publicly reported, in aggregate, for one calendar year. The measure has been publicly reported, annually, by CMS as a component of its Hospital Outpatient Quality Reporting (OQR) Program since 2012.
1b.1. Developer Rationale: Prompt brain imaging is a critical component of ED evaluation for patients with suspected acute stroke because it provides important information about the diagnosis, prognosis, and immediate and long-term treatment of these patients. A head CT or MRI scan is recommended to differentiate ischemic strokes, hemorrhagic strokes, and stroke mimics, and to identify appropriate candidates for tissue plasminogen activator (tPA), which is the gold standard for treating acute ischemic stroke (Jauch et al. 2013). Because the Food and Drug Administration (FDA) has approved tPA to be administered within three hours of symptom onset, expedited imaging can facilitate administration of the time-sensitive therapy for eligible patients (Cheng et al. 2015).

REFERENCES:
1)   Cheng NT, Kim AS. Intravenous thrombolysis for acute ischemic stroke within 3 hours versus between 3 and 4.5 hours of symptom onset. Demaerschalk BM, ed. The Neurohospitalist. 2015;5(3):101–109. doi:10.1177/1941874415583116.
2)   Jauch EC, Saver JL, Adams HP Jr, Bruno A, Connors JJ, Demaerschalk BM, Khatri P, McMullan PW Jr, Qureshi AI, Rosenfield K, Scott PA, Summers DR, Wang DZ, Wintermark M, Yonas H; on behalf of the American Heart Association Stroke Council, Council on Cardiovascular Nursing, Council on Peripheral Vascular Disease, and Council on Clinical Cardiology. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2013;44. Guideline available at: http://stroke.ahajournals.org/content/early/2013/01/31/STR.0b013e318284056a.full.pdf+html.

S.4. Numerator Statement: Emergency department (ED) acute ischemic stroke or hemorrhagic stroke patients arriving at the ED within 2 hours of the time last known well, with an order for a head CT or MRI scan whose time from ED arrival to interpretation of the Head CT scan is within 45 minutes of arrival.
S.6. Denominator Statement: Emergency department acute ischemic stroke or hemorrhagic stroke patients arriving at the ED within two hours of the time last known well with an order for a head CT or MRI scan.
S.8. Denominator Exclusions: Studies are excluded for any patients under 18 years of age, patients who expired in the ED, or patients who left the ED against medical advice or discontinued care.

De.1. Measure Type: Process
S.17. Data Source: Claims, Electronic Health Records, Paper Medical Records
S.20. Level of Analysis: Facility, Other

IF Endorsement Maintenance – Original Endorsement Date: Jan 17, 2011 **Most Recent Endorsement Date:** Jul 31, 2020

IF this measure is included in a composite, NQF Composite#/title:
3581:Intravenous Fibrinolytic Treatment Measure Bundle

IF this measure is paired/grouped, NQF#/title:

De.4. **IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results?** Not applicable; this measure is not a paired or grouped measure.

1. Evidence, Performance Gap, Priority – Importance to Measure and Report

Extent to which the specific measure focus is evidence-based, important to making significant gains in healthcare quality, and improving health outcomes for a specific high-priority (high-impact) aspect of healthcare where there is variation in or overall less-than-optimal performance. ***Measures must be judged to meet all sub criteria to pass this criterion and be evaluated against the remaining criteria.***

1a. Evidence to Support the Measure Focus – See attached Evidence Submission Form
NQF_0661_Measure_Evidence_Form_-Updated--637322249720468570-637322269180421205-637322273724187352.docx
1a.1 For Maintenance of Endorsement: Is there new evidence about the measure since the last update/submission?
Do not remove any existing information. If there have been any changes to evidence, the Committee will consider the new evidence. Please use the most current version of the evidence attachment (v7.1). Please use red font to indicate updated evidence.
No

1b. Performance Gap
Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating:
- considerable variation, or overall less-than-optimal performance, in the quality of care across providers; and/or
- Disparities in care across population groups.

1b.1. Briefly explain the rationale for this measure *(e.g., how the measure will improve the quality of care, the benefits or improvements in quality envisioned by use of this measure)*
If a COMPOSITE (e.g., combination of component measure scores, all-or-none, any-or-none), SKIP this question and answer the composite questions.
Prompt brain imaging is a critical component of ED evaluation for patients with suspected acute stroke because it provides important information about the diagnosis, prognosis, and immediate and long-term treatment of these patients. A head CT or MRI scan is recommended to differentiate ischemic strokes, hemorrhagic strokes, and stroke mimics, and to identify appropriate candidates for tissue plasminogen activator (tPA), which is the gold standard for treating acute ischemic stroke (Jauch et al. 2013). Because the Food and Drug Administration (FDA) has approved tPA to be administered within three hours of symptom onset, expedited imaging can facilitate administration of the time-sensitive therapy for eligible patients (Cheng et al. 2015).

REFERENCES:
1)   Cheng NT, Kim AS. Intravenous thrombolysis for acute ischemic stroke within 3 hours versus between 3 and 4.5 hours of symptom onset. Demaerschalk BM, ed. The Neurohospitalist. 2015;5(3):101–109. doi:10.1177/1941874415583116.
2)   Jauch EC, Saver JL, Adams HP Jr, Bruno A, Connors JJ, Demaerschalk BM, Khatri P, McMullan PW Jr, Qureshi AI, Rosenfield K, Scott PA, Summers DR, Wang DZ, Wintermark M, Yonas H; on behalf of the American Heart Association Stroke Council, Council on Cardiovascular Nursing, Council on Peripheral Vascular Disease, and Council on Clinical Cardiology. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2013;44. Guideline available at: http://stroke.ahajournals.org/content/early/2013/01/31/STR.0b013e318284056a.full.pdf+html.

1b.2. Provide performance scores on the measure as specified (<u>current and over time</u>) at the specified level of analysis. *(<u>This is required for maintenance of endorsement</u>. Include mean, std dev, min, max, interquartile range, scores by decile. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include.) This information also will be used to address the sub-criterion on improvement (4b1) under Usability and Use.*
Analysis of facility-level data from Hospital Compare downloadable files indicates that there is variation in the use of head CT and MRI scans within 45 minutes of ED arrival for patients with a principal diagnosis of acute ischemic or hemorrhagic stroke. During the

October 2012 through September 2013 data collection period, performance scores ranged from 0.0% to 100.0%, with a weighted mean of 59.6%. During the July 2017 through June 2018 data collection reporting period, performance scores ranged from 0.0% to 100%, with a weighted mean of 75.0, representing an 25.8% increase in the weighted mean of performance scores from the October 2012 through September 2013 data collection period.

The data presented below represent performance scores for the facilities whose denominator counts met minimum case count requirements during the October 2012 through September 2013 and July 2017 through June 2018 data collection periods. Publicly available data, at the facility level, was first included on Hospital Compare downloadable files for the data collection period of October 2012 through September 2013. To conduct longitudinal analysis, the most recent and complete 12 months of data available (July 2017 through June 2018) were compared against the October 2012 through September 2013 data.

Further details on the descriptive statistics for longitudinal facility performance are included below:

| | Data Collection Period | Percentage Point Change1 |
	October 2012–September 2013	July 2017–June 2018	
Facilities	918	1,550	
Minimum Value	0.0%	0.0%	0.0
1st Percentile	4.0%	17.0%	13.0
5th Percentile	15.0%	36.0%	21.0
10th Percentile	24.0%	46.0%	22.0
25th Percentile	42.0%	64.0%	22.0
Median	62.0%	79.0%	17.0
75th Percentile	78.0%	88.0%	10.0
90th Percentile	88.0%	94.0%	6.0
95th Percentile	92.0%	100.0%	8.0
99th Percentile	100.0%	100.0%	0.0
Maximum Value	100.0%	100.0%	0.0
Weighted Mean Performance (Standard Deviation)	59.6% (99.9)	75.0% (82.2)	
Number of CT and MRI scans performed (Denominator)	16,817	31,939	

(1) Note that this value represents the percentage point change, not the percentage increase/decrease.

From the inception of public reporting through June 2018 data collection, there has been wide variation in facility performance, though this variation has narrowed. During the October 2012 through September 2013 data collection period, the interquartile range (IQR) of performance scores ranged from 42% to 78%. During the July 2017 through June 2018 reporting period, the IQR ranged from 64% to 88%. While median performance is improving, there is an ongoing opportunity for improvement in facility performance.

1b.3. If no or limited performance data on the measure as specified is reported in 1b2, then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement.

Data have been included in Section 1b.2; these data represent national performance over time, comparing data from October 2012 through September 2013 to data from July 2017 through June 2018.

1b.4. Provide disparities data from the measure as specified (current and over time) by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability. (_This is required for maintenance of endorsement_. _Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included.) For measures that show high levels of performance, i.e., "topped out", disparities data may demonstrate an opportunity for improvement/gap in care for certain sub-populations. This information also will be used to address the sub-criterion on improvement (4b1) under Usability and Use._

Using 2014 data submitted to the Clinical Data Warehouse (CDW), we evaluated the effect of patient and facility characteristics on the likelihood of each patient having a head CT or MRI scan interpreted within 45 minutes of ED arrival for patients with a principal diagnosis associated with acute ischemic or hemorrhagic stroke, who arrived at the ED within two hours of the time last known well, and who had an order for a head CT or MRI scan. Using a logistic regression model, we assessed the impact of patient and facility characteristics for the 28,236 patients who met these criteria. The same analysis was subsequently repeated using CDW data from July 2016 through December 31, 2018, with 80,749 patients meeting the measure's criteria for numerator inclusion.

In 2014, primary results from the regression were related to patient demographics. African-American patients were less likely than White patients to have a head CT or MRI scan interpreted within 45 minutes of ED arrival (OR= 0.865, p=0.003). In comparison to

non-Hispanic patients, Hispanic patients were less likely to have a head CT or MRI scan interpreted within 45 minutes of ED arrival (OR= 0.80, p=0.010). Finally, female patients were less likely than male patients to have a head CT or MRI scan interpreted within 45 minutes of ED arrival (OR= 0.86, p<0.001).

In contrast, the July 2016 through December 31, 2018 data showed no race disparities for head CT or MRI scan interpreted within 45 minutes of ED arrival; however, Hispanic patients remained less likely to be included in the measure's numerator (OR=0.81, p=0.001) compared to non-Hispanic patients. Females also remained less likely than males to have a head CT or MRI scan interpreted within 45 minutes of ED arrival (OR=0.87, p<0.001).

Facility characteristics also play a role in determining whether a patient had a head CT or MRI scan interpreted within 45 minutes of ED arrival for patients with a principal diagnosis associated with acute ischemic or hemorrhagic stroke, who arrived at the ED within two hours of the time last known well, and who had an order for a head CT or MRI scan. In 2014, when compared to patients treated in facilities with fewer than 50 beds (a proxy for facility size), patients treated in facilities with 51-100 beds (OR= 1.45, p<0.001), 101-250 beds (OR= 2.12, p<0.001), 251-500 beds (OR=1.81, p<0.001), and 500 or more beds (OR 1.143, p=0.007) were more likely to have a head CT or MRI scan interpreted within 45 minutes of ED arrival. Patients treated in a major teaching facility were less likely than those treated in a non-teaching facility to have a head CT or MRI scan interpreted within 45 minutes of ED arrival (OR= 0.62, p<0.001).

Logistic regression performed on data from July 2016 through December 31, 2018 showed a similar pattern, with patients treated in larger facilities, that is, facilities with 51-100 beds (OR=1.18, p=0.002), 101 to 250 beds (OR=1.35, p<0.001), 251-500 beds (OR=1.35, p<0.001) significantly more likely to have a head CT or MRI scan interpreted within 45 minutes of ED arrival than patients in facilities with 50 or fewer beds. Similar to 2014, patients treated in major teaching hospitals were less likely than those treated in a non-teaching facility to have a head CT or MRI scan interpreted within 45 minutes of ED arrival (OR=0.77, p=0.013).

While the current and previous logistic regression models identified subpopulations of patients and facilities for which there are statistically significant differences in the likelihood of a patient having a head CT or MRI scan interpreted within 45 minutes of ED arrival for patients with a principal diagnosis associated with acute ischemic or hemorrhagic stroke, who arrived at the ED within two hours of the time last known well, and who had an order for a head CT or MRI scan, these disparities do not indicate a need for adjustment of the measure specifications. Adjusting for these differences would mask underlying differences in quality of care. As this is a process measure, there should be no difference in the standard of care for these patients; we believe these statistically significant differences are driven by variation in provider practice. Consequently, we do not believe risk adjustment or stratification is necessary or appropriate for this measure.

1b.5. If no or limited data on disparities from the measure as specified is reported in 1b.4, then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations. Not necessary if performance data provided in 1b.4
Data on disparities from the measure as specified is reported in 1b.4, above.

2. Reliability and Validity—Scientific Acceptability of Measure Properties

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. *Measures must be judged to meet the sub criteria for both reliability and validity to pass this criterion and be evaluated against the remaining criteria.*

2a.1. Specifications The measure is well defined and precisely specified so it can be implemented consistently within and across organizations and allows for comparability. eMeasures should be specified in the Health Quality Measures Format (HQMF) and the Quality Data Model (QDM).

De.5. Subject/Topic Area *(check all the areas that apply):*
Neurology, Neurology : Stroke/Transient Ischemic Attack (TIA)

De.6. Non-Condition Specific*(check all the areas that apply):*

De.7. Target Population Category *(Check all the populations for which the measure is specified and tested if any):*
Elderly, Populations at Risk

S.1. Measure-specific Web Page *(Provide a URL link to a web page specific for this measure that contains current detailed*

specifications including code lists, risk model details, and supplemental materials. Do not enter a URL linking to a home page or to general information.)
https://www.qualitynet.org/inpatient/specifications-manuals#tab2

S.2a. **If this is an eMeasure**, HQMF specifications must be attached. Attach the zipped output from the eMeasure authoring tool (MAT) - if the MAT was not used, contact staff. (Use the specification fields in this online form for the plain-language description of the specifications)
This is not an eMeasure **Attachment:**

S.2b. **Data Dictionary, Code Table, or Value Sets** *(and risk model codes and coefficients when applicable) must be attached. (Excel or csv file in the suggested format preferred - if not, contact staff)*
Attachment **Attachment:** AppendixA_v12.0a_010119_0930190-637322249718280855-637322269179796180-637322273723562345.xlsx

S.2c. Is this an instrument-based measure (i.e., data collected via instruments, surveys, tools, questionnaires, scales, etc.)? Attach copy of instrument if available.
No, this is not an instrument-based measure **Attachment:**

S.2d. Is this an instrument-based measure (i.e., data collected via instruments, surveys, tools, questionnaires, scales, etc.)? Attach copy of instrument if available.
Not an instrument-based measure

S.3.1. **For maintenance of endorsement:** Are there changes to the specifications since the last updates/submission. If yes, update the specifications for S1-2 and S4-22 and explain reasons for the changes in S3.2.
Yes

S.3.2. **For maintenance of endorsement,** please briefly describe any important changes to the measure specifications since last measure update and explain the reasons.
NQF #0661 was granted time-limited endorsement in January 2011. The Consensus Standards Approval Committee (CSAC) removed the time-limited endorsement after reviewing testing results for NQF #0661 in April 2014, moving the measure to a fully endorsed status. Since 2011, the measure specifications have been updated to reflect clinical changes in appropriate stroke diagnosis or ED evaluation and management (E/M) codes; to address stakeholder feedback; or to harmonize with the Hospital Inpatient Quality Reporting (HIQR) program. In 2012, the measure algorithm was updated to reject cases with less than zero measurement values and to exclude outliers from being included in the data set. The Discharge Status data element was changed to Discharge Code. To facilitate abstraction, suggested data sources and a hierarchy of provider types were added for the Time Last Known Well, Date Last Known Well, and Last Known Well data elements.
In 2015, as part of the annual measure maintenance and review process, all ICD-9-CM diagnosis codes were updated to corresponding ICD-10-CM diagnosis codes. The data accuracy section of the Measure Information Form was updated with a disclaimer that there may be variation in the assignment of ICD-10-CM codes by provider, facility, and documentation protocol for the chart-abstracted data elements. The proposed updates were supported by independent reviews by the experts supporting the HIQR program, which has a related stroke measure (STK-4: Thrombolytic Therapy, NQF #0437).
The Notes for Abstraction for key data elements were updated to add examples and clarifying language to address stakeholder feedback and to better align with NQF #0437; affected data elements include: Arrival Time and Head CT or MRI Scan Interpretation Date.
Since endorsement in 2016, ICD-10-CM diagnosis codes have been updated and provided as a part of the annual measure maintenance process. The most recent annual update review occurred in October 2018.

S.4. **Numerator Statement** *(Brief, narrative description of the measure focus or what is being measured about the target population, i.e., cases from the target population with the target process, condition, event, or outcome) DO NOT include the rationale for the measure.*
IF an OUTCOME MEASURE, state the outcome being measured. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).
Emergency department (ED) acute ischemic stroke or hemorrhagic stroke patients arriving at the ED within 2 hours of the time last known well, with an order for a head CT or MRI scan whose time from ED arrival to interpretation of the Head CT scan is within 45

minutes of arrival.

S.5. Numerator Details *(All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b)*

IF an OUTCOME MEASURE, describe how the observed outcome is identified/counted. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).

The numerator is defined by six evaluation and management (E/M) codes and 102 ICD-10-CM diagnosis codes included in the code set for this measure; these detailed lists can be found in the Excel workbook provided for Section S2b.

The numerator includes patients age 18 or older who were last known well within two hours of ED arrival and had a head CT or MRI ordered and interpreted within 45 minutes of ED arrival. Numerator exceptions include:
- Date Last Known Well is equal to UTD
- Time Last Known Well is equal to UTD
- Arrival Time is equal to UTD
- Head CT Scan or MRI Interpretation Date is equal to UTD

S.6. Denominator Statement *(Brief, narrative description of the target population being measured)*

Emergency department acute ischemic stroke or hemorrhagic stroke patients arriving at the ED within two hours of the time last known well with an order for a head CT or MRI scan.

S.7. Denominator Details *(All information required to identify and calculate the target population/denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b.)*

IF an OUTCOME MEASURE, describe how the target population is identified. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).

The denominator is defined by six evaluation and management (E/M) codes and 104 ICD-10-CM diagnosis codes included in the code set for this measure; these detailed lists can be found in the Excel workbook provided for Section S2b.

The denominator includes patients age 18 or older who were last known well within two hours of ED arrival and had a head CT or MRI ordered.

S.8. Denominator Exclusions *(Brief narrative description of exclusions from the target population)*

Studies are excluded for any patients under 18 years of age, patients who expired in the ED, or patients who left the ED against medical advice or discontinued care.

S.9. Denominator Exclusion Details *(All information required to identify and calculate exclusions from the denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b.)*

Studies are excluded for any patients that meet any of the following criteria:
- Patients less than 18 years of age
- Patients who expired (discharge code = 6)
- Patients who left the emergency department against medical advice or discontinued care (discharge code = 7 or 8)

S.10. Stratification Information *(Provide all information required to stratify the measure results, if necessary, including the stratification variables, definitions, specific data collection items/responses, code/value sets, and the risk-model covariates and coefficients for the clinically-adjusted version of the measure when appropriate – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format with at S.2b.)*

Not applicable; this measure does not stratify its results.

S.11. Risk Adjustment Type (Select type. Provide specifications for risk stratification in measure testing attachment)

No risk adjustment or risk stratification

If other:

S.12. Type of score:

Rate/proportion
If other:

S.13. **Interpretation of Score** *(Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score)*
Better quality = Higher score

S.14. **Calculation Algorithm/Measure Logic** (*Diagram or describe the calculation of the measure score as an ordered sequence of steps including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; time period for data, aggregating data; risk adjustment; etc.)*
This measure calculates the percentage of acute ischemic stroke or hemorrhagic stroke patients who arrive at the ED within two hours of the onset of symptoms and have a head CT or MRI interpreted within 45 minutes of ED arrival. The measure is calculated based on four consecutive quarters of hospital outpatient claims data, as follows:
1. Check E/M Code; if on Table 1.0 (in the Excel workbook provided for Section S2b), proceed
2. Calculate Patient Age (Outpatient Encounter Date - Birthdate)
3. Check Patient Age; if >= 18, proceed
4. Check ICD-10-CM Principal Diagnosis Code; if on Table 8.0 (in the Excel workbook provided for Section S2b), proceed
5. Check Discharge Code; exclude any patients with code 6, 7, or 8
6. Check Head CT or MRI Scan Order; if "Yes," proceed
7. Check Last Known Well; if "Yes," proceed
8. Check Date Last Known Well; if a Non-Unable to Determine (UTD) value, proceed
9. Check Time Last Known Well; if a Non-UTD value, proceed
10. Check Arrival Time; if a Non-UTD value, proceed
11. Calculate measurement value (Arrival Time minus Time Last Known Well)
12. Check measurement value; if >= 0 min and <= 120 min, record as the denominator and proceed
13. Check Head CT or MRI Scan Interpretation Date; if a Non-Unable to Determine (UTD) value, proceed
14. Check Head CT or MRI Scan Interpretation Time; if a Non-Unable to Determine (UTD) value, proceed
15. Calculate measurement value (Arrival Time minus Head CT or MRI Scan Interpretation Time)
16. Check measurement value; if >= 0 min and <= 45 min, record as the numerator
17. Aggregate denominator and numerator counts by Medicare provider number
Measure = numerator counts / denominator counts [The value should be recorded as a percentage]

S.15. **Sampling** *(If measure is based on a sample, provide instructions for obtaining the sample and guidance on minimum sample size.)*
IF an instrument-based performance measure (e.g., PRO-PM), identify whether (and how) proxy responses are allowed.
Sampling is a process of selecting a representative part of a population in order to estimate the hospital's performance without collecting data for its entire population. Using a statistically valid sample, a hospital can measure its performance in an effective and efficient manner. Sampling is a particularly useful technique for performance measures that require primary data collection from a source such as the medical record. Sampling should not be used unless the hospital has a large number of cases in the outpatient population because a fairly large number of sample cases are needed to achieve a representative sample of the population. For the purpose of sampling outpatient department quality measures, the terms "sample," "effective sample," and "case" are defined below:
• The "sample" is the fraction of the population that is selected for further study.
• "Effective sample" refers to the part of the sample that makes it into the denominator of an outpatient measure set. This is defined as the sample for an outpatient measure set minus all the exclusions and contraindications for the outpatient measure set in the sample.
• A "case" refers to a single record (or an encounter) within the population. For example, during the first quarter a hospital may have 100 patients who had a principal diagnosis associated with the OP-1, 2, 3, 4, and 5 measures. The hospital's outpatient population would include 100 cases or 100 outpatient records for these measures during the first quarter.
To obtain statistically valid sample data, the sample size should be carefully determined, and the sample cases should be randomly selected in such a way that the individual cases in the population have an equal chance of being selected. Only when the sample data truly represent the whole population can the sample-based performance outpatient measure set data be meaningful and useful. Each hospital is ultimately responsible for adhering to the sampling requirements outlined in this manual.
As a general rule/policy of CMS, providers are encouraged to submit as many cases as possible up to the entire population of cases if

reasonably feasible. For example, if the raw data can be easily extracted from an existing electronic database or the abstraction burden is manageable, providers should consider submitting the entire population of cases that meet the initial selection criteria. Otherwise, a statistically valid sample can be selected.

S.16. **Survey/Patient-reported data** *(If measure is based on a survey or instrument, provide instructions for data collection and guidance on minimum response rate.)*
Specify calculation of response rates to be reported with performance measure results.
This measure does not use survey data.

S.17. **Data Source** *(Check ONLY the sources for which the measure is SPECIFIED AND TESTED).*
If other, please describe in S.18.
 Claims, Electronic Health Records, Paper Medical Records

S.18. **Data Source or Collection Instrument** *(Identify the specific data source/data collection instrument (e.g. name of database, clinical registry, collection instrument, etc., and describe how data are collected.)*
IF instrument-based, identify the specific instrument(s) and standard methods, modes, and languages of administration.
An electronic data collection tool is made available from vendors or facilities can download the free CMS Abstraction & Reporting Tool (CART). Paper tools for manual abstraction, which are posted on www.QualityNet.org, are also available for the CART tool. These tools are posted on www.QualityNet.org.

S.19. **Data Source or Collection Instrument** *(available at measure-specific Web page URL identified in S.1 OR in attached appendix at A.1)*
No data collection instrument provided

S.20. **Level of Analysis** *(Check ONLY the levels of analysis for which the measure is SPECIFIED AND TESTED)*
 Facility, Other

S.21. **Care Setting** *(Check ONLY the settings for which the measure is SPECIFIED AND TESTED)*
 Emergency Department and Services
If other:

S.22. **COMPOSITE Performance Measure** - Additional Specifications *(Use this section as needed for aggregation and weighting rules, or calculation of individual performance measures if not individually endorsed.)*
Not applicable; this is not a composite measure.

2. Validity – See attached Measure Testing Submission Form
NQF_0661_Measure_Testing_Form-637322249722187390-637322269180889987-637322273724656114.docx

2.1 For maintenance of endorsement
Reliability testing: If testing of reliability of the measure score was not presented in prior submission(s), has reliability testing of the measure score been conducted? If yes, please provide results in the Testing attachment. Please use the most current version of the testing attachment (v7.1). Include information on all testing conducted (prior testing as well as any new testing); use red font to indicate updated testing.
Yes

2.2 For maintenance of endorsement
Has additional empirical validity testing of the measure score been conducted? If yes, please provide results in the Testing attachment. Please use the most current version of the testing attachment (v7.1). Include information on all testing conducted (prior testing as well as any new testing); use red font to indicate updated testing.
Yes

2.3 For maintenance of endorsement
Risk adjustment: For outcome, resource use, cost, and some process measures, risk-adjustment that includes social risk factors is not prohibited at present. Please update sections 1.8, 2a2, 2b1,2b4.3 and 2b5 in the Testing attachment and S.140 and S.11 in the online submission form. NOTE: These sections must be updated even if social risk factors are not included in the risk-adjustment strategy.

You MUST use the most current version of the Testing Attachment (v7.1) -- older versions of the form will not have all required questions.

No - This measure is not risk-adjusted

3. Feasibility

Extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

3a. Byproduct of Care Processes

For clinical measures, the required data elements are routinely generated and used during care delivery (e.g., blood pressure, lab test, diagnosis, medication order).

3a.1. Data Elements Generated as Byproduct of Care Processes.
Generated or collected by and used by healthcare personnel during the provision of care (e.g., blood pressure, lab value, diagnosis, depression score)
If other:

3b. Electronic Sources

The required data elements are available in electronic health records or other electronic sources. If the required data are not in electronic health records or existing electronic sources, a credible, near-term path to electronic collection is specified.

3b.1. To what extent are the specified data elements available electronically in defined fields (*i.e., data elements that are needed to compute the performance measure score are in defined, computer-readable fields*) Update this field for **maintenance of endorsement**.
Some data elements are in defined fields in electronic sources

3b.2. If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources. For **maintenance of endorsement**, if this measure is not an eMeasure (eCQM), please describe any efforts to develop an eMeasure (eCQM).
NQF #0661 shares key data elements with NQF #0437: Thrombolytic Therapy, which is currently an electronic clinical quality measure (eCQM). The potential for e-specification will require special attention for the Last Known Well, Date Last Known Well, Time Last Known Well, Head CT or MRI Scan Interpretation Date, and Head CT or MRI Scan Interpretation Time data elements since these currently rely on logic and inferences that abstractors have been trained to interpret. In particular, the head CT or MRI interpretation data elements, which are not part of the algorithm for NQF #0437, are not readily available in structured fields. Abstractors often rely on the radiology images or medical notes to determine the appropriate interpretation time. Additionally, electronic timestamps may not reflect the earliest interpretation time as required by the current specifications. The stroke and acute myocardial infarction expert work group (EWG) considers NQF #0661 to be wholly feasible as it is currently specified, but considers e-specification to be moderately feasible. They concur that the key data elements for NQF #0661 are not readily available in a structured format within an electronic health record (EHR). In particular, EHR systems may need a new structured field for Date Last Known Well and Time Last Known Well, which is not perceived to be a standard feature for most systems at this time.
Based on EWG feedback, EHRs will need to be compatible with RIS PACS (radiology information system and picture archiving and capture) data. If Date Last Known Well and Time Last Known Well cannot be translated into structured fields, then the data elements must be manually chart abstracted.

3b.3. If this is an eMeasure, provide a summary of the feasibility assessment in an attached file or make available at a measure-specific URL. Please also complete and attach the NQF Feasibility Score Card.
Attachment:

3c. Data Collection Strategy

Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, costs associated with fees/licensing of proprietary measures) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use). For eMeasures, a feasibility assessment addresses the data elements and measure logic and demonstrates the eMeasure can be implemented or feasibility concerns can be adequately addressed.

3c.1. <u>Required for maintenance of endorsement.</u> **Describe difficulties (as a result of testing and/or operational use of the measure) regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.**

<u>IF instrument-based,</u> **consider implications for both individuals providing data (patients, service recipients, respondents) and those whose performance is being measured.**

NQF 0661 was added to the Hospital OQR Program in November 2014 via the Outpatient Prospective Payment System (OPPS) rule for calendar year 2015 (79 FR 66769). Since that time, CMS has not received feedback from stakeholders suggesting difficulty with data collection for the measure, nor its feasibility or usability.

In fall 2015, we conducted an online survey of five members of the stroke and acute myocardial infarction (AMI) EWG with expertise in cardiology, neuro-radiology, emergency medicine, and emergency nursing to assess the face validity, feasibility, use, and usability of NQF #0661. All participants agreed or strongly agreed that patients who have a head CT or MRI scan ordered and interpreted within 45 minutes of ED arrival can be accurately identified using chart-abstracted data. Additionally, 80% of participants agreed that practical aspects of reporting this chart-abstracted measure do not place undue burden on facilities that collect the data. Unstructured feedback from the EWG obtained in summer 2019 is consistent with the 2015 survey.

3c.2. **Describe any fees, licensing, or other requirements to use any aspect of the measure as specified** *(e.g., value/code set, risk model, programming code, algorithm).*

No fees, licensure, or other requirements are necessary to use this measure; however, CPT codes, descriptions, and other data are copyright 2015 American Medical Association. All rights reserved. CPT is a registered trademark of the American Medical Association. Applicable FARS\DFARS Restrictions Apply to Government Use. Fee schedules, relative value units, conversion factors, and/or related components are not assigned by the AMA, are not part of CPT, and the AMA is not recommending their use. The AMA does not directly or indirectly practice medicine or dispense medical services. The AMA assumes no liability for data contained or not contained herein.

4. Usability and Use

Extent to which potential audiences (e.g., consumers, purchasers, providers, policy makers) are using or could use performance results for both accountability and performance improvement to achieve the goal of high-quality, efficient healthcare for individuals or populations.

4a. Accountability and Transparency

Performance results are used in at least one accountability application within three years after initial endorsement and are publicly reported within six years after initial endorsement (or the data on performance results are available). If not in use at the time of initial endorsement, then a credible plan for implementation within the specified timeframes is provided.

4.1. Current <u>and</u> Planned Use

NQF-endorsed measures are expected to be used in at least one accountability application within 3 years and publicly reported within 6 years of initial endorsement in addition to performance improvement.

Specific Plan for Use	Current Use (for current use provide URL)

4a1.1 For each CURRENT use, checked above (update for <u>maintenance of endorsement</u>), provide:
- Name of program and sponsor
- Purpose
- Geographic area and number and percentage of accountable entities and patients included
- Level of measurement and setting

Public Reporting:

Name of program and sponsor: The CMS Hospital OQR Program

Purpose: The Hospital OQR Program is a pay for quality data reporting program implemented by CMS for outpatient hospital services. In addition to providing hospitals with a financial incentive to report their quality of care measure data, the Hospital OQR Program provides CMS with data to help Medicare beneficiaries make more informed decisions about their health care. Hospital quality of care information gathered through the Hospital OQR Program is publicly available on the Hospital Compare website.

Accountable entities and patients: The publicly reported values (on Hospital Compare) are calculated for all facilities participating in the Hospital OQR Program in the United States that meet minimum case count requirements. During the July 2017 through June 2018 data collection period, 1550 facilities met the minimum case count. Facilities eligible to report this measure are subject to the Outpatient Prospective Payment System (OPPS) guidelines.

Quality Improvement with Benchmarking (external benchmarking to multiple organizations):

Name of program and sponsor: The CMS Hospital OQR Program

Purpose: The Hospital OQR Program is a pay for quality data reporting program implemented by CMS for outpatient hospital services. In addition to providing hospitals with a financial incentive to report their quality of care measure data, the data is publicly reported on the Hospital Compare Website. The data reported on Hospital Compare not only shows the hospital's score on the measure, but also provides state and national averages for the measure. This enables consumers to compare the hospital's performance to other facilities and determine if the facility is an outlier.

Accountable entities and patients: The publicly reported values (on Hospital Compare) are calculated for all facilities in the United States that meet minimum case count requirements. During the October 2012 through September 2013 data collection periods, 918 facilities met the minimum case count. During the October 2013 through September 2014 data collection period, 959 facilities met the minimum case count. Facilities eligible to report this measure are subject to the OPPS guidelines.

4a1.2. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing) what are the reasons? (*e.g., Do policies or actions of the developer/steward or accountable entities restrict access to performance results or impede implementation?*)
This measure is publicly reported.

4a1.3. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes -- any accountability application within 3 years and publicly reported within 6 years of initial endorsement. (*Credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.*)
This measure is publicly reported.

4a2.1.1. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation.
How many and which types of measured entities and/or others were included? If only a sample of measured entities were included, describe the full population and how the sample was selected.
As a part of the Hospital OQR Program, performance data is provided quarterly to facilities in their preview reports, which are distributed to hospitals via their QualityNet secure inboxes, and are available to the public through the CMS Hospital Compare website. The preview report contains a summary of the facility's score on a number of metrics, including NQF 0661. All facilities eligible to report NQF 0661 receive a preview report and FSR each quarter, regardless of whether they have sufficient cases to publicly report NQF 0661. Technical assistance is provided through help desk support (RightNow Q&A Tool) and Hospital OQR Program webinars. Frequently asked questions are monitored and used to determine whether updates or additional guidance is needed for facilities.

4a2.1.2. Describe the process(es) involved, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.
As a part of the Hospital OQR Program, performance data is provided quarterly to facilities in their preview reports, which are distributed to hospitals via their QualityNet secure inboxes, and are available to the public through the CMS Hospital Compare website. The preview report contains a summary of the facility's score on a number of metrics, including NQF 0661. All facilities eligible to report NQF 0661 receive a preview report and FSR each quarter, regardless of whether they have sufficient cases to publicly report NQF 0661. On Hospital Compare the performance data is located under Timely and Effective Care – ED Throughput. To assist users with understanding the data on Hospital Compare, CMS shares details on the data collection period of what is currently displayed (10/1/2017–9/30/2018) and user-friendly language describing the measure title ("Percentage of patients who came to the emergency department with stroke symptoms who received brain scan results within 45 minutes of arrival").

4a2.2.1. Summarize the feedback on measure performance and implementation from the measured entities and others described in 4d.1.
Describe how feedback was obtained.

Feedback received from stakeholders (via the RightNow Q&A tool) is used to revise the measure specifications. Following receipt of a suggestion to adjust the specifications, a literature review is performed to determine if the proposed change aligns with the empirical evidence base for the measure; feedback from the expert work group is obtained to evaluate the change to the specifications. To date, we have received no significant concerns raised by stakeholders about the measure specifications through the RightNow Q&A tool.

In addition, stakeholders may submit comments on the measure through the Outpatient Prospective Payment System (OPPS) annual rule-making process. No comments were received for this measure during the Calendar Year (CY) 2016 -2019 OPPS rule-making cycles.

4a2.2.2. **Summarize the feedback obtained from those being measured.**
To date, we have received no significant feedback about the measure specifications.

4a2.2.3. **Summarize the feedback obtained from other users**
To date, we have received no significant feedback about the measure specifications.

4a2.3. **Describe how the feedback described in 4a2.2.1 has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not.**
To date, we have received no significant feedback about the measure specifications.

Improvement
Progress toward achieving the goal of high-quality, efficient healthcare for individuals or populations is demonstrated. If not in use for performance improvement at the time of initial endorsement, then a credible rationale describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

4b1. **Refer to data provided in 1b but do not repeat here. Discuss any progress on improvement (trends in performance results, number and percentage of people receiving high-quality healthcare; Geographic area and number and percentage of accountable entities and patients included.)**
If no improvement was demonstrated, what are the reasons? If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.
Summary statistics of performance scores during the October 2012 through September 2013 and July 2017 through June 2018 data collection periods are provided in Section 1b.2.
The median rate of head CT or MRI scans interpreted within 45 minutes of ED arrival, given that the patient had a principal diagnosis associated with acute ischemic or hemorrhagic stroke, arrived at the ED within two hours of the time last known well, and had an order for a head CT or MRI scan has increased 27percentage points (from 62.0% to 79.0%) between 2012 and 2018. Nine hundred eighteen facilities met minimum case counts during the October 2012 through September 2013 data collection periods, and 1550 facilities met minimum case counts during the July 2017 through June 2018 data collection period. During the October 2012 through September 2013 data collection period, there were 16,817 sampled cases where a patient had a principal diagnosis associated with acute ischemic or hemorrhagic stroke, who arrived at the ED within two hours of the time last known well, and who had an order for a head CT or MRI scan. Of those patients, 10,026 had a head CT or MRI scan interpreted within 45 minutes of ED arrival (59.6%). During the July 2017 through June 2018 data collection period, 31,939 patients had a principal diagnosis associated with acute ischemic or hemorrhagic stroke, who arrived at the ED within two hours of the time last known well, and who had an order for a head CT or MRI scan. Of those patients, 23,955 had a head CT or MRI scan interpreted within 45 minutes of ED arrival (75.0%). These cases reflect only a subset of the patients eligible for the measure. Dependent upon the facility's total case count, the facility may report all cases or a sample of cases; thus, the number of patients receiving high-quality healthcare as performance on the measure improves is larger than the number of cases captured by the measure.

4b2. Unintended Consequences
   The benefits of the performance measure in facilitating progress toward achieving high-quality, efficient healthcare for individuals or populations outweigh evidence of unintended negative consequences to individuals or populations (if such evidence exists).

4b2.1. **Please explain any unexpected findings (positive or negative) during implementation of this measure including unintended impacts on patients.**
We did not identify any unintended consequences during measure testing. Similarly, no evidence of unintended consequences to

individuals or populations has been reported by external stakeholders since its implementation. We will continue to monitor the potential for unintended consequences through an annual review of the literature as well as an ongoing review of stakeholder comments and inquiries.The risk in advancing measures that address timeliness is that there may be a decrease in testing performance to avoid measurement, however this is not likely due to the need to assess diagnostic results to ensure a proper diagnosis.

4b2.2. **Please explain any unexpected benefits from implementation of this measure.**
We did not identify any unintended consequences from implementing this measure.

5. Comparison to Related or Competing Measures

If a measure meets the above criteria <u>and</u> there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure.

5. Relation to Other NQF-endorsed Measures
Are there related measures (conceptually, either same measure focus or target population) or competing measures (conceptually both the same measure focus and same target population)? If yes, list the NQF # and title of all related and/or competing measures.
Yes

5.1a. **List of related or competing measures (selected from NQF-endorsed measures)**
0437 : STK 04: Thrombolytic Therapy

5.1b. **If related or competing measures are not NQF endorsed please indicate measure title and steward.**
Diagnosis and treatment of ischemic stroke: percentage of patients with stroke symptoms who undergo a CT scan within 25 minutes of arrival in the emergency department - Institute for Clinical Systems Improvement (ICSI).

5a. **Harmonization of Related Measures**
The measure specifications are harmonized with related measures;
OR
The differences in specifications are justified

5a.1. **If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s):**
Are the measure specifications harmonized to the extent possible?
Yes

5a.2. **If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.**
Although NQF #0437 (used in the Hospital Inpatient Quality Reporting [HIQR] Program) is similar to NQF #0661 (Hospital OQR), the two measures serve different target populations and purposes: the Hospital OQR measure focuses on imaging in the ED setting, while the HIQR measure focuses on administration of thrombolytic therapy in an inpatient setting. Both measures do, however, share a number of key data elements (i.e., Last Known Well, Date Last Known Well, Time Last Known Well, and Arrival Time). The specifications for the two measures are generally aligned, where possible. As appropriate, the measure maintenance team for the Hospital OQR measure (NQF #0661) incorporates specification updates added by the measure maintenance team for the HIQR measure (NQF #0437) to maintain harmonization (e.g., updates to the appropriate ICD-10 codes to determine measure inclusion). The measure-maintenance teams for both reporting programs meet periodically to resolve any inconsistencies in the interpretation or guidance provided for the shared data elements. While the ICSI measure is related to NQF #0661, it focuses on head CT completion, which is an intermediate step for head CT interpretation (NQF #0661). NQF #0661 includes an additional imaging modality—MRI interpretation. Details about the measure algorithm, data elements, and measure specifications for the ICSI measure are not readily available to compare.

5b. Competing Measures
The measure is superior to competing measures (e.g., is a more valid or efficient way to measure);
OR

Multiple measures are justified.

5b.1. If this measure conceptually addresses both the same measure focus and the same target population as NQF-endorsed measure(s):
Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible.)
We did not identify any competing measures that address both the same measure focus and target population as NQF #0661.

Appendix

A.1 Supplemental materials may be provided in an appendix. All supplemental materials (such as data collection instrument or methodology reports) should be organized in one file with a table of contents or bookmarks. If material pertains to a specific submission form number, that should be indicated. Requested information should be provided in the submission form and required attachments. There is no guarantee that supplemental materials will be reviewed.
No appendix **Attachment:**

Contact Information

Co.1 Measure Steward (Intellectual Property Owner): Centers for Medicare & Medicaid Services
Co.2 Point of Contact: Helen, Dollar-Maples, Helen.Dollar-Maples@cms.hhs.gov, 410-786-7214-
Co.3 Measure Developer if different from Measure Steward: Mathematica
Co.4 Point of Contact: Robert, Dickerson, RDickerson@mathematica-mpr.com, 312-585-3345-

Additional Information

Ad.1 Workgroup/Expert Panel involved in measure development
Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.
The contractor has convened an expert workgroup (EWG), which evaluates and provides feedback on measure-development and maintenance efforts for a set of six stroke and AMI measures. Specifically, the EWG provides direction and feedback through all phases of project activities, including expansion of the measures to additional CMS quality reporting programs, updates to the current specifications of these six measures, review of quantitative testing results, feedback on qualitative testing questions (i.e., results of EWG member questionnaires), and support for endorsement of the measures by the National Quality Forum (NQF).
The following is a list of the contractor's EWG members:
Kenneth Bricker, DO
EWG 2019; Minneapolis VA Medical Center
Joseph P. Drozda, Jr., MD
TEP 2010; Mercy Health, Rep. of American College of Cardiology; Director of Outcomes Research
T. Bruce Ferguson, Jr., MD, FACC
TEP 2010; Brody School of Medicine at ECU, Dept. of Cardiovascular Sciences, Professor of Surgery and Physiology
Joseph V. Messer, MD, MACC
TEP 2010; Rush University Medical Center, Rep. of American Medical Association, Professor of Medicine
Cathy Olson, MSN, RN
EWG 2019; Emergency Nurses Association (ENA), Institute for Quality, Safety, and Injury Prevention, Director
David Seidenwurm, MD
EWG 2019; American Society of Neuroradiology (ASNR); American College of Radiologists (ACR)
Stephen Traub, MD
TEP 2010; Mayo Clinic, Department of Emergency Medicine, Chair
Paul D. Varosy, MD, FACC, FAHA, FHRS
TEP 2010; VA Eastern Colorado Health Care System, Director of Cardiac Electrophysiology

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.2 Year the measure was first released: 2012
Ad.3 Month and Year of most recent revision: 01, 2019

Ad.4 What is your frequency for review/update of this measure? Annually
Ad.5 When is the next scheduled review/update for this measure? 08, 2019

Ad.6 Copyright statement: This measure does not have a copyright.
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This performance measure is not a clinical guideline and does not establish a standard of medical care, and has not been tested for all potential applications. The measure and specifications are provided without warranty.

Ad.8 Additional Information/Comments: