Hospital Outpatient Quality Measure
Stroke

Measure ID #	Measure Short Name
OP-23	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

OP Stroke General Data Element List

General Data Element Name	Collected For:
Arrival Time	All Records
Birthdate	All Records
CMS Certification Number ‡, †	All Records
First Name	All Records
Hispanic Ethnicity	All Records
Last Name	All Records
National Provider Identifier ‡, †	Optional for All Records
Outpatient Encounter Date	All Records
Patient Identifier	All Records
Payment Source	All Records
Physician 1	Optional for All Records
Physician 2	Optional for All Records
Postal Code	All Records
Race	All Records
Sex	All Records

‡Transmission Data Element.
†Defined in the Transmission Data Element List within the Hospital Outpatient Measure Data Transmission section of this manual.

OP Stroke Specific Data Element List

OP Stroke Data Element Name	Collected For:
Arrival Time	OP-23
Discharge Code	OP-23
E/M Code	OP-23
Date Last Known Well	OP-23
ICD-10-CM Principal Diagnosis Code	OP-23
Head CT Scan or MRI Order	OP-23
Head CT Scan or MRI Interpretation Date	OP-23
Head CT Scan or MRI Interpretation Time	OP-23
Last Known Well	OP-23
Time Last Known Well	OP-23

OP-23 Hospital Outpatient Emergency Department Stroke Population

Stroke

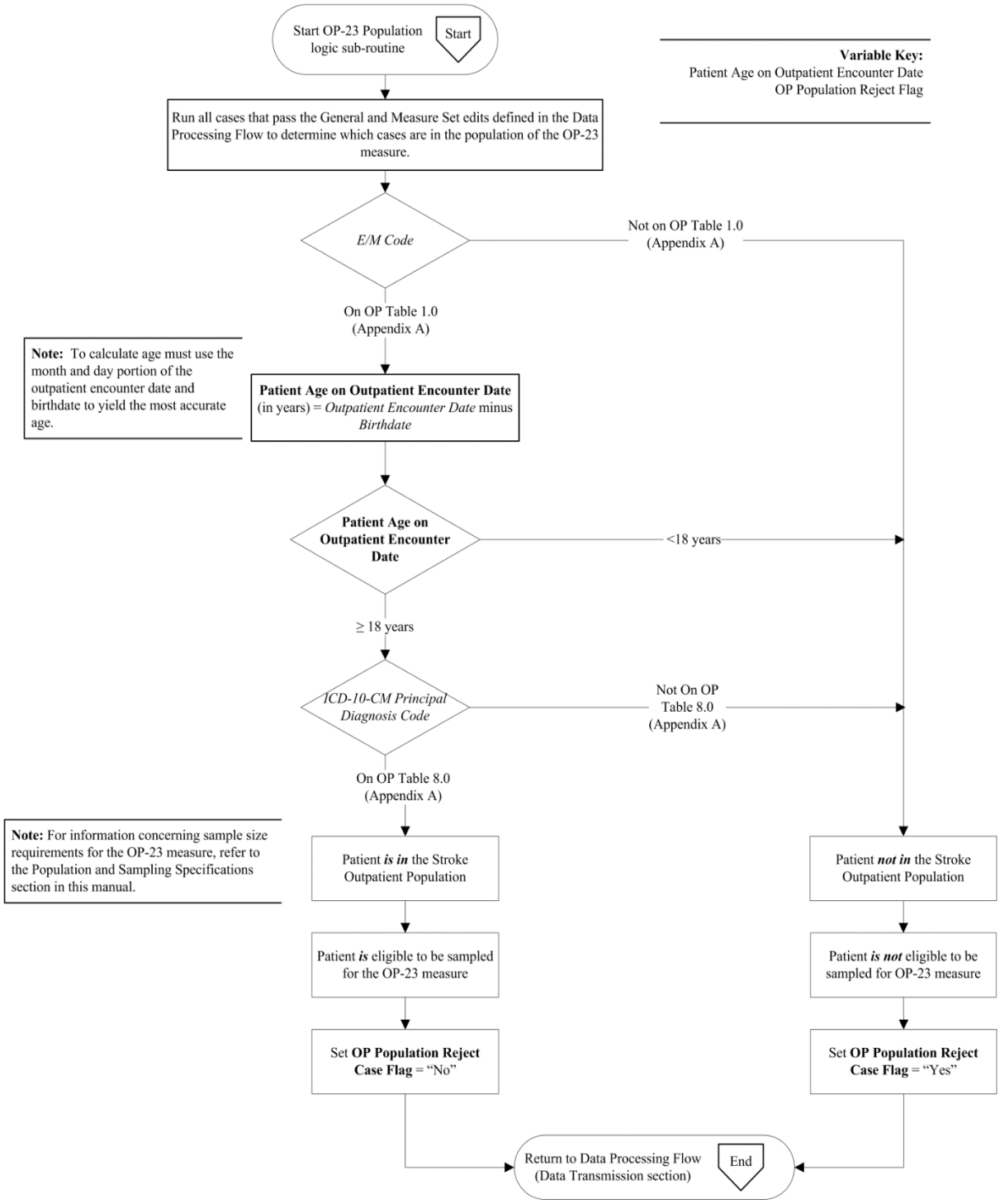
The population of the OP-23 ED Stroke measure is identified using 4 data elements:

- *E/M Code*
- *Outpatient Encounter Date*
- *Birthdate*
- *ICD-10-CM Principal Diagnosis Code*

Patients seen in a Hospital Emergency Department (E/M Code in Appendix A, OP Table 1.0) are included in the OP-23 ED Stroke Hospital Outpatient Population and are eligible to be sampled if they have:

- A patient age on *Outpatient Encounter Date* (*Outpatient Encounter Date – Birthdate*) ≥ 18 years, and
- An *ICD-10-CM Principal Diagnosis Code* for Acute Ischemic or Hemorrhagic Stroke as defined in Appendix A, OP Table 8.0

Stroke Hospital Outpatient Population Algorithm
OP-23



Algorithm Narrative for OP-23:
Stroke Hospital Outpatient Population

1. Start Stroke Initial Patient Population logic sub-routine. Process all cases that have successfully reached the point in the Transmission Data Processing Flow: Clinical which calls this Initial Patient Population Algorithm. Do not process cases that have been rejected before this point in the Transmission Data Processing Flow.

2. Check *E/M Code*
   a. If *E/M Code* is not in Appendix A, OP Table 1.0, patient is not in the Outpatient Stroke Population. Patient is not eligible to be sampled for the OP-23 measure. Set the OP Population Reject Case Flag to Yes. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If *E/M Code* is in Appendix A, OP Table 1.0, continue processing and proceed to Measurement Value.

3. Calculate Measurement Value. Measurement Value, in years, is equal to the *Outpatient Encounter Date* minus *Birthdate*

4. Check Measurement Value
   a. If the Measurement Value is less than 18 years, patient is not in the Outpatient Stroke Population. Patient is not eligible to be sampled for the OP-23 measure. Set the OP Population Reject Case Flag to Yes. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If the Measurement Value is greater than or equal to 18 years, continue processing, and the case will proceed to *ICD-10-CM Principal Diagnosis Code*.

5. Check *ICD-10-CM Principal Diagnosis Code*
   a. If the *ICD-10-CM Principal Diagnosis Code* is on Table 8.0, patient is in the Outpatient Stroke Population. Patient is eligible to be sampled for the OP-23 measure. Set the OP Population Reject Case Flag to No. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If the *ICD-10-CM Principal Diagnosis Code* is not on Table 8.0, patient is not in the Outpatient Stroke Population. Patient is not eligible to be sampled for the OP-23 measure. Set the OP Population Reject Case Flag to Yes. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.

NQF-Endorsed Voluntary Consensus Standards for Hospital Care
Measure Information Form

Performance Measure Name: 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

Measure ID #: OP-23

Measure Set: Hospital Outpatient Stroke

Outpatient Setting: Emergency Department

Description: Emergency Department Acute Ischemic Stroke or Hemorrhagic Stroke patients who arrive at the ED within 2 hours of the onset of symptoms who have a head CT or MRI scan performed during the stay and having a time from ED arrival to interpretation of the Head CT or MRI scan within 45 minutes of arrival.

Rationale: The Centers for Disease Control and Prevention (CDC) estimates that nearly 800,000 people experience a stroke in the United States each year; approximately 140,000 deaths annually are related to stroke (Yang et al., 2017). The American Health Association (AHA) and American Stroke Association (ASA) recommend performing emergency imaging of the brain before initiating any specific treatment for acute stroke; for most patients, a non-enhanced brain imaging scan, such as a computed tomography (CT) scan or magnetic resonance imaging (MRI), provides sufficient information to make care decisions (Powers et al., 2018; Jauch et al. 2013). Timely 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 treatment needs for these patients (Powers et al. 2018). AHA/ASA guidelines recommend that brain imaging be interpreted by a qualified provider within 45 minutes of ED arrival because results from these studies are critical to differentiate ischemic strokes, hemorrhagic strokes, and stroke mimics; imaging findings can be used 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 for use within three hours of symptom onset, prompt imaging can accelerate administration of the time-sensitive therapy for eligible patients (Cheng et al. 2015).

Because of the therapeutic window for selecting a stroke treatment, timely completion and interpretation of the CT or MRI scan are imperative; playing a role in evaluating the quality of care a patient receives (Kamal, 2017). Decreasing radiology report turnaround times can improve care team coordination, impact ED length of stay, and reduce the time needed for providers to initiate potentially life-saving interventions for stroke patients (Handel, 2011).

Type of Measure: Process

Improvement Noted As: An increase in the rate.

Numerator Statement: Emergency Department 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.

Included Populations: Not Applicable

Excluded Populations: None

Data Elements:
- *Arrival Time*
- *Head CT or MRI Scan Interpretation Date*
- *Head CT or MRI Scan Interpretation Time*
- *Outpatient Encounter Date*

Denominator Statement: Emergency Department 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.

Included Populations:
- Patients with an *ICD-10-CM Principal Diagnosis Code* for acute ischemic stroke, or hemorrhagic stroke as defined in Appendix A, OP Table 8.0; and
- Patients who had a *Head CT or MRI Scan Order*; and
- An *E/M Code* for emergency department encounter as defined in Appendix A, OP Table 1.0.

Excluded Populations:
- Patients less than 18 years of age.
- Patients who expired.
- Patients who left the emergency department against medical advice, discontinued care, or for whom *Discharge Code* is not documented or unable to be determined (UTD).

Data Elements:
- *Birthdate*
- *Date Last Known Well*
- *Discharge Code*
- *E/M Code*
- *Head CT or MRI Scan Order*
- *ICD-10-CM Principal Diagnosis Code*
- *Last Known Well*
- *Time Last Known Well*

Risk Adjustment: No

Data Collection Approach: Retrospective data sources for required data elements include administrative data and medical record documents. Some hospitals may prefer to gather data concurrently by identifying patients in the population of interest. This approach provides opportunities for improvement at the point of care/service. However, complete documentation includes the principal or other ICD-10-CM diagnosis and procedure codes, which require retrospective data entry.

Data Accuracy: Variation may exist in the assignment of ICD-10-CM codes; therefore, coding practices may require evaluation to ensure consistency. There may be additional variation by provider, facility, and documentation protocol for chart-abstracted data elements.

Measure Analysis Suggestions: None

Sampling: Yes; for additional information see the Population and Sampling Specifications section.

Data Reported As: Aggregate rate generated from count data reported as a proportion.

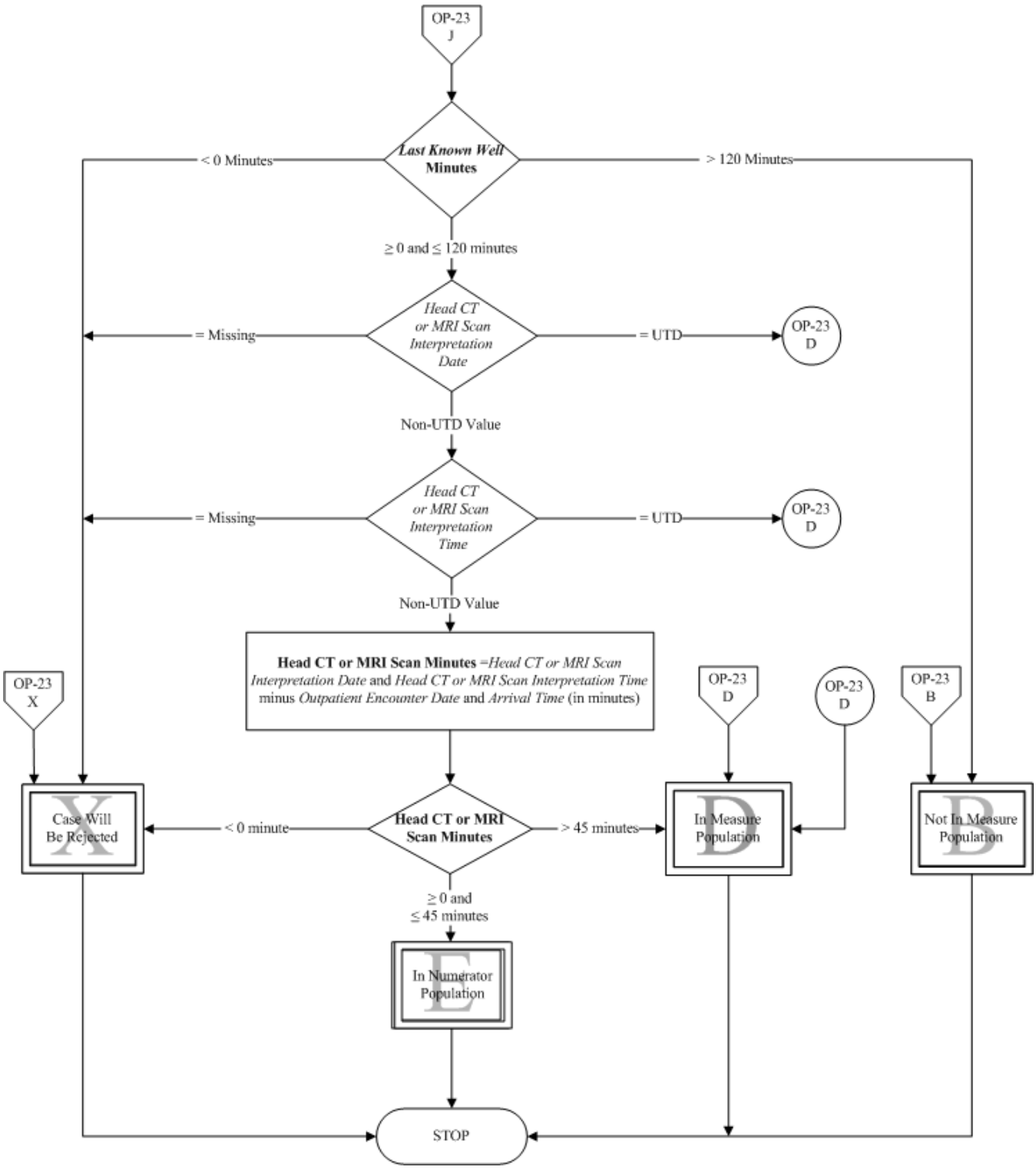
Suggested References:

- 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.
- Jauch E.C., Saver J.L., Adams H.P. Jr, Bruno A., Connors J.J., Demaerschalk B.M., 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. (2013). 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, 44(3), 870-947
- Handel, D., Epstein, S., Khare, R., Abernethy, D., Klauer, K., Pilgrim, R., Soremekun, O. and O. Sayan. (2011). Interventions to Improve the Timeliness of Emergency Care. Academic Emergency Medicine, 18:1295-302.
- Kamal, N., S. Sheng, Y. Xian, R. Matsouaka, M. D. Hill, D. L. Bhatt, J. L. Saver, M. J. Reeves, G. C. Fonarow, L. H. Schwamm and E. E. Smith. (2017). Delays in Door-to-Needle Times and Their Impact on Treatment Time and Outcomes in Get With The Guidelines-Stroke. Stroke, 48(4), 946-954.
- Powers, W.J., Rabinstein, A.A., Ackerson, T., Adeoye, O. M., et al. (2018). American Heart Association/American Stroke Association.
- Powers, W. J., C. P. Derdeyn, J. Biller, C. S. Coffey, B. L. Hoh, E. C. Jauch, K. C. Johnston, S. C. Johnston, A. A. Khalessi, C. S. Kidwell, J. F. Meschia, B. Ovbiagele, and D. R. Yavagal. (2015). American Heart Association/American Stroke Association Focused Update of the 2013 Guidelines for the Early Management of Patients with Acute Ischemic Stroke Regarding Endovascular Treatment.

OP-23: 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

Numerator: Emergency Department 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.

Denominator: Emergency Department 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.



Algorithm Narrative for OP-23:
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

Numerator Statement: Emergency Department Acute Ischemic Stroke or Hemorrhagic Stroke patients who arrive at the ED within 2 hours of the onset of symptoms who have a head CT or MRI scan performed during the stay and having a time from ED arrival to interpretation of the Head CT or MRI scan within 45 minutes of arrival.

Denominator Statement: Emergency Department 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.

1. Start processing. Run cases that are included in the Stroke Hospital Outpatient Population and pass the edits defined in the Data Processing Flow through this measure.

2. Check *Discharge Code*.
   a. If *Discharge Code* is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If *Discharge Code* equals 6, 7, or 8, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   c. If *Discharge Code* equals 1, 2, 3, 4a, 4b, 4c, 4d, or 5, continue processing and proceed to *Head CT or MRI Scan Order*.

3. Check *Head CT or MRI Scan Order*.
   a. If *Head CT or MRI Scan Order* is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If *Head CT or MRI Scan Order* equals No, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   c. If *Head CT or MRI Scan Order* equals Yes, continue processing and proceed to *Last Known Well*.

4. Check *Last Known Well*.
   a. If *Last Known Well* is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If *Last Known Well* equals No, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   c. If *Last Known Well* equals Yes, continue processing and proceed to *Date Last Known Well*.

5. Check *Date Last Known Well*.
   a. If *Date Last Known Well* is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.

b. If *Date Last Known Well* equals UTD, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
c. If *Date Last Known Well* equals a Non-UTD Value, continue processing and proceed to *Time Last Known Well.*

6. Check *Time Last Known Well*.
   a. If *Time Last Known Well* is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If *Time Last Known Well* equals UTD, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   c. If *Time Last Known Well* equals a Non-UTD Value, continue processing and proceed to *Arrival Time*.

7. Check *Arrival Time*.
   a. If *Arrival Time* equals UTD, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If *Arrival Time* equals a Non-UTD Value, continue processing and proceed to Measurement Value.

8. Calculate Measurement Value. Measurement Value, in minutes, is equal to the *Outpatient Encounter Date* and *Arrival Time* minus *Date Last Known Well* and *Time Last Known Well*.

9. Check *Measurement Value*.
   a. If the Measurement Value is greater than 120 minutes, the case will proceed to a Measurement Category Assignment of B and will not be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
   b. If the Measurement Value is greater than or equal to zero and less than or equal to 120 minutes, continue processing and proceed to *Head CT or MRI Scan Interpretation Date*.
   c. If the Measurement Value is less than zero minutes, the case will proceed to a Measurement Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.

10. Check *Head CT or MRI Scan Interpretation Date*.
    a. If *Head CT or MRI Scan Interpretation Date* is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
    b. If *Head CT or MRI Scan Interpretation Date* equals UTD, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
    c. If *Head CT or MRI Scan Interpretation Date* equals a Non-UTD Value, continue processing and proceed to *Head CT or MRI Scan Interpretation Time*.

11. Check *Head CT or MRI Scan Interpretation Time.*
    a. If *Head CT or MRI Scan Interpretation Time* is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
    b. If *Head CT Scan Interpretation Time* equals UTD, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
    c. If *Head CT Scan Interpretation Time* equals a Non-UTD Value, continue processing and proceed to Measurement Value.

12. Calculate *Measurement Value.*
    a. *Measurement Value*, in minutes, is equal to the *Head CT or MRI Scan Interpretation Date* and *Head CT or MRI Scan Interpretation Time* minus *Outpatient Encounter Date* and *Arrival Time*.

13. Check *Measurement Value.*
    a. If the Measurement Value is greater than 45 minutes, the case will proceed to a Measurement Category Assignment of D and will be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
    b. If the Measurement Value is greater than or equal to zero and less than or equal to 45 minutes, the case will proceed to a Measure Category Assignment of E and will be in the Measure Population. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.
    c. If the Measurement Value is less than zero minutes, the case will proceed to a Measure Category Assignment of X and will be rejected. Return to Transmission Data Processing Flow: Clinical in the Data Transmission section.

