

GWTG-Stroke ICH Measure Descriptions

Updated January 2022

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Note: These measures are based on the 2018 AHA/ASA Clinical Performance Measures for Adults Hospitalized With Intracerebral Hemorrhage. Some relatively minor changes from the published measures were required to operationalize them within GWTG-Stroke.

1. Baseline Severity Score

Percentage of patients with intracerebral hemorrhage in whom a baseline severity score is measured and a total score recorded as part of initial evaluation on arrival at the hospital

Initial Patient Population

Include:

All patients 18 years of age and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

All patients in the initial patient population

Data Elements for Calculation

Same as Initial Patient Population

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Arrival date/time date/time is missing or unknown or not in MM/DD/YYYY HH:MM format
- Initial ICH score date/time is earlier than arrival date/time
- Intracranial procedure was performed but procedure date/time is missing, unknown, not in MM/DD/YYYY HH:MM format or earlier than arrival time
- Patients who arrive at the hospital more than 48 hours after last known well time
- Length of stay > 120 days
- Clear documentation for comfort care/palliative care measures established before hospital arrival

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital
OR

Not Admitted Yes, Not Admitted
OR

Arrival Date/Time Missing, unknown or not in MM/DD/YYYY HH:MM format
OR

(Initial ICH Score Date/Time not blank AND is in MM/DD/YYYY HH:MM Format
AND

Initial ICH Score Date/Time < **Arrival Date/Time**
OR

(Surgical treatment for ICH at this hospital Yes
AND

(Procedure Date/ Time Missing, unknown or not in MM/DD/YYYY HH:MM format
OR

	<u>Procedure Date/ Time</u> MINUS <u>Arrival Date/Time</u> < 0)) OR <u>(Date/Time Last Known Well</u> is not blank AND is in MM/DD/YYYY HH:MM Format AND <u>Arrival Date/Time</u> MINUS <u>Date/time Last Known Well</u> > 48 hours) OR <u>Discharge Date/Time</u> MINUS > 120 days OR <u>Comfort Care/Palliative Care Measures Established Before Hospital Arrival</u> Yes
Exceptions: (Remove from denominator if present and numerator is not met)	
None	N/A
Numerator	
Patients with an initial severity score documented within 6 hours of hospital arrival. If an intracranial procedure is performed within 6 hours of arrival, the severity score must be measured prior to the procedure.	<u>((Surgical treatment for ICH at this hospital</u> No OR <u>(Surgical treatment for ICH at this hospital</u> Yes AND <u>Procedure Date/ Time</u> MINUS <u>Arrival Date/time</u> > 6 hours)) AND <u>(Initial ICH score done at this hospital</u> Yes AND <u>ICH Score Value</u> is not blank AND <u>Initial ICH Score Date/Time</u> is not blank AND is in MM/DD/YYYY HH:MM Format AND <u>Initial ICH Score Date/Time</u> MINUS <u>Arrival Date/time</u> <= 6 hours)) OR <u>((Surgical treatment for ICH at this hospital</u> Yes AND

Procedure Date/ Time MINUS Arrival Date/time ≤ 6 hours)
AND

(Initial ICH score done at this hospital Yes
AND

ICH Score Value is not blank
AND

Initial ICH Score Date/Time is not blank AND is in MM/DD/YYYY HH:MM Format
AND

Initial ICH Score Date/Time < Procedure Date/Time))

Rationale

Baseline clinical evaluation is part of the standard care of every intracerebral hemorrhage patient. Measurement of a validated standardized severity score is important for prioritizing interventions such as intensive care unit admission and surgical intervention, is the main determinant of short-term and long-term prognosis, facilitates communication of stroke severity between survivors, and is essential for risk-adjustment to monitor provider and hospital care outcomes. The ICH Score is selected for use as it is the most commonly used validated baseline severity score and is required by The Joint Commission in its analogous measure.

Supporting Guideline Recommendations or Other Evidence

2015 AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage

A baseline severity score should be performed as part of the initial evaluation of patients with ICH (*Class I; Level of Evidence B*).

2a. Coagulopathy Reversal (Warfarin)

Percentage of patients with intracerebral hemorrhage and an INR > 1.4 resulting from warfarin treatment who receive therapy to replace vitamin K-dependent clotting factors within 90 minutes of emergency department (ED) presentation and who also receive intravenous vitamin K*

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage.

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

All patients in the initial patient population who arrive within 12 hours of last known well, were on warfarin prior to arrival and have an INR >1.4 on arrival to the hospital

Data Elements for Calculation

Same as Initial Patient Population
AND

(Arrival Date/Time is not blank AND is in MM/DD/YYYY HH:MM Format
AND

Date/Time Last Known Well is not blank AND is in MM/DD/YYYY HH:MM Format
AND

Arrival Date/Time MINUS Date/time Last Known Well > 0 AND <= 12 hours)
AND

(Antiplatelet or Anticoagulant Medication(s) Yes
AND

(Prior Antithrombotic Medication 1 warfarin(Coumadin)
OR

Prior Antithrombotic Medication 2 warfarin(Coumadin)
OR

Prior Antithrombotic Medication 3 warfarin(Coumadin)))
AND

INR value performed closest to hospital arrival > 1.4 Yes

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital

- Patients not admitted as an inpatient
- Clear documentation for comfort care/palliative care measures established prior to hospital arrival
- Length of stay > 120 days
- Enrolled in a clinical trial that would impact the use of anticoagulant reversal agents
- Use of non-warfarin anticoagulants
- Patients with procoagulant reversal therapy already started prior to arrival (in another hospital or MSU)
- where therapy to replace vitamin K-dependent clotting factors was already started
- Warfarin reversal agent date/time is missing or unknown or not in MMDDYYYY HHMM format
- Warfarin reversal agent date/time is prior to arrival

OR

Not Admitted Yes, Not Admitted

OR

Comfort Care/Palliative Care Measures Established Before Hospital Arrival

Yes

OR

Discharge Date/Time minus **Admit Date/Time** > 120 days

OR

Clinical Trial Yes

OR

(Antiplatelet or Anticoagulant Medication(s)) (gs_priorantithrom) = 1 [Yes]
AND

(Prior Antithrombotic Medication 1) apixaban (Eliquis) OR argatroban OR dabigatran (Pradaxa) OR desirudin (Iprivask) OR edoxaban (Savaysa) OR fondaparinux (Arixtra) OR full dose LMW heparin OR lepirudin (Refludan) OR rivaroxaban (Xarelto) OR Unfractionated heparin IV OR Other Anticoagulant
OR

Prior Antithrombotic Medication 2 apixaban (Eliquis) OR argatroban OR dabigatran (Pradaxa) OR desirudin (Iprivask) OR edoxaban (Savaysa) OR fondaparinux (Arixtra) OR full dose LMW heparin OR lepirudin (Refludan) OR rivaroxaban (Xarelto) OR Unfractionated heparin IV OR Other Anticoagulant
OR

Prior Antithrombotic Medication 3 apixaban (Eliquis) OR argatroban OR dabigatran (Pradaxa) OR desirudin (Iprivask) OR edoxaban (Savaysa) OR fondaparinux (Arixtra) OR full dose LMW heparin OR lepirudin (Refludan) OR rivaroxaban (Xarelto) OR Unfractionated heparin IV OR Other Anticoagulant))
OR

(How patient arrived at your hospital) Transfer from other hospital OR Mobile Stroke Unit

AND

(Procoagulant Reversal Treatment Initiated Prior to Arrival (in MSU or first hospital)) Yes

AND

	<u>Reversal Agent Prior to Arrival</u> prothrombin complex concentrate OR fresh frozen plasma)) OR <u>(Procoagulant Reversal Treatment Initiated at this Hospital</u> Yes AND <u>(Procoagulant Treatment Date/Time</u> is blank or not in MM/DD/YYYY HH:MM Format OR <u>Procoagulant Treatment Date/Time < Arrival Date/time</u>))
Exceptions: (Remove from denominator if present and numerator is not met)	
Documented reason for not administering a procoagulant reversal agent	<u>Documentation of a reason for not administering a procoagulant reversal agent</u> Yes
Numerator	
Patients who receive therapy to replace vitamin K-dependent clotting factors within 90 minutes of ^{arrival} and who also receive intravenous vitamin K* *Acceptable therapies include prothrombin complex concentrate (preferable) or fresh frozen plasma (acceptable). Treatment with vitamin K alone is not acceptable to meet this measure. However, to meet this performance measure not delineated. Recombinant Factor VIIa is not recommended by the AHA/ASA ICH Guidelines and is not acceptable.	<u>(Procoagulant Reversal Treatment Initiated at this Hospital</u> Yes AND <u>Procoagulant Reversal Agent</u> prothrombin complex concentrate OR fresh frozen plasma AND <u>Procoagulant Treatment Date/Time MINUS Arrival Date/time</u> < 90 minutes) AND <u>IV Vitamin K</u> Yes, prior to arrival (in MSU or first hospital) OR Yes, at your hospital
Rationale	
Coagulopathy, specifically that due to the vitamin K antagonist warfarin, is a significant risk factor for hematoma expansion in ICH and outcome is worsened in these patients. Time to correction of an elevated INR due to warfarin has been related to amount of hematoma expansion. Prothrombin complex concentrates (PCC) and fresh frozen plasma (FFP) decrease the INR and quickly reverse the anticoagulant effect of warfarin.	
Supporting Guideline Recommendations or Other Evidence	
2015 AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage	

1. Patients with ICH whose INR is elevated because of VKA should have their VKA withheld, receive therapy to replace vitamin K–dependent factors and correct the INR, and receive intravenous vitamin K (*Class I; Level of Evidence C*).
2. Recombinant factor VIIa (rFVIIa) does not replace all clotting factors, and although the INR may be lowered, clotting may not be restored in vivo; therefore, rFVIIa is not recommended for VKA reversal in ICH (*Class III; Level of Evidence C*).

2b. Anticoagulant Reversal (DOACs)

Percentage of patients with life-threatening intracerebral hemorrhage who are taking rivaroxaban, apixaban or dabigatran prior to arrival and who are treated with the appropriate reversal agent within 90 minutes of arrival

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage.

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

All patients in the initial patient population who arrived within 12 hours of LKW and were on rivaroxaban, apixaban or dabigatran prior to arrival

Data Elements for Calculation

Same as Initial Patient Population
AND

(Arrival Date/Time not blank AND is in MM/DD/YYYY HH:MM Format
AND

Date/Time Last Known Well is not blank AND is in MM/DD/YYYY HH:MM Format
AND

Arrival Date/Time MINUS Date/time Last Known Well > 0 AND <= 12 hours)
AND

(Antiplatelet or Anticoagulant Medication(s) Yes
AND

(Prior Antithrombotic Medication 1 rivaroxaban (Xarelto) OR dabigatran (Pradaxa) OR apixaban (Eliquis)
OR

Prior Antithrombotic Medication 2 rivaroxaban (Xarelto) OR dabigatran (Pradaxa) OR apixaban (Eliquis)
OR

Prior Antithrombotic Medication 3 rivaroxaban (Xarelto) OR dabigatran (Pradaxa) OR apixaban (Eliquis)))

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital
OR

- Clear documentation for comfort care/palliative care measures established prior to hospital arrival
- Length of stay > 120 days
- Enrolled in a clinical trial that would impact the use of anticoagulant reversal agents
- Use of non-DOAC anticoagulants
- Patients with anticoagulant reversal therapy already started prior to arrival (in another hospital or MSU)
- Anticoagulant reversal agent date/time is missing or unknown or not in MMDDYYYY HHMM format
- Anticoagulant reversal agent date/time is prior to arrival

Not Admitted Yes, Not Admitted
OR

Comfort Care/Palliative Care Measures Established Before Hospital Arrival
Yes
OR

Discharge Date/Time minus **Admit Date** > 120 days
OR

Clinical Trial Yes
OR

Prior Antithrombotic Medication 1 warfarin(Coumadin)
OR

Prior Antithrombotic Medication 2 warfarin(Coumadin)
OR

Prior Antithrombotic Medication 3 warfarin(Coumadin)
OR

(How patient arrived at your hospital) Transfer from other hospital **OR** Mobile Stroke Unit
AND

Procoagulant Reversal Treatment Initiated Prior to Arrival (in first hospital or MSU) Yes
AND

((Prior Antithrombotic Medication 1 rivaroxaban (Xarelto) OR apixaban (Eliquis)
OR
Prior Antithrombotic Medication 2 rivaroxaban (Xarelto) OR [apixaban (Eliquis)
OR
Prior Antithrombotic Medication 3 rivaroxaban (Xarelto) OR apixaban (Eliquis)
AND

Procoagulant Reversal Agent Administered Prior to Arrival Andexanet alfa)
OR

(Prior Antithrombotic Medication 1 dabigatran (Pradaxa)
OR
Prior Antithrombotic Medication 2 dabigatran (Pradaxa)
OR

	<u>Prior Antithrombotic Medication 3</u> dabigatran (Pradaxa) AND <u>Reversal Agent Administered Prior to Arrival</u> Idarucizumab))) OR <u>(Procoagulant Reversal Treatment Initiated at this Hospital</u> Yes AND <u>(Procoagulant Treatment Date/Time</u> is blank or not in MM/DD/YYYY HH:MM Format OR <u>Procoagulant Treatment Date/Time < Arrival Date/time</u>)
Exceptions: (Remove from denominator if present and numerator is not met)	
Documented medical, patient or system reason for not administering a anticoagulant (DOAC) reversal agent	<u>Documented reason for not administering an anticoagulant reversal agent</u> Yes, Medical Reason OR Yes, Patient Reason OR Yes, System Reason
Numerator	
Patients who receive appropriate anticoagulant reversal therapy within 90 minutes of arrival * *Acceptable therapies include Andexanet alfa, if the patient is on rivaroxaban or apixaban, or Idarucizumab, if the patient is on dabigatran.	<u>Procoagulant Treatment Initiated at this Hospital</u> Yes AND <u>(((Prior Antithrombotic Medication 1</u> ivaroxaban (Xarelto) OR apixaban (Eliquis) OR <u>Prior Antithrombotic Medication 2</u> rivaroxaban (Xarelto) OR apixaban (Eliquis) OR <u>Prior Antithrombotic Medication 3</u> rivaroxaban (Xarelto) OR apixaban (Eliquis)) AND <u>Reversal Agent Administered at this Hospital</u> Andexanet alfa (Andexxa)) OR <u>(((Prior Antithrombotic Medication 1</u> dabigatran (Pradaxa) OR <u>Prior Antithrombotic Medication 2</u> dabigatran (Pradaxa) OR <u>Prior Antithrombotic Medication 3</u> dabigatran (Pradaxa)) AND <u>Reversal Agent Administered at this Hospital</u> Idarucizumab (Praxbind)))

AND

Procoagulant Treatment Date/Time MINUS Arrival Date/time < 90 minutes

Rationale

Coagulopathy, specifically that due to the vitamin K antagonist warfarin, is a significant risk factor for hematoma expansion in ICH and outcome is worsened in these patients. Time to correction of an elevated INR due to warfarin has been related to amount of hematoma expansion. Prothrombin complex concentrates (PCC) and fresh frozen plasma (FFP) decrease the INR and quickly reverse the anticoagulant effect of warfarin.

Supporting Guideline Recommendations or Other Evidence

2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation

Class I
Idarucizumab is recommended for the reversal of dabigatran in the event of life-threatening bleeding or an urgent procedure. (*Level of Evidence: B-NR*)

Class IIa
Andexanet alfa can be useful for the reversal of rivaroxaban and apixaban in the event of life-threatening or uncontrolled bleeding. (*Level of Evidence: B-NR*)

3. Venous Thromboembolism (VTE) Prophylaxis

Percentage of patients with intracerebral hemorrhage who receive lower limb pneumatic compression on hospital day 0 or 1

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhagic

Denominator

Include:

All patients in the initial patient population

Data Elements for Calculation

Same as Initial Patient Population

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Length of stay < 2 days or >120 days
- Comfort measures only documented on hospital day 0 or 1
- Enrolled in a clinical trial that would affect the use of VTE prophylaxis
- Admission date is missing or unknown
- IPC device date/time is earlier than admission date.

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital

OR

Not Admitted Yes, Not Admitted

OR

Admit Date is blank

OR

Admit Date > Discharge Date/Time

OR

Discharge Date/Time MINUS Admit Date < 2 days

OR

Discharge Date/Time MINUS Admit Date > 120 days

OR

When is the earliest documentation of comfort measures only Day 0 or 1

OR

Clinical Trial Yes

OR

	<u>IPC Device Date/Time</u> < <u>Admit Date</u>
Exceptions: (Remove from denominator if present and numerator is not met)	
None	N/A
Numerator	
Patients who received VTE prophylaxis using lower limb intermittent pneumatic compression device on the day of admission (day 0) or the day after admission (day 1) OR Who have a documented reason why an intermittent pneumatic compression device was not used for VTE prophylaxis⁺	(<u>Intermittent pneumatic compression devices (IPC)</u> is not blank AND (<u>IPC Device Date/Time</u> is not blank AND is in MM/DD/YYYY format or MM/DD/YYYY HH:MM format AND <u>IPC Device Date/Time</u> MINUS Admit Date < 2 days) OR Documented Reason IPC Device was not used for VTE Prophylaxis Yes)
Rationale	
Pulmonary embolism from deep venous thrombosis (DVT) accounts for nearly 10% of deaths after stroke. DVT is common in patients with intracerebral hemorrhage due to decreased mobility. The CLOTS trials demonstrated that pneumatic compression is superior to the use of graduated compression stockings and that DVT occurrence is reduced, especially in ICH patients, if pneumatic compression was started as early as the day of hospital admission.	
Supporting Guideline Recommendations or Other Evidence	
2015 AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage Patients with ICH should have intermittent pneumatic compression for prevention of venous thromboembolism beginning the day of hospital admission (<i>Class I; Level of Evidence A</i>). Graduated compression stockings are not beneficial to reduce DVT or improve outcome (<i>Class III; Level of Evidence A</i>).	

⁺ Acceptable contraindications to the use of pneumatic compression includes (e.g. any local leg condition in which the sleeves may interfere, such as dermatitis, vein ligation [immediate postoperative], gangrene, recent skin graft, severe peripheral arterial disease, existing DVT, or severe congestive heart failure with pulmonary edema)

4. Admission Unit

Percentage of patients with intracerebral hemorrhage who are admitted to an intensive care unit or dedicated stroke unit with physician and nursing neuroscience acute care expertise

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhagic

Denominator

Include:

All patients in the initial patient population who arrive within 24 hours of last known well

Data Elements for Calculation

Same as Initial Patient Population
AND

(Arrival Date/Time is not blank AND is in MM/DD/YYYY HH:MM Format
AND

Date/Time Last Known Well is not blank AND is in MM/DD/YYYY HH:MM Format
AND

Arrival Date/Time MINUS Date/time Last Known Well > 0 AND < = 24 hours)

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Length of stay >120 days
- Clear documentation for comfort care/ palliative care measures established before hospital arrival

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital
OR

Not Admitted Yes, Not Admitted
OR

(Admit Date is not blank
AND

Discharge Date/Time MINUS Admit Date > 120 days)
OR

Comfort Care/Palliative Care Measures Established Before Hospital Arrival
Yes

Exceptions: (Remove from denominator if present and numerator is not met)	
None	N/A
Numerator	
Patients admitted to an intensive care unit or dedicated stroke unit with physician and nursing neuroscience acute care expertise	<u>In what setting was care delivered?</u> Neuro/Neurosurgery ICU OR Stroke Unit (non-ICU)
Rationale	
Patients with ICH are frequently medically and neurologically unstable particularly at the time of initial presentation. Care of patients with ICH in a dedicated neuroscience intensive care unit is associated with a lower mortality rate. Stroke units have demonstrated improved long-term outcome in randomized trials. Presence of a stroke unit is a required component for Primary and Comprehensive Stroke Center certification by TJC.	
Supporting Guideline Recommendations or Other Evidence	
2015 AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage	
Initial monitoring and management of patients with ICH should take place in an intensive care unit or dedicated stroke unit with physician and nursing neuroscience acute care expertise (<i>Class I; Level of Evidence B</i>).	

5. Dysphagia Screening within 24 Hours

Percentage of patients with intracerebral hemorrhage for whom there is documentation that a dysphagia screening was performed within 24 hours of admission using a dysphagia screening tool approved by the institution in which the patient is receiving care

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

Data Elements for Calculation

All patients in the initial patient population

Same as the Initial Patient Population

Exclusions: (Always remove from denominator)

Data Elements for Calculation

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Length of stay >120 days
- Enrolled in a clinical trial related to stroke that would impact on dysphagia screening
- Discharged before 24 hours
- Documented reason that dysphagia screening was not indicated. Reasons could include coma, intubation, or that the patient was entirely dependent on enteral feeding (without oral intake of food, liquids, or medications) before hospitalization as a result of a chronic medical condition.

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital
OR

Not Admitted Yes, Not Admitted
OR

Admit Date is blank
OR

Admit Date > Discharge Date/Time
OR

Discharge Date/Time MINUS Admit Date > 120 days
OR

Clinical Trial Yes
OR

Discharge Date/Time MINUS Admit Date < 1 day)
OR

Initial Dysphagia Screen Performed N/C

Exceptions: (Remove from denominator if present and numerator is not met)	
None	N/A
Numerator	
Patients for whom there is documentation that a dysphagia screening was performed within 24 hours of arrival using a dysphagia screening tool approved by the institution in which the patient is receiving care.	Initial Dysphagia Screen Performed Yes, within 24 hours of arrival
Rationale	
Dysphagia is present in up to 67% of patients with acute stroke, and of these, almost 50% have aspiration, a prerequisite for aspiration pneumonia. Up to one third of patients who aspirate develop pneumonia. Pneumonia is a serious complication of stroke and is associated with increased mortality. Several studies have demonstrated a reduction in pneumonia after institutional implementation of dysphagia screening protocols, but without randomized control groups. Several swallow screening methods have been published in the literature, each with benefits and limitations, without sufficient evidence to recommend a single consensus method.	
Supporting Guideline Recommendations or Other Evidence	
2015 AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage A formal screening procedure for dysphagia should be performed in all patients before the initiation of oral intake to reduce the risk of pneumonia (<i>Class I; Level of Evidence B</i>).	

*Dysphagia screening may consist of a structured bedside swallowing screen administered by nursing staff, bedside swallow evaluation by a speech-language pathologist, videofluoroscopic swallow evaluation, fiberoptic endoscopic evaluation of swallowing, or other method approved by local institutional protocol.

6. Passed Dysphagia Screen Before First Oral Intake

Percentage of patients with intracerebral hemorrhage who were documented to have passed the most recent dysphagia screen before oral intake of fluids, nutrition, or medications

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

All patients in the initial patient population

Data Elements for Calculation

Same as Initial Patient Population

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Patients who remained NPO for the entire hospital stay
- Length of stay >120 days
- Dysphagia screening prior to oral intake is NC
- Patients who failed dysphagia screening
- Enrolled in a clinical trial related to stroke that would impact on dysphagia screening

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital
OR

Not Admitted Yes, Not Admitted
OR

Patient NPO throughout the entire hospital stay Yes
OR

Admit Date > Discharge Date/Time
OR

Discharge Date/Time MINUS Admit Date > 120 days
OR

Screened for dysphagia prior to any oral intake N/C
OR

(Screened for dysphagia prior to any oral intake Yes
AND

If yes, Dysphagia screening results Fail)

	OR Clinical Trial Yes
Exceptions: (Remove from denominator if present and numerator is not met)	
None	N/A
Numerator	
Patients who were documented to have passed [†] the most recent dysphagia screen before oral intake of fluids, nutrition, or medications AND Whose first oral intake was consistent with any modified diet or restrictions recommended based on the most recent dysphagia screen results.	<u>Screened for dysphagia prior to any oral intake</u> Yes AND <u>If yes, Dysphagia screening results</u> Pass AND <u>First Oral Intake Consistent with any Recommended Dietary Modifications</u> Yes
Rationale	
Dysphagia is present in up to 67% of patients with acute stroke, and of these, almost 50% have aspiration, a prerequisite for aspiration pneumonia. Up to one third of patients who aspirate develop pneumonia. Pneumonia is a serious complication of stroke and is associated with increased mortality. Several studies have demonstrated a reduction in pneumonia after institutional implementation of dysphagia screening protocols, but without randomized control groups. Several swallow screening methods have been published in the literature, each with benefits and limitations, without sufficient evidence to recommend a single consensus method.	
Supporting Guideline Recommendations or Other Evidence	
From the 2015 AHA/ASA Guidelines for the management of spontaneous intracerebral hemorrhage A formal screening procedure for dysphagia should be performed in all patients before the initiation of oral intake to reduce the risk of pneumonia (<i>Class I; Level of Evidence B</i>).	

[†]"Passed" indicates that an oral dysphagia screening protocol was performed according to institutional protocol and that the results of the screen indicated that oral intake, with or without modifications or restrictions (eg, for consistency of liquids or solid food, or supervision during oral intake), was recommended. In cases in which the most recent screening before first oral intake recommended a modified diet or restrictions, the first oral intake should have been consistent with the recommended modifications; if the first oral intake was not consistent with the recommended dietary modification (eg, the patient was provided thin liquids even though the recommendation was for thickened liquids), then the patient should be excluded from the numerator. The methods for dysphagia assessment and recommendations should be based on an institutional protocol and may include some combination of a structured bedside swallowing screen administered by nursing staff, bedside swallow evaluation by a speech-language pathologist, videofluoroscopic swallow evaluation, fiberoptic endoscopic evaluation of swallowing, consultation with speech language pathologist or other specialist, or other method approved by local institutional protocol.

7. Blood Pressure Treatment at Discharge

Percentage of patients with intracerebral hemorrhage who are prescribed an antihypertensive medication or who have a documented blood pressure off medications less than 130/80 at the time of hospital discharge.

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

Data Elements for Calculation

All patients in the initial patient population

Same as Initial Patient Population

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Length of stay > 120 days
- Comfort Measures Only documented
- Enrolled in a clinical trial that would affect the use of antihypertensive medications or a specific blood pressure target
- Documentation of reason for no long-term antihypertensive medication prescribed at discharge

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital
OR

Not Admitted Yes, Not Admitted
OR

Admit Date > Discharge Date/Time
OR

Discharge Date/Time MINUS Admit Date/Time > 120 days
OR

When is the earliest documentation of comfort measures only Day 0 or 1 OR Day 2 or after OR Timing unclear
OR

Clinical Trial Yes
OR

Antihypertensive medication prescribed at discharge None—Contraindicated

Exceptions: (Remove from denominator if present and numerator is not met)

None

N/A

Numerator

Patients who are prescribed an oral or transdermal antihypertensive medication
OR
Who have a documented blood pressure off medications less than 130/80 mmHg at the time of hospital discharge

Antihypertensive medication prescribed at discharge ACE Inhibitors OR ARB OR Beta Blockers OR Ca⁺⁺ Channel Blockers OR Diuretics OR Other anti-hypertensive medication
OR

(Discharge Blood Pressure (measurement closest to discharge) Systolic < 130 mmHg
AND

Discharge Blood Pressure (measurement closest to discharge) Diastolic < 80 mmHg
AND

Antihypertensive Medication on the Day of or Day Prior to Discharge No)

Rationale

Hypertension is the single most important modifiable risk factor for recurrent stroke among patients who survive intracerebral hemorrhage. Long-term blood pressure (BP) control reduces the risk of recurrent intracerebral hemorrhage. Randomized clinical trials have found early lowering of blood pressure to be safe after spontaneous intracerebral hemorrhage.

Supporting Guideline Recommendations or Other Evidence

From the 2015 AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage

1. BP should be controlled in all ICH patients (*Class I, Level of Evidence A*).
2. Measures to control BP should begin immediately after ICH onset (*Class I, Level of Evidence A*).

8. Assessed for Rehabilitation

Percentage of patients with intracerebral hemorrhage who were assessed for, or who received, rehabilitation services

Initial Patient Population

All patients age 18 years of age and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

Data Elements for Calculation

All patients in the initial patient population

Same as Initial Patient Population

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Length of stay >120 days
- Comfort Measures Only documented
- Enrolled in a clinical trial that would impact on the use of rehabilitation services
- Patients who are discharged to another acute care hospital, discharged to home or another healthcare facility for hospice care, left AMA or expired

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital

OR

Not Admitted Yes, Not Admitted

OR

Admit Date > Discharge Date/Time

OR

Discharge Date/Time minus Admit Date > 120 days

OR

When is the earliest documentation of comfort measures only Day 0 or 1 OR [Day 2 or after OR Timing unclear

OR

Clinical Trial Yes

OR

Discharge Disposition Hospice – Home OR Hospice – Health Care Facility OR Expired OR Left against medical advice/ AMA

Exceptions: (Remove from denominator if present and numerator is not met)

None	N/A
Numerator	
Patients who were assessed for, or who received, rehabilitation services during the hospital stay*	<u>Assessed for or Received Rehabilitation Services during hospitalization</u> Yes
Rationale	
Intracerebral hemorrhage often results in severe long-term disability. Comprehensive stroke units that include rehabilitation services demonstrate improved outcomes compared with other models of stroke unit care and most studies of rehabilitation in stroke have included intracerebral hemorrhage and ischemic stroke patients.	
Supporting Guideline Recommendations or Other Evidence	
2015 AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage It is recommended that all patients with ICH have access to multidisciplinary rehabilitation (<i>Class I; Level of Evidence A</i>).From 2016 AHA/ASA “Guidelines for Adult Stroke Recovery and Rehabilitation” It is recommended that early rehabilitation for hospitalized stroke patients be provided in environments with organized, interprofessional stroke care (<i>Class I; Level of Evidence A</i>). It is recommended that stroke survivors receive rehabilitation at an intensity commensurate with anticipated benefit and tolerance (<i>Class I; Level of Evidence B</i>).	

* The assessment should be documented in the medical record by a physician, physical therapist, occupational therapist, or speech language pathologist, as appropriate. If rehabilitation is not needed, then that should be documented explicitly in the record.

9. Avoidance of Corticosteroid Use

Percentage of patients with intracerebral hemorrhage who do not receive corticosteroids for elevated intracranial pressure or brain edema during acute hospitalization

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

All patients in the initial patient population

Data Elements for Calculation

Same as Initial Patient Population

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Length of stay > 120 admission days
- Received corticosteroids prior to arrival at this hospital (at first hospital or in MSU)
- Participation in a clinical trial in which corticosteroids are part of the investigational regimen

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital

OR

Not Admitted Yes, Not Admitted
OR

Admit Date > Discharge Date/Time
OR

Discharge Date/Time minus Admit Date > 120 days
OR

(How patient arrived at your hospital) Transfer from other hospital OR Mobile Stroke Unit
AND

Treated with Oral or IV Corticosteroids Yes, prior to arrival (at first hospital or MSU))
OR

Clinical Trial Yes

Exceptions: (Remove from denominator if present and numerator is not met)

Documentation of a neurological or other medical reason for prescribing oral or IV corticosteroids (e.g., brain tumor, vasculitis, asthma, COPD, cortisol deficiency or postcraniotomy)

Documentation of a neurological or other medical reason for prescribing oral or IV corticosteroids Yes

Numerator

Patients who <i>do not</i> receive oral or intravenous corticosteroids at this hospital	<u>Treated with Oral or IV Corticosteroids</u> No
Rationale	
Corticosteroids may be used for the treatment of cerebral mass effect and elevated intracranial pressure if vasogenic edema is present from brain tumors or cerebral abscess. A prior randomized clinical trial in intracerebral hemorrhage found increased complications and no outcome benefit. This has also been found in traumatic brain and spinal cord injury and corticosteroids are not recommended in these conditions.	
Supporting Guideline Recommendations or Other Evidence	
2015 AHA/ASA Guidelines for the Management of Spontaneous Intracerebral Hemorrhage	
Corticosteroids should not be administered for treatment of elevated ICP in ICH (<i>Class III; Level of Evidence B</i>).	

10. ICH Records with Missing Times

Histogram of patient records missing one or more of the times required to calculate ICH measures

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

All patients in the initial patient population

Data Elements for Calculation

Same as Initial Patient Population

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Length of stay > 120 days

Patient location when stroke symptoms discovered Stroke occurred while patient was an inpatient in your hospital

OR

Not Admitted Yes, Not Admitted

OR

Admit Date > Discharge Date/Time

OR

Discharge Date/Time minus Admit Date > 120 days

Exceptions: (Remove from denominator if present and numerator is not met) *Note: In the PMT, this is achieved via enabling rules or parent/child relationships between variables)*

None

N/A

Numerator/Report

Display a bar graph of patients grouped by the times that are missing:

1. Arrival Date/Time
2. Initial ICH Score Date/Time
3. Procedure Date/ Time
4. Date/Time Last Known Well
5. Procoagulant Treatment Date/Time
6. IPC Device Date/Time

Create 6 groups:

Group 1: (Arrival Date/Time is blank, unknown, or MM/DD/YYYY Format only

Group 2: (Initial ICH score done at this hospital Yes

AND

Initial ICH Score Date/Time is blank, unknown, or in MM/DD/YYYY Format only

Group 3: (Surgical treatment for ICH at this hospital Yes

AND

Procedure Date/ Time is blank, unknown, or in MM/DD/YYYY Format only

	Group 4: (<u>Date/Time Last Known Well</u> is blank, unknown, or in MM/DD/YYYY Format only Group 5: (<u>Procoagulant Reversal Treatment Initiated at this Hospital</u> Yes AND <u>Procoagulant Treatment Date/Time</u> is blank, unknown, or in MM/DD/YYYY Format only Group 6: (<u>Intermittent pneumatic compression devices (IPC)</u> is not blank AND <u>IPC Device Date/Time</u> is blank, unknown, or in MM/DD/YYYY Format only <i>Plot bars as percent of total denominator after all exclusions are applied. Total may not = 100% due to potential for multiple missing times in individual cases.</i>

11. Anticoagulant Reversal Agents

Patients with intracerebral hemorrhage who received anticoagulant reversal grouped by agent administered

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage.

Age ≥ 18
AND

Final clinical diagnosis related to stroke Intracerebral Hemorrhage

Denominator

Include:

All patients in the initial patient population who received anticoagulant reversal at this hospital

Data Elements for Calculation

Same as Initial Patient Population
AND

Procoagulant Reversal Treatment Initiated at this Hospital = Yes

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)

Patient location when stroke symptoms discovered = Stroke occurred while patient was an inpatient in your hospital

- Patients not admitted as an inpatient - Length of stay > 120 days - Enrolled in a clinical trial that would impact the use of anticoagulant reversal agents	OR <u>Not Admitted</u> = Yes, Not Admitted OR <u>Comfort Care/Palliative Care Measures Established Before Hospital Arrival</u> = Yes OR <u>Discharge Date/Time</u> minus <u>Admit Date/Time</u> > 120 days
Exceptions: (Remove from denominator if present and numerator is not met)	
None	N/A
Numerator/Report	
Display a bar graph of patients grouped by the anticoagulant reversal agent they received: - Prothrombin complex concentrates - Fresh Frozen Plasma - Andexxa (andexanet alfa) - Praxbind (idarucizumab) - Other factor complexes - Other	Create 6 groups: Group 1: <u>Procoagulant Reversal Agent</u> = Prothrombin complex concentrates (PCC) Group 2: <u>Procoagulant Reversal Agent</u> = Fresh Frozen Plasma Group 3: <u>Procoagulant Reversal Agent</u> = Factor Xa Reversal - Andexxa (andexanet alfa) Group 4: <u>Procoagulant Reversal Agent</u> = Pradaxa Reversal - Praxbind (idarucizumab) Group 5: <u>Procoagulant Reversal Agent</u> = Other factor complexes (including anti-inhibitor coagulant complex, factor IX complex) Group 6: <u>Procoagulant Reversal Agent</u> = Other <i>Plot bars as percent of total denominator after all exclusions are applied. Total of all bars will = 100%.</i>

12. Time to Anticoagulant Reversal

Patients with intracerebral hemorrhage who received anticoagulant reversal grouped by time from arrival to administration

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage.

Same as Initial Patient Population
AND

Procoagulant Reversal Treatment Initiated at this Hospital = Yes

Denominator

Include:

All patients in the initial patient population who received anticoagulant reversal at this hospital

Data Elements for Calculation

Same as Initial Patient Population
AND

Procoagulant Reversal Treatment Initiated at this Hospital = Yes

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Clear documentation for comfort care/palliative care measures established prior to hospital arrival
- Length of stay > 120 days
- Anticoagulant reversal date/time or arrival date/time is missing or not in MM/DD/YYYY HH:MM format

Patient location when stroke symptoms discovered = Stroke occurred while patient was an inpatient in your hospital
OR

Not Admitted = Yes, Not Admitted
OR

Comfort Care/Palliative Care Measures Established Before Hospital Arrival = Yes
OR

Discharge Date/Time minus Admit Date/Time > 120 days
OR

Procoagulant Treatment Date/Time is blank or in MM/DD/YYYY Format only
OR

Arrival Date/time is blank or in MM/DD/YYYY Format only

Exceptions: (Remove from denominator if present and numerator is not met)	
None	N/A
Numerator/Report	
Display a bar graph of patients grouped by time to anticoagulant reversal in 15-minutes increments from 0 to 120 minutes, with one bar for greater than 120 minutes. 0 –15 minutes 16 – 30 minutes 31 – 45 minutes 46 – 60 minutes 61 – 75 minutes 76 – 90 minutes 91 – 105 minutes 106 –120 minutes > 120 minutes	Create 9 groups: Group 1: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> = 0-15 minutes Group 2: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> = 16-30 minutes Group 3: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> = 31-45 minutes Group 4: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> = 46 – 60 minutes Group 5: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> = 61 – 75 minutes Group 6: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> = 76 – 90 minutes Group 7: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> = 91 – 105 minutes Group 8: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> = 106 –120 minutes Group 9: <u>Procoagulant Treatment Date/Time</u> MINUS <u>Arrival Date/time</u> > 120 minutes <i>Plot bars as percent of total denominator after all exclusions are applied. Total of all bars will = 100%.</i>

13. Reasons No Anticoagulant Reversal was Administered

Patients with intracerebral hemorrhage grouped by reason for not administering an anticoagulant reversal agent

Initial Patient Population

All patients age 18 years and older with a final clinical diagnosis of intracerebral hemorrhage.

Age ≥ 18
AND

Final clinical diagnosis related to stroke = Intracerebral Hemorrhage

Denominator

Include:

All patients in the initial patient population who did not receive anticoagulant reversal at this hospital

Data Elements for Calculation

Same as Initial Patient Population
AND

Procoagulant Reversal Treatment Initiated at this Hospital = No

Exclusions: (Always remove from denominator)

- Hemorrhagic Stroke occurred after hospital arrival (in ED/Obs/Inpatient)
- Patients not admitted as an inpatient
- Clear documentation for comfort care/palliative care measures established prior to hospital arrival
- Length of stay > 120 days

Patient location when stroke symptoms discovered = Stroke occurred while patient was an inpatient in your hospital

OR

Not Admitted = Yes, Not Admitted

OR

Comfort Care/Palliative Care Measures Established Before Hospital Arrival = Yes

OR

Discharge Date/Time minus **Admit Date/Time** > 120 days

Exceptions: (Remove from denominator if present and numerator is not met)

None

N/A

Numerator/Report

Display a bar graph of patients grouped by reasons for not administering an anticoagulant reversal agent:

Create 5 groups:

1. No reason documented 2. Any reason documented 3. Medical reason no DOAC Reversal Agent 4. Patient reason no DOAC Reversal Agent 5. System reason no DOAC Reversal Agent	Group 1: <u>Documentation of a reason for not administering a procoagulant reversal agent</u> = No Group 2: <u>Documentation of a reason for not administering a procoagulant reversal agent</u> = Yes Group 3: <u>(Documentation of a reason for not administering a procoagulant reversal agent</u> = Yes AND <u>Patient Currently Taking DOAC - Documentation for not administering anticoagulant reversal agent</u> = Yes, Medical Reason) Group 4: <u>(Documentation of a reason for not administering a procoagulant reversal agent</u> = Yes AND <u>Patient Currently Taking DOAC - Documentation for not administering anticoagulant reversal agent</u> = Yes, Patient Reason) Group 5: <u>(Documentation of a reason for not administering a procoagulant reversal agent</u> = Yes AND <u>Patient Currently Taking DOAC - Documentation for not administering anticoagulant reversal agent</u> = Yes, System Reason) <i>Plot bars as percent of total denominator after all exclusions are applied. Total of all bars will be > 100%.</i>
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Citations:

1. Hemphill JC 3rd, Adeoye OM, Alexander DN, Alexandrov AW, Amin-Hanjani S, Cushman M, George MG, LeRoux PD, Mayer SA, Qureshi AI, Saver JL, Schwamm LH, Sheth KN, Tirschwell D; on behalf of the AHA/ASA Stroke Performance Oversight Committee. Clinical performance measures for adults hospitalized with intracerebral hemorrhage: performance measures for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2018;49:e243–e261.
2. Hemphill JC 3rd, Greenberg SM, Anderson CS, Becker K, Bendok BR, Cushman M, Fung GL, Goldstein JN, Macdonald RL, Mitchell PH, Scott PA, Selim MH, Woo D; on behalf of the American Heart Association Stroke Council, Council on Cardiovascular and Stroke Nursing, and Council on Clinical Cardiology. Guidelines for the management of spontaneous intracerebral hemorrhage: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2015;46:2032–2060.
3. January CT, Wann LS, Calkins H, Chen LY, Cigarroa JE, Cleveland JC Jr, Ellinor PT, Ezekowitz MD, Field ME, Furie KL, Heidenreich PA, Murray KT, Shea JB, Tracy CM, Yancy CW. 2019 AHA/ACC/HRS focused update of the 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. *Circulation*. 2019;140:e125–e151.

