Measure Number: IEP-007-10

Measure Title: Appropriate head CT imaging in adults with mild traumatic brain injury

Description: Percent of adult patients who presented within 24 hours of a non-penetrating head injury with a Glasgow coma score (GCS) >13 and underwent head CT for trauma in the ED who have a documented indication consistent with guidelines (1) prior to imaging

Numerator Statement: Number of denominator patients who have a documented indication consistent with the American College of Emergency Physicians (ACEP) clinical policy for mild traumatic brain injury prior to imaging

Denominator statement: Number of adult patients undergoing head CT for trauma who presented within 24 hours of a nonpenetrating head injury with a Glasgow Coma Scale (GCS) 14


Data Source: Paper medical record/flowsheet, Electronic administrative data/claims, Electronic clinical data

Measure developer: Partners Healthcare System, Inc.

Type of Endorsement (full or time-limited): Time-Limited Endorsement

Attachments: N/A
This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The sub-criteria and most of the footnotes from the evaluation criteria are provided in Word comments and will appear if your cursor is over the highlighted area (or in the margin if your Word program is set to show revisions in balloons). Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized): Complete all yellow highlighted areas of the form. Evaluate the extent to which each sub-criterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: If there is no TAP or workgroup, the SC also evaluates the sub-criteria (yellow highlighted areas).

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the sub-criterion, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met
C = Completely (unquestionably demonstrated to meet the criterion)
P = Partially (demonstrated to partially meet the criterion)
M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)
N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)
NA = Not applicable (only an option for a few sub-criteria as indicated)

<table>
<thead>
<tr>
<th>(for NQF staff use) NQF Review #: IEP-007-09</th>
<th>NQF Project: Efficiency: Imaging Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MEASURE DESCRIPTIVE INFORMATION</strong></td>
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<tr>
<td>De.1 Measure Title: Appropriate Head CT Imaging in Adults with Mild Traumatic Brain Injury</td>
<td></td>
</tr>
<tr>
<td>De.3 Type of Measure: efficiency/cost</td>
<td></td>
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<tr>
<td>De.4 National Priority Partners Priority Area: Overuse</td>
<td></td>
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<tr>
<td>De.5 IOM Quality Domain: efficiency, safety</td>
<td></td>
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<tr>
<td>De.6 Consumer Care Need:</td>
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<tr>
<th>CONDITIONS FOR CONSIDERATION BY NQF</th>
<th>NQF Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.</td>
<td>A Y N</td>
</tr>
</tbody>
</table>
### A. Do you attest that the measure steward holds intellectual property rights to the measure and the right to use aspects of the measure owned by another entity (e.g., risk model, code set)?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

#### A.2 Indicate if Proprietary Measure (as defined in measure steward agreement):

- [ ] Yes
- [ ] No

#### A.3 Measure Steward Agreement:

- Agreement signed and submitted

#### A.4 Measure Steward Agreement attached:

- [ ] Yes
- [ ] No

#### B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section

- [ ] Yes
- [ ] No

#### C. The intended use of the measure includes both public reporting and quality improvement.

- [ ] Yes
- [ ] No

#### D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is available. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement.

- [ ] Yes
- [ ] No

#### D.1 Testing:

- [ ] No, testing will be completed within 12 months

#### D.2 Have NQF-endorsed measures been reviewed to identify if there are similar or related measures?

- [ ] Yes
- [ ] No

#### (for NQF staff use) Have all conditions for consideration been met?

- [ ] Met
- [ ] Not met

#### Staff Notes to Reviewer(s) (issues or questions regarding any criteria):

Staff Reviewer Name(s):

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### 1. IMPORTANCE TO MEASURE AND REPORT

#### Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.

- [ ] Eval
- [ ] Rating

#### 1a. High Impact

- [ ] 1a.1 Demonstrated High Impact Aspect of Healthcare: affects large numbers, patient/societal consequences of poor quality, frequently performed procedure, high resource use

- [ ] 1a.2

#### 1a.3 Summary of Evidence of High Impact:

- Head injury is a common presenting complaint in American emergency departments, comprising more than 1.8 million cases annually (1). While the potential for serious morbidity and mortality exists, most head injuries are minor, with low risk for serious intracranial injury. As access to CT technology has improved, CT has been increasingly utilized in the evaluation of minor head injury incurring significant cost to the healthcare system. However, because many injuries are indeed low risk, the yield for CT scans for detecting intracranial injury is low (2), and significant variation in CT utilization has been identified (3), clinical decision rules have been developed to reduce unnecessary CT scanning and better standardize care for patients with minor head injury (2, 4). These rules are highly sensitive and have the potential to significantly reduce the number of CT scans ordered for patients with mild traumatic brain injury without missing serious intracranial pathology. As such, the Clinical Policies Committee of the American College of Emergency Physicians has developed a clinical policy that provides evidence-based recommendations in the evaluation of patients with mild traumatic brain injury (5).

#### Comment [KP1]: 1a. The measure focus addresses:

- A specific national health goal/priority identified by NQF’s National Priorities Partners; OR
- A demonstrated high impact aspect of healthcare (e.g., affects large numbers, leading cause of morbidity/mortality, high resource use (current and/or future), severity of illness, and patient/societal consequences of poor quality).


1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: This measure aims to improve quality by improving appropriateness of head CT imaging for emergency department patients with minor traumatic brain injury by increasing adherence to validated clinical decision rules and accepted evidence-based guidelines. Recent studies have shown that a decrease in CT scanning of up to 37% without missing serious intracranial injury can be achieved through the utilization of clinical decision rules (1, 2). Through reductions in unnecessary CT scanning, several benefits are anticipated including decreasing costs to the health care system and decreasing radiation exposure.


1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:

Several studies have shown that there is significant variability in the rates of CT utilization for patients with minor head injury (1) and that the yield of CT in minor head injury is low (2). Furthermore, the awareness and use of validated clinical decision rules directing head CT for patients with minor head injury is low, especially in the United States (3), and likely results in widespread inappropriate use of CT for patients with minor head injury.

1b.3 Citations for data on performance gap:


1b.4 Summary of Data on disparities by population group:

We know of no data to suggest that disparities exist in use of head CT for patients with minor head injury.
In this prospective study involving over 1400 patients in 2 study phases, the authors derive a clinical decision rule to identify which patients with minor head injury require head CT. Using a recursive partitioning model, 5 high risk factors (GCS<15 within 2 hours of injury, suspected traumatic CT findings (83.4% vs 99.4%) and clinically important CT findings (84.5% vs 97.7%). The CCHR was more specific (50.6% vs 12.7%). The authors conclude that the CCHR would have significantly reduced the number of CT scans ordered without missing any important injuries.

Through a prospective cohort study involving over 3000 patients, the authors derive a clinical decision rule known as the Canadian CT Head Rule (CCHR) to identify which patients with minor head injury require head CT. Using a recursive partitioning model, 5 high risk factors (GCS<15 within 2 hours of injury, suspected open skull fracture, sign of basal skull fracture, vomiting = 2 episodes, age > 60 years, drug or alcohol intoxication, deficits in short-term memory, physical evidence of trauma above the clavicles, and seizure). The rule was 100% sensitive and had a specificity of 25%.

The authors of the Canadian CT Head Rule (CCHR) validate the CCHR and compare it against the competing New Orleans Criteria (NOC) rule states that any one of the following 7 clinical findings necessitated head CT including: headache, vomiting, age > 60 years, drug or alcohol intoxication, deficits in short-term memory, physical evidence of trauma above the clavicles, and seizure. The rule was 100% sensitive and had a specificity of 25%.

The authors compare the CCHR and the NOC in a prospective multicenter study in the Netherlands involving 3100 patients and found that both rules were 100% sensitive for patients with injuries requiring neurological intervention, but that the CCHR was less sensitive than the NOC for identifying neurocranial traumatic CT findings (83.4% vs 99.4%) and clinically important CT findings (84.5% vs 97.7%). The CCHR was more specific (50.6% vs 12.7%). The authors conclude that the CCHR would have significantly reduced the number of CT scans ordered without missing any important injuries.
more specific than the NOC for each of neurocranial traumatic CT findings (39.4% vs 5.6%) and clinically important CT findings (38.9% vs 5.5%). The authors concluded that the CCHR would have reduced the number of CT scans ordered more than the NOC (37.1 vs 5.3%).

1c.5 Rating of strength/quality of evidence (also provide narrative description of the rating and by whom):
The evidence from which the ACEP 2008 Clinical Policy on Neuroimaging and Decisionmaking in Adult Mild Traumatic Brain Injury in the Acute Setting was rated by a multidisciplinary panel including members of the American College of Emergency Physicians and the Centers for Disease Control and Prevention. Relevant medical literature was identified through searches of MEDLINE and the Cochrane Database from January 2000 through 2007. Rating of strength and quality of evidence was achieved through rating the quality of the study design on a 3-point scale, and then each paper was graded on an individual basis on 6 dimensions relevant to clinical guideline development, and the evidence was given a final grade of class I, II or III.

1c.6 Method for rating evidence: All articles used in the formation of the ACEP clinical policy were graded by at least 2 subcommittee members into three different classes of evidence based on study design, with “1” representing the strongest evidence and “3” representing the weakest evidence. Articles were then further rated on 6 dimensions thought to be relevant to development of a clinical guideline, including: blinded vs unblinded outcome assessment, blinded or randomized allocation, direct or indirect outcome measures, biases, external validity, and sample size. They then received a final grade of Class I, II or III according to a predetermined formula.

Strength of recommendations was then classified into 3 categories: Level A - High degree of clinical certainty based on Class I or Class II evidence; Level B - Moderate clinical certainty based on Class II or Class II evidence; Level C - Consensus recommendations based on incomplete, conflicting or preliminary evidence.

For more details on the rating system, please refer directly to the ACEP Clinical Policy:


1c.7 Summary of Controversy/Contradictory Evidence: There are currently no significant controversies or contradictions in the evidence.


1c.9 Quote the Specific guideline recommendation (including guideline number and/or page number): In the ACEP Clinical Policy, Critical Question #1 on page 718 provides the recommendation:

“Critical Question #1. Which patients with mild traumatic brain injury should have a non-contrast head CT scan in the ED?

Recommendations:
Level A recommendations: A noncontrast head CT is indicated in head trauma patients with loss of
consciousness or post-traumatic amnesia only if one or more of the following is present: headache, vomiting, age greater than 60 years, drug or alcohol intoxication, deficits in short-term memory, physical evidence of trauma above the clavicle, posttraumatic seizure, GCS score less than 15, focal neurologic deficit, or coagulopathy."

Level B recommendations: A noncontrast head CT should be considered in head trauma patients with no loss of consciousness or posttraumatic amnesia if there is a focal neurologic deficit, vomiting, severe headache, age 65 years or greater, physical signs of a basilar skull fracture, GCS score less than 15, coagulopathy, or a dangerous mechanism of injury."

"Dangerous mechanism of injury includes ejection from a motor vehicle, a pedestrian struck, and a fall from a height of more than 3 feet or 5 stairs.

Level C recommendations: None specified"
### 2. 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. (evaluation criteria)

<table>
<thead>
<tr>
<th>Rationale:</th>
<th>Y</th>
<th>N</th>
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#### 2a. MEASURE SPECIFICATIONS

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<tr>
<th>Question</th>
<th>Rating</th>
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<tbody>
<tr>
<td>Do you have a web page where current detailed measure specifications can be obtained?</td>
<td></td>
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<tr>
<td>If yes, provide web page URL:</td>
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</tr>
</tbody>
</table>

#### 2a.1 Numerator Statement (Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome):

Number of denominator patients who have a documented indication consistent with the ACEP clinical policy for mild traumatic brain injury prior to imaging.

#### 2a.2 Numerator Time Window (The time period in which cases are eligible for inclusion in the numerator):

Numerator and denominator data will be collected concurrently at the index visit only, and will not be measured over subsequent time intervals.

#### 2a.3 Numerator Details (All information required to collect/calculate the numerator, including all codes, logic, and definitions):

**Indications for Head CT in patients presenting to the ED for mild traumatic brain injury:**

**Patients with loss of consciousness or posttraumatic amnesia AND**
- Headache OR
- Vomiting OR
- Age>60 OR
- Drug/alcohol intoxication OR
- Short-term memory deficits OR
- Evidence of trauma above the clavicles OR
- Posttraumatic seizure OR
- GCS<15 OR
- Focal neurological deficit OR
- Coagulopathy*

**Patients without loss of consciousness or posttraumatic amnesia AND**
- Severe headache OR
- Vomiting OR
- Age>65 OR
- GCS<15 OR
- Physical signs of a basilar skull fracture OR
- Focal neurological deficit OR
- Coagulopathy* OR
- Dangerous Mechanism**

*Patient taking anticoagulation (warfarin, fractionated or unfractionated heparin) or has a documented coagulation disorder

**Dangerous mechanism of injury includes: ejection from a motor vehicle, a pedestrian struck, and a fall from a height of more than 3 feet or 5 stairs.

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Comment [KP8]: 2a. The measure is well defined and precisely specified so that it can be implemented consistently within and across organizations and allow for comparability. The required data elements are of high quality as defined by NQF’s Health Information Technology Expert Panel (HITEP).

2a.4 Denominator Statement (Brief, text description of the denominator - target population being measured):
Number of adult patients undergoing head CT for trauma who presented within 24 hours of a non-penetrating head injury with a Glasgow Coma Scale (GCS) ?14

2a.5 Target population gender: Female, Male
2a.6 Target population age range: The target population includes all ED patients 16 years of age and older.

2a.7 Denominator Time Window (The time period in which cases are eligible for inclusion in the denominator):
Numerator and denominator data will be collected concurrently at the index visit only, and will not be measured over subsequent time intervals.

2a.8 Denominator Details (All information required to collect/calculate the denominator - including all codes, logic, and definitions):
? Head CT performed in emergency department (with or without contrast)
? Age =16 years
? Non-penetrating head trauma
? Emergency department presentation within 24 hours of injury
? Glasgow Coma Scale (GCS) 14 or 15 on initial emergency department evaluation

2a.9 Denominator Exclusions (Brief text description of exclusions from the target population):
- Age <16 years
- GCS <14 on initial ED evaluation
- Obvious penetrating skull injury or obvious depressed skull fracture
- Patients with multisystem trauma
- Returned for reassessment of the same injury
- Pregnant

2a.10 Denominator Exclusion Details (All information required to collect exclusions to the denominator, including all codes, logic, and definitions):

2a.11 Stratification Details/Variables (All information required to stratify the measure including the stratification variables, all codes, logic, and definitions):

2a.12-13 Risk Adjustment Type: no risk adjustment necessary

2a.14 Risk Adjustment Methodology/Variables (List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method):

2a.15-17 Detailed risk model available Web page URL or attachment:

2a.18-19 Type of Score: rate/proportion
2a.20 Interpretation of Score: better quality = higher score
2a.21 Calculation Algorithm (Describe the calculation of the measure as a flowchart or series of steps):

2a.22 Describe the method for discriminating performance (e.g., significance testing):
This measure does not require any significance testing. Rather rates of imaging use will be reported with the opportunity for classification by quintiles or other similar mechanisms based on initial reporting.

2a.23 Sampling (Survey) Methodology If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate):

Rating: C=Completely; P=Partially; M=Minimally; N=Not at all; NA=Not applicable
2a.24 Data Source (Check the source(s) for which the measure is specified and tested)
- paper medical record/flowsheet,
- Electronic administrative data/claims,
- Electronic clinical data

2a.25 Data source/data collection instrument (identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.);
- Data will be collected from the medical record, specifically from the provider’s order for a brain CT. No specific data collection instrument need be used since the determination of guideline adherence will be made solely on the criteria mentioned in the guideline. These can be easily recorded either electronically or on paper using institution-specific instruments.

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL
http://www.brighamandwomens.org/emergencymedicine/Quality_Improvement.aspx?sub=0

2a.29-31 Data dictionary/code table web page URL or attachment:

2a.32-35 Level of Measurement/Analysis (Check the level(s) for which the measure is specified and tested)

2a.36-37 Care Settings (Check the setting(s) for which the measure is specified and tested)
- Ambulatory Care: Emergency Dept, Other (specify) This measure was developed for use in the ED, but the guideline upon which it is based is not specific for the ED. It would be reasonable to consider the measure for the following additional care settings: Office, Clinic, and Hospital Outpatient

2a.38-41 Clinical Services (Healthcare services being measured, check all that apply)
- Clinicians: PA/NP/Advanced Practice Nurse, Clinicians: Physicians (MD/DO)

### TESTING/ANALYSIS

<table>
<thead>
<tr>
<th>2b. Reliability testing</th>
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<tbody>
<tr>
<td>2b.1 Data/sample (description of data/sample and size): The guidelines used as the basis for the measure are drawn from large prospective cohort studies conducted in the United States, Canada and Europe deriving and validating clinical decision rules. The evidence for these rules is strong and non-conflicting. In addition to the evidence base of these guidelines, we are current engaging in internal quality improvement initiatives intended to measure efficiency in CT head use for ED patients presenting with mild traumatic brain injury.</td>
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<tr>
<th>2b.2 Analytic Method (type of reliability &amp; rationale, method for testing):</th>
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<tr>
<th>2b.3 Testing Results (reliability statistics, assessment of adequacy in the context of norms for the test conducted):</th>
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<tr>
<th>2c. Validity testing</th>
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<tr>
<td>2c.1 Data/sample (description of data/sample and size):</td>
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<tr>
<th>2d. Exclusions Justified</th>
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**Comment [KP10]:** 2b. Reliability testing demonstrates the measure results are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period.

**Comment [K11]:** 8 Examples of reliability testing include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing may address the data items or final measure score.

**Comment [KP12]:** 2c. Validity testing demonstrates that the measure reflects the quality of care provided, adequately distinguishing good and poor quality. If face validity is the only validity addressed, it is systematically assessed.

**Comment [KP13]:** 9 Examples of validity testing include, but are not limited to: determining if measure scores adequately distinguish between providers known to have good or poor quality assessed by another valid method; correlation of measure scores with another valid indicator of quality for the specific topic; ability of measure scores to predict scores on some other related valid measure; content validity for multi-item scales/tests. Face validity is a subjective assessment by experts of whether the measure reflects the quality of care (e.g., whether the proportion of patients with BP < 140/90 is a marker of quality). If face validity is the only validity addressed, it is systematically assessed (e.g., ratings by relevant stakeholders) and the measure is judged to represent quality care for the specific topic and that the measure focus is the most important aspect of quality for the specific topic.

**Comment [KP14]:** 2d. Clinically necessary measure exclusions are identified and must be:
- supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;
- AND
  - clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;
  - AND
  - precisely defined and specified: if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact of inclusion and exclusion); if patient preference (e.g., informed decision-making), is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately).
2d.1 Summary of Evidence supporting exclusion(s):
These exclusions are based largely on the exclusions cited in the original research on which the current ACEP Clinical Policy is based, namely, the New Orleans’ Criteria and the Canadian CT Head Rule. All of the above groups except “pregnant” are excluded because they are perceived to be subgroups at higher risk for serious injury, and as such were excluded from the original derivation studies of the clinical decision rules. Pregnant patients are excluded because of concerns over radiation exposure to the fetus, and are less likely to be imaged, and more likely to be admitted and observed, to reduce the risk of injury to the fetus.

2d.2 Citations for Evidence:

2d.3 Data/sample (description of data/sample and size):
2d.4 Analytic Method (type analysis & rationale):
2d.5 Testing Results (e.g., frequency, variability, sensitivity analyses):

2e. Risk Adjustment for Outcomes/ Resource Use Measures
2e.1 Data/sample (description of data/sample and size):
2e.2 Analytic Method (type of risk adjustment, analysis, & rationale):
2e.3 Testing Results (risk model performance metrics):
2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:

2f. Identification of Meaningful Differences in Performance
2f.1 Data/sample from Testing or Current Use (description of data/sample and size):
2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance (type of analysis & rationale):
2f.3 Provide Measure Scores from Testing or Current Use (description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance):

2g. Comparability of Multiple Data Sources/Methods
2g.1 Data/sample (description of data/sample and size):
2g.2 Analytic Method (type of analysis & rationale):
2g.3 Testing Results (e.g., correlation statistics, comparison of rankings):

Comment [K15]: 10 Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, sensitivity analyses with and without the exclusion, and variability of exclusions across providers.

Comment [KP16]: 2e. For outcome measures and other measures (e.g., resource use) when indicated:
• an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care; OR rationale/data support no risk adjustment.

Comment [K17]: 13 Risk models should not obscure disparities in care for populations by including factors that are associated with differences/inequalities in care such as race, socioeconomic status, gender (e.g., poorer treatment outcomes of African American men with prostate cancer, inequalities in treatment for CVD risk factors between men and women). It is preferable to stratify measures by race and socioeconomic status rather than adjusting out differences.

Comment [KP18]: 2f. Data analysis demonstrates that methods for scoring and analysis of the specified measure allow for identification of statistically significant and practically/clinically meaningful differences in performance.

Comment [K19]: 14 With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74% v. 75%) is clinically meaningful; or whether a statistically significant difference of $25 in cost for an episode of care (e.g., $5,000 v. $5,025) is practically meaningful. Measures with overall poor performance may not demonstrate much variability across providers.

Comment [KP20]: 2g. If multiple data sources/methods are allowed, there is demonstration they produce comparable results.
2h. Disparities in Care

2h.1 If measure is stratified, provide stratified results (scores by stratified categories/cohorts):

2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:

TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria for Scientific Acceptability of Measure Properties?

Steering Committee: Overall, to what extent was the criterion, Scientific Acceptability of Measure Properties, met?

Rationale:

3. USABILITY

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)

3a. Meaningful, Understandable, and Useful Information

3a.1 Current Use: testing not yet completed

3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large) (if used in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years):

We intend this measure to be suitable for public reporting in the future. We plan to continue our internal Quality Improvement study to demonstrate the efficiencies in imaging, which can be result from use of the measure.

3a.3 If used in other programs/initiatives (if used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years):

Testing of Interpretability (Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement)

3a.4 Data/sample (description of data/sample and size):

3a.5 Methods (e.g., focus group, survey, QI project):

3a.6 Results (qualitative and/or quantitative results and conclusions):

3b/3c. Relation to other NQF-endorsed measures

3b.1 NQF # and Title of similar or related measures:

(for NQF staff use) Notes on similar/related endorsed or submitted measures:

3b. Harmonization

If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source or different topic but same target population):

3b.2 Are the measure specifications harmonized? If not, why?
### 3c. Distinctive or Additive Value

3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF- endorsed measures:

5.1 Competing Measures If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the same target population), describe why it is a more valid or efficient way to measure quality:

- **TAP/Workgroup:** What are the strengths and weaknesses in relation to the sub-criteria for Usability?
  - **Steering Committee:** Overall, to what extent was the criterion, Usability, met?
  - **Rationale:**

### 4. FEASIBILITY

Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)

<table>
<thead>
<tr>
<th>4a. Data Generated as a Byproduct of Care Processes</th>
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<tbody>
<tr>
<td>4a.1-2 How are the data elements that are needed to compute measure scores generated?</td>
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<tr>
<td>data generated as byproduct of care processes during delivery,</td>
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<table>
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<tr>
<th>4b. Electronic Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>4b.1 Are all the data elements available electronically? (elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims)</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>4b.2 If not, specify the near-term path to achieve electronic capture by most providers.</td>
</tr>
<tr>
<td>All data elements are not likely to be available electronically to most providers currently. Although many electronic health records include computerized physician order entry (CPOE) for radiologic tests, most are not currently programmed to have guideline-based decision support. At Brigham and Women’s Hospital, the Center for Evidence Based Imaging has developed a CPOE interface that can collect specific clinical information at the time of ordering and offer interactive decision support. This measure is one of several for which there is ongoing quality improvement work utilizing this interface. Although most electronic health records do not currently have the exact specifications for this measure in their CPOE, it is technically feasible for them to be reprogrammed to include such data. The measure specifications provided include all information needed for any EHR to be reprogrammed to collect the needed data elements. Providers who do not have CPOE could implement a templated paper order entry form that included all data fields. Alternatively they could conduct chart review to identify if the data fields were present at the time of test ordering, but this would likely have a low yield as most clinical charts do not have time to data entry and many are completed at the end of the patient visit. If approved by the NQF, we would produce a model templated paper order entry form for this measure. Ultimately, this and other measures will be significantly aided by the transition to electronic health records.</td>
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<tr>
<th>4c. Exclusions</th>
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<tbody>
<tr>
<td>4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?</td>
</tr>
<tr>
<td>Yes</td>
</tr>
</tbody>
</table>
4c.2 If yes, provide justification. The specified exclusions require additional data sources only if an electronic order entry system is not programmed to capture them. In this case, clinical records, either electronic or paper would be needed to identify exclusions. An EHR can be programmed to collect all data on exclusions at the time of order entry.

4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences

4d.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results.

As with any NQF measure based on guideline recommendations, the major source of inaccuracy or error will be incomplete medical records. This measure is based on a set of specific clinical criteria outlined by the guideline and will require physicians to document the presence or absence of these criteria in patients undergoing CT imaging.

The main unintended consequence of this measure is that CT images ordered by emergency physicians at the request of consultants may be attributed to the emergency physicians themselves. However, by analyzing this measure at the Group or Facility level, organizations can develop measure-specific policies that will apply to all physicians, including emergency physicians and consultants.

4e. Data Collection Strategy/Implementation

4e.1 Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data/missing data, timing/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/implementation issues:

Successful data collection using an electronic order entry system is dependent on designing an explicit order form with a method of categorizing indications for CT imaging. If these indications are categorized correctly, the inclusion and exclusion criteria can effectively sort the CT images obtained into those to which the guideline should apply and those to which it should not.

4e.2 Costs to implement the measure (costs of data collection, fees associated with proprietary measures): The cost to implement this measure will depend on the method used to collect data. An electronic order entry system, after it is programmed, will be able to determine guideline-appropriateness for little or no cost other than that associated with the programming. Personnel time will be needed if paper medical records are to be reviewed in order to determine the appropriateness of individual CTS.

4e.3 Evidence for costs:

4e.4 Business case documentation:

TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria for Feasibility?

| Steering Committee: Overall, to what extent was the criterion, Feasibility, met? |
|-------------------|-----------------|-----------------|-----------------|
| Rationale:        | 4               | C               | P               |

RECOMMENDATION

(for NQF staff use) Check if measure is untested and only eligible for time-limited endorsement.

| Steering Committee: Do you recommend for endorsement? |
|------------------------------------------------------|-------------|
| Comments:                                            | Y           | N               |

Rating: C=Completely; P=Partially; M=Minimally; N=Not at all; NA=Not applicable
CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 Organization
Partners HealthCare System, Inc. | Prudential Tower, 800 Boylston Street, Suite 1150 | Boston | Massachusetts | 02199-8001

Co.2 Point of Contact
Sheridan | Kassirer, Vice President, Quality Management and Clinical Programs | eesheppard@partners.org | 617-278-1036

Measure Developer if different from Measure Steward
Co.3 Organization
Partners HealthCare System, Inc. | Prudential Tower, 800 Boylston Street, Suite 1150 | Boston | Massachusetts | 02199-8001

Co.4 Point of Contact
Jereimah | Schuur, MD, MHS | jschuur@partners.org | 617-525-8872

Co.5 Submitter If different from Measure Steward POC
Jereimah | Schuur, MD, MHS | jschuur@partners.org | 617-525-8872 | Partners HealthCare System, Inc.

Co.6 Additional organizations that sponsored/participated in measure development

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 Provide a list of sponsoring organizations and workgroup/panel members’ names and organizations. Describe the members’ role in measure development.
Measure development team: Jeremiah Schuur, M.D., MHS, Brigham and Women’s Hospital; Ron Walls, M.D., Brigham and Women’s Hospital; Richard Zane, M.D., Brigham and Women’s Hospital; Ali Russia, M.D., MBA, Brigham and Women’s Hospital; James Andruchow, MD, Brigham and Women’s Hospital; Arjun Venkatesh, M.D., MBA, Brigham and Women’s Hospital.

Ad.2 If adapted, provide name of original measure:
Ad.3-5 If adapted, provide original specifications URL or attachment

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 Year the measure was first released: 2009
Ad.7 Month and Year of most recent revision: 2010-05
Ad.8 What is your frequency for review/update of this measure? Every 2 years.
Ad.9 When is the next scheduled review/update for this measure? 2011-12

Ad.10 Copyright statement/disclaimers:

Ad.11 -13 Additional Information web page URL or attachment:

Date of Submission (MM/DD/YY): 05/19/2010
#IEP-007-10 Appropriate Head CT Imaging in Adults with Mild Traumatic Brain Injury /BWH

**Description**

Percent of adult patients who presented within 24 hours of non-penetrating head injury with a Glasgow coma score (GCS) >13 and underwent head CT for trauma in the ED who have a documented indication consistent with guidelines prior to imaging.

**Initial In-person Vote**

Recommend for endorsement with conditions – 16  
Not recommend for endorsement - 3

<table>
<thead>
<tr>
<th>Steering Committee Questions/Conditions for Measure Developer:</th>
<th>Abbreviated Response from Measure Developer:</th>
</tr>
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<tbody>
<tr>
<td>• Need to affirm a 12 month testing strategy using strictly the paper form of the data collection tool</td>
<td>• PHS is committed to conducting a paper testing strategy within the next 12 months but has not yet started it at this time.</td>
</tr>
<tr>
<td>• Consider changing the inclusion criteria to read a GCS ≥ to 13 or provide a rational for why the measure as currently written uses an inclusion criteria of &gt; than 13</td>
<td>• Does not support</td>
</tr>
<tr>
<td></td>
<td>• Examining “paper” testing at other Partners HealthCare site or ED and will inform the committee as soon as confirmed.</td>
</tr>
<tr>
<td></td>
<td>• <em>Note: Most Partners HealthCare sites have CPOE for radiology, although all do not have the active decision support system that is at BWH.</em></td>
</tr>
<tr>
<td></td>
<td>• GC&gt;=13 considered during measure development;</td>
</tr>
<tr>
<td></td>
<td>• Decision, based on evidence, for GC &gt;13 as the cut-off score for this measure. (See additional notes in response.)</td>
</tr>
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</table>

**Detailed Response from Measure Developer:**

• While we have already begun a testing strategy it is based upon computerized physician order entry (CPOE). We cannot commit to conducting a paper testing strategy at this date, but are actively investigating this. We are looking into the possibility of doing this at another Partners HealthCare site or another ED and will be in touch with the committee as soon as we confirm. Most Partners HealthCare sites have CPOE for radiology, although all do not have the active decision support system that is at BWH.

• There have been a number of GCS criteria used in the various studies on which this measure is based. While the Canadian CT Head Rule uses an initial GCS of 13-15 (allowing two hours for normalization of the GCS to 15), the New Orleans Criteria and the majority of later studies have used either a GCS of 15 or a GCS of 14-15 as inclusion criteria. For this reason, the authors of the ACEP Clinical Policy based their recommendation on a GCS inclusion criterion of 14-15. We have created the performance measure to follow this most recent evidence based guideline.
Revised/Clarified MD response submitted to NQF on Thursday April 8, 2010:

- PHS is committed to conducting a paper testing strategy within the next 12 months but have not yet started it at this time