

# **Center for Clinical Standards and Quality (CCSQ)**

## **Centers for Medicare & Medicaid Services (CMS)**



### **Measure Justification Form**

**Hospital Harm: Postoperative Venous Thromboembolism**

**Task 2, Deliverable #3-4**

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Version 4

**SUBMITTED TO**

Centers for Medicare & Medicaid Services (CMS)  
Center for Clinical Standards and Quality (CCSQ)

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**PROJECT**

Patient Safety Measure Development and Maintenance  
Contract Number: 75FCMC18D0027

**TASK & DELIVERABLE**

Chapter 3 Information Gathering  
Deliverable 3-4 Measure Justification Form

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## Overview

**PROJECT TITLE:** Patient Safety Measure Development and Maintenance Project

**DATE:** Information included is current on September 21, 2021.

**PROJECT OVERVIEW:** The Centers for Medicare & Medicaid Services (CMS) has contracted with IMPAQ International, LLC (IMPAQ) to develop, maintain, reevaluate, and implement patient safety measures for CMS' hospital-level quality reporting programs. The contract name is Patient Safety Measure Development and Maintenance. The contract number is 75FCMC19F0001 (Task Order: 75FCMC19F0001).

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# Measure Name

Hospital Harm – Postoperative Venous Thromboembolism

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## 1. Type of Measure

Outcome

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## 2. Importance (NQF Importance to Measure and Report)

### 2.1 EVIDENCE TO SUPPORT THE MEASURE FOCUS

Venous thromboembolism (VTE) is a condition characterized by a blood clot form along the wall of a moderate or large diameter vein. VTE includes two related conditions – deep vein thrombosis (DVT) and pulmonary embolism (PE). DVT refers to a blood clot that develops in large or moderate diameter vein in the “deep venous system” (not the superficial venous system). These clots generally occur in the deep veins in the legs but can also occur in the arms or in other veins in the body. PE refers to blood clot(s) that form in the deep veins that dislodge and migrate into the arterial circulation of the lung, blocking some or all of the blood flow through the lung. The group of hospital surgery patients with the highest-risk for manifesting VTE include patients who undergo: 1) orthopedic surgery involving the acetabulum, tibia and tibia (including elective hip or knee arthroplasty); 2) acute spinal cord injury with paresis; 3) multiple major trauma; 4) any surgery in the presence of metastatic cancer; and 5) neurosurgery or spine surgery.<sup>1</sup>

VTE is the most common “potentially-preventable cause of death in surgical patients.”<sup>2</sup> According to the Agency for Healthcare Research and Quality (AHRQ), there were an estimated 25,400 postoperative VTEs in the United States in 2014.<sup>3</sup> Despite a 17% reduction in the absolute number of postoperative acute VTE events from 25,400 in 2014 to 21,080 VTE in 2017, further reductions were deemed necessary.<sup>3</sup> Development of acute VTE can lead to poor clinical outcomes, including fatal PE, severe post thrombotic syndrome in the leg, and fatal bleeding during treatment of acute VTE.<sup>4</sup>

VTE in the surgical population can contribute substantially to the costs of an inpatient stay. The mean excess costs for VTE occurring post-operatively for over 100,000 Veterans Affairs (VA)

orthopedic surgery patients ranged from \$17,453-\$18,935 (in 2007 dollars), compared to similar patients without VTE.<sup>5</sup> In a pooled meta-analysis of four studies, researchers estimated hospital-acquired VTE to be associated with \$17,367 [95% CI \$11,837–\$22,898]) in additional costs.<sup>4</sup> While there have been recent declines in the incidence of postoperative VTE,<sup>3</sup> there remains opportunity to further reduce the occurrence of these events. An electronic clinical quality measure (eCQM)-based Hospital Harm – Postoperative VTE measure would enable hospitals to more reliably assess harm reduction efforts and modify their quality improvement efforts in near real-time. The measure would also help to identify hospitals that have persistently high postoperative VTE rates. The proposed measure concept will ensure that postoperative acute VTE events are tracked and that hospitals are incentivized to reduce the incidence of postoperative VTE. The eCQM would also be able to identify cases from an all-payer population, as it would not be dependent upon claims-based ICD-10-CM coded data.

Recommended clinical practices and guidelines to reduce VTE in the surgical population include the use of pharmacologic thromboprophylaxis (e.g., anticoagulants) and mechanical prophylaxis (e.g., graduated compression stockings), assessing individual patient risk (e.g. through Rogers or Caprini scores),<sup>6,7</sup> and customizing a plan of care that balances the individual patients' risks of both VTE and bleeding.<sup>8–13</sup> Studies suggest that alert systems can increase the incidence of patients receiving appropriate prophylaxis and reduce the incidence of hospital-acquired VTE in the medical and surgical populations.<sup>14</sup> Given the body of evidence that appropriate thromboprophylaxis can reduce the incidence of post-operative VTE events by about 50%, an outcome measure of hospital harm due to VTE is appropriate.

This eCQM is an adaptation of AHRQ's current claims-based Patient Safety Indicator (PSI 12), "Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate." PSI 12 focuses on the surgical patient population that does not have an acute VTE 'present on admission'.<sup>15</sup> An eCQM uses discrete electronic health record (EHR) fields that are time-stamped upon data entry, and therefore, can identify if an event is post-operative. Conversely, ICD-10-CM diagnosis codes have no such time stamp, which means the AHRQ PSI 12 claims measure encompasses the entire perioperative period including the preoperative period, not just the time frame following the surgical procedure. Surgical patients are considered at much higher risk for developing VTE.<sup>1</sup> Additionally, guideline recommendations for prevention and management are more homogeneous for this subset of surgical patients than for the entire population of medical and surgical patients.<sup>8,9,11</sup>

### **2.1.1 This is a Measure of:**

☒ Outcome: *Hospital Harm – Postoperative Venous Thromboembolism*

## 2.1.2 Logic Model

The goal of this eCQM is to raise awareness of postoperative VTE, provide hospitals with a measure that allows them to monitor VTE as an outcome in their surgical patients, and, ultimately, to improve patient safety by reducing the incidence of postoperative VTE in high-risk patients.

Thromboprophylaxis is the most frequently cited evidence-based method to prevent postoperative VTE. Thromboprophylaxis can reduce the incidence of VTE in at-risk patients by 30-65%,<sup>1,16</sup> has a low risk of major bleeding complications,<sup>1,16</sup> and is cost-effective.<sup>1,17</sup>

Recommended anticoagulants for postoperative VTE prophylaxis are listed below in **Table 1**. Recommended clinical practices and professional society guidelines to reduce VTE in the surgical population include the use of pharmacologic prophylaxis, with or without mechanical prophylaxis based on assessing each individual patient's risk, and balancing the risk of VTE with the risk of bleeding.<sup>8-13</sup> The literature suggests that alert systems can increase the incidence of patients receiving appropriate prophylaxis and reduce the incidence of hospital-acquired VTE and that multifaceted interventions are associated with small increases in patients receiving prophylaxis.<sup>14</sup>

Additionally, the literature also suggests that early ambulation/mobilization can reduce the incidence of VTE.<sup>18-20</sup> The institution of an early ambulation protocol (defined as ambulation within 24 hours post-surgery) resulted in a 30-fold reduction in the risk of postoperative DVT after knee replacement surgery, controlling for other risk factors, in a single-site study of 195 patients (27.6% incidence in the control group of 98 patients, 1.0% incidence in the early mobilization group of 97 patients,  $p < 0.001$ ).<sup>20</sup> A multi-site case-control study of 130 cases matched to 463 controls patients found factors significantly associated with VTE were: bilateral simultaneous total knee arthroplasty (odds ratio [OR] = 4.2; 95% confidence interval [CI]: 1.9-9.1); receipt of FDA-approved pharmacological prophylaxis (OR = 0.5; 95% CI: 0.3-0.8); and ambulation by postoperative day 2 (OR = 0.3; 95% CI: 0.1-0.9).<sup>18</sup> This suggests that hospitals can improve their rates of postoperative VTEs through implementing pharmacologic prophylaxis and early ambulation. **Figure 1** outlines the link between processes of care and VTE-related patient outcomes.

**Table 1 – Anticoagulant Prophylaxis Doses for VTE**

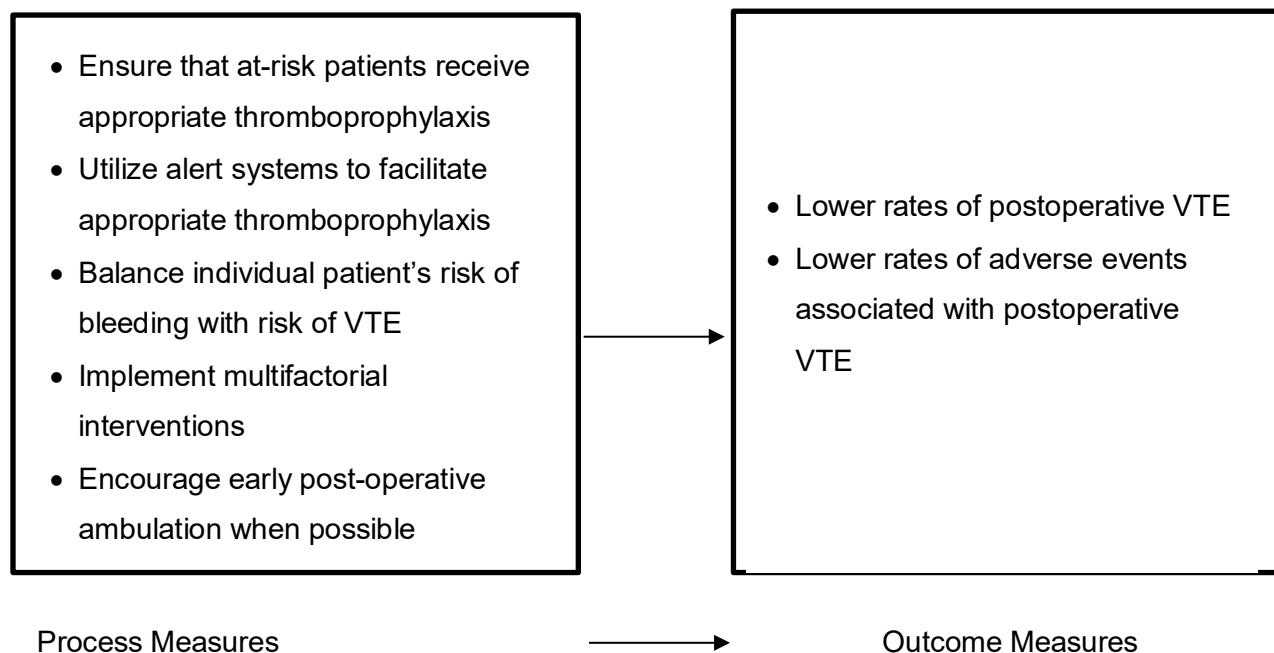
Anticoagulant	Prophylaxis dose
Fondaparinux	2.5 mg subcutaneously, daily
Dabigatran (Post hip replacement only)	• <i>First day</i> : 110 mg orally, THEN • 220 mg daily



Anticoagulant	Prophylaxis dose
Rivaroxaban (Post hip or knee replacement only)	10 mg daily
Enoxaparin	<ul style="list-style-type: none"> <li>• 40 mg subcutaneously once daily</li> <li>• <i>Bariatric surgery</i>: 40 mg, twice daily</li> <li>• 30 mg subcutaneously twice daily for hip or knee replacement surgery</li> </ul>
Apixaban (Post hip or knee replacement only)	2.5 mg orally every 12 hours
Dalteparin	<ul style="list-style-type: none"> <li>• 2,500 subcutaneously once daily, OR</li> <li>• 5,000 IU subcutaneously once daily, OR</li> <li>• 2,500 IU subcutaneously, THEN <ul style="list-style-type: none"> <li>○ 2,500 IU 12 hours later, THEN</li> <li>○ 5,000 IU once daily subcutaneously</li> </ul> </li> </ul>
Warfarin	<b>TBD</b>
Unfractionated Heparin (UFH)	1,000 IU subcutaneously two or three times daily

Acronyms: mg = milligram; IU = international unit.

**Figure 1 – Link of Process to Outcome Measures for In-Hospital Postoperative VTE**



If a patient has a suspected VTE, there are several imaging tests used by hospitals to both identify blood clots in the veins or lungs and rule out other diagnostic possibilities (muscle tear,



hematoma, etc.).<sup>21</sup> These tests include duplex ultrasonography, contrast venography, magnetic resonance imaging (MRI), and computed tomography (CT) scans to detect DVT; and computed tomographic pulmonary angiography (CTPA), ventilation-perfusion (V/Q) scans, pulmonary angiography, and MRI to detect PE.<sup>21,22</sup> A serum D-dimer laboratory test adjusted for age, when normal, is useful to rule out the possibility of an acute blood clot. If a postoperative VTE is detected, treatment is usually either oral, subcutaneously or intravenously administered higher-dose anticoagulation therapy or, if anticoagulation is contraindicated, deployment of an inferior vena cava (IVC) filter in patients who have a documented lower extremity DVT.<sup>21,23</sup> Some examples of anticoagulants used in the hospital setting that are recommended for treatment of postoperative VTE are listed below in **Table 2**.

**Table 2 – Anticoagulant Treatment Doses for VTE**

Anticoagulant	Treatment Dose
Fondaparinux	<ul style="list-style-type: none"> <li>• 5 mg, 7.5 mg or 10 mg subcutaneously, once daily (based on weight)</li> <li>• <i>Renal insufficiency</i>: 2.5 mg subcutaneously, daily</li> </ul>
Rivaroxaban <sup>i</sup>	15 mg PO twice daily for 21 days followed by 20 mg PO once a day
Enoxaparin <sup>ii</sup>	<ul style="list-style-type: none"> <li>• 1 mg/kg twice daily, OR</li> <li>• 1.5 mg/kg once daily</li> </ul>
Apixaban <sup>iii</sup>	10 mg PO twice a day for 7 days followed by 5 mg PO twice daily thereafter. (Potential dose reduction based on weight, age and creatinine)
Unfractionated Heparin (UFH)	No bolus or 2,500 IU or 5000 IU bolus followed by infusion of 18 IU/kg per hour dose

Acronyms: mg – milligram; mg/kg- a milligram of medication per kilogram of the body weight of the person taking the medication; IU/kg – a international unit of medication per kilogram of body weight of the person taking the medication; PO – medication taken orally through the mouth; CrCL – creatine clearance; LMWH – low-molecular weight heparin dosing; INR- International Normalized Ratio.

Given that physicians first conduct an imaging test to document the presence of a blood clot, and then treat the blood clot using full dose anticoagulation therapy, identification of a patient with a diagnosis of acute VTE using data from an EHR is possible using several different strategies. Henry Ford Hospital (**Figure 2**) has used a logic that starts with the addition of a new diagnosis of DVT/PE to the hospital problem list coupled with administration of therapeutic

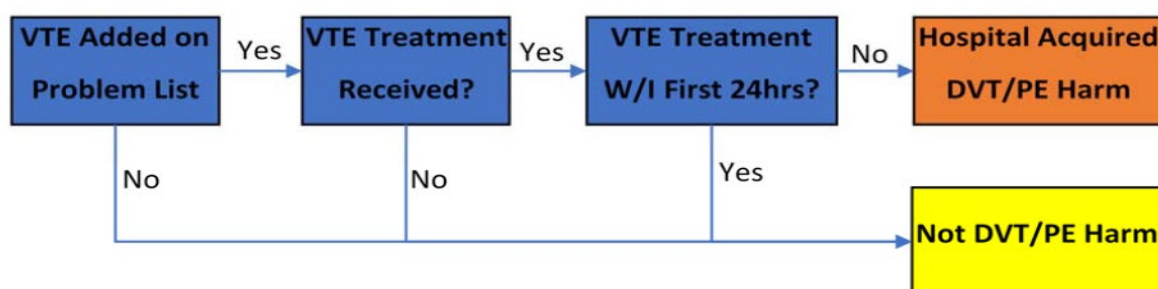
<sup>i</sup> >10 mg of Rivaroxaban daily orally is also recommended for treatment of nonvalvular AF; 10 mg orally once daily is recommended for long-term prevention of VTE

<sup>ii</sup> 1 mg/kg twice daily or lower dose of Enoxaparin is also recommended for AF patients perioperatively

<sup>iii</sup> 5 mg twice daily or lower of Apixaban is also recommended for reduction in the risk of stroke/systemic embolism in patients with nonvalvular AF

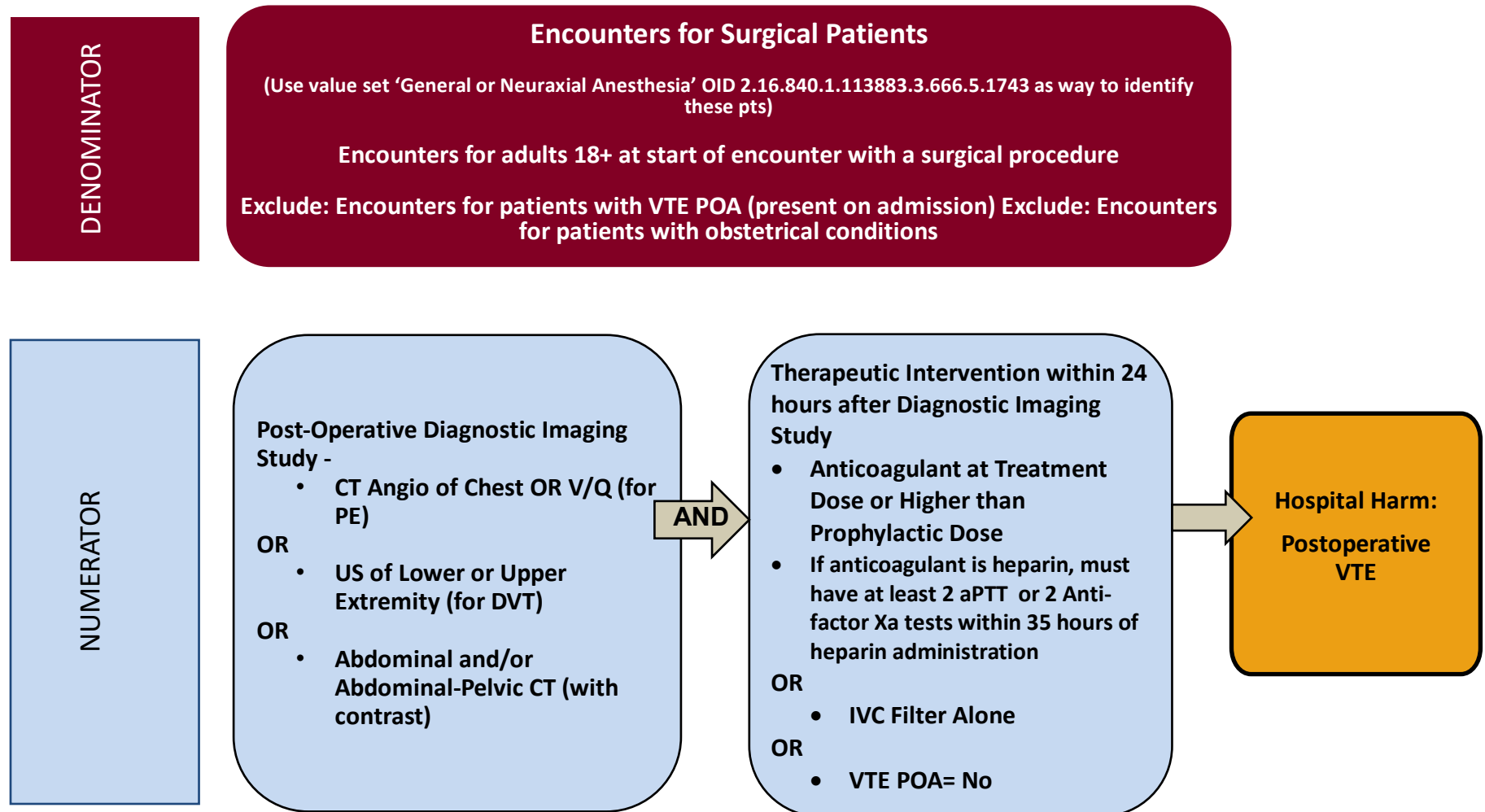
doses of an anticoagulant. Researchers at this hospital tested this logic against a modified version of PSI 12 that included both medical and surgical patients in the denominator.<sup>24</sup> The model was more than twice as sensitive in identifying a VTE event as the modified PSI 12 including medical and surgical patients (84% [95% CI, 72-97%] vs. 38% [95% CI, 21-54%]), and outperformed the modified PSI 12 in negative predictive value (NPV) (99% [95% CI, 98-100%] vs. 95% [95% CI, 93-97%]).<sup>24</sup>

**Figure 2 – Henry Ford Health System: Venous Thromboembolism Harm Measurement and Risk Assessment in Real Time Using Electronic Health Records**



The logic we propose for this VTE eQIM starts with identifying a postoperative diagnostic VTE imaging study and combining this with documentation of the delivery of therapeutic doses of an anticoagulant within 24 hours following the imaging study (**Figure 3**). Qualifying diagnostic imaging studies include: CT angiography of the chest (CTPA), a pulmonary ventilation-perfusion (V/Q) lung scan and compression/duplex ultrasound (US) of the lower or upper extremity. Qualifying therapeutic interventions include: 1) administration of a treatment dose of an anticoagulant (**Table 2**), or, administration of an anticoagulant at a dose higher than routine thromboprophylaxis dosing (**Table 1**); for heparin administration the patient must also have 2 aPTT or 2 Anti-factor Xa tests performed within 35 hours of heparin administration or 3) deployment of an inferior vena cava (IVC) filter, or 4) an encounter diagnosis of VTE not present on admission. Abdominal CT scanning with contrast may also be an allowed diagnostic test, particularly in cancer patients, as this scan can detect “incidental PE” in the lower lobes of the lung.

**Figure 3 - Logic Model for Postoperative VTE Outcome Measure**



Acronyms: CT=computerized tomography; Angio= angiogram; V/Q= Lung or Pulmonary Ventilation (V) and Perfusion (Q) Scans; US=ultrasound; IVC= inferior vena cava; POA= Present On Admission; aPTT= activated partial thromboplastin time;

### **2.1.3 Value and Meaningfulness**

Not applicable (this is not a patient-reported measure).

### **2.1.4 Empirical Data (for outcomes measures) – as applicable**

Because in-hospital postoperative VTE events are a serious, potentially preventable hospital harms, several associations – including the AHRQ and The Joint Commission (TJC) – have developed quality measures for identifying acute VTE events. AHRQ developed the PSI 12 and TJC developed several VTE Core measures.<sup>15,25</sup> This eCQM has been designed as a re-specification of PSI 12, which is currently a claims-based measure that identifies VTE perioperatively (could be diagnosed before or after surgery). Because the eCQM utilizes the Clinical Quality Language (CQL), it allows for better timing precision of the data elements to target the intended postoperative population.

AHRQ publications have reported a downward trend in the incidence rate of postoperative VTE over time. In 2014, the measured baseline number of postoperative VTE was 25,400 compared to 21,080 in 2017 for an overall reduction of 17%.<sup>3</sup> Additionally, between 2014 and 2017, this reduction in the incidence of postoperative VTE was associated with projected cost savings of \$390,000,000 and a projected 1,000 lives saved.<sup>3</sup> AHRQ cited financial incentives created by CMS and other payers' payment policies, public reporting of hospital-level results, technical assistance and catalytic efforts of the Department of Health and Human Services (HHS) Partnership for Patients (PfP) initiative led by CMS as likely contributing factors to downward trends in HACs over time.<sup>26</sup> Despite this downward trend, more work is needed to reduce the hospital harm and healthcare costs associated with postoperative VTE.

This eCQM provides a path to directly engage hospital staff and executives on the importance on VTE prevention and reducing the risk of adverse events associated with VTE events. The eCQM will be a tool for quality improvement that hospitals will use to assess internal performance in near real-time, and to assess improvement over time. This eCQM additionally provides CMS with an instrument to assess the quality of care in reducing VTE for all-payer patients across all acute care hospitals.

### **2.1.5 Systematic Review of the Evidence (for intermediate outcome, process, or structure performance measures, including those that are instrument-based) – as applicable**

Not applicable.

## **2.1.6 Other Source of Evidence – as applicable**

### **2.1.6.1 Briefly Synthesize the Evidence**

TBD.

### **2.1.6.2 Process Used to Identify the Evidence**

Not applicable.

### **2.1.6.3 Citations for the Evidence**

Not applicable.

## **2.2 PERFORMANCE GAP – OPPORTUNITY FOR IMPROVEMENT**

Despite reductions in hospital-acquired VTE reported by AHRQ in recent years, the overall incidence of postoperative VTE in hospitals remains high in the United States.<sup>26</sup> The American College of Chest Physicians (ACCP) estimates the cumulative untreated 35-day postoperative risk of VTE is 4.3% (PE 1.5%, DVT 2.8%) after major orthopedic surgery.<sup>9</sup> The ACCP estimates this risk decreased to 1.8% (PE 0.55%, DVT 1.25%) when patients were treated with low molecular weight heparin.<sup>9</sup> Moreover, one study found that Medicare's implementation of a policy to not reimburse hospitals for cases of hospital-acquired PE or DVT was associated with a 35% lower incidence of these adverse events.<sup>27</sup> These findings suggest that there likely remains room for improvement, and that a reimbursement policy that penalizes poor patient safety outcomes can be a significant driver in reducing the incidence of hospital-acquired VTE (HA-VTE).

At this time, this measure has not gone through the testing process.

### **2.2.1 Rationale**

This eQCM intends to identify acute postoperative VTE events diagnosed and treated in the hospital. Rates of postoperative VTE can be considered an indicator of the quality of care provided by a hospital. In-hospital postoperative VTE is associated with poor clinical outcomes (fatal PE, post thrombotic syndrome), including fatal PE, post-thrombotic syndrome in the leg, and anticoagulation related bleeding.<sup>4</sup>

Despite a reported 17% reduction in the incidence of postoperative VTE between 2014 to 2017,<sup>3</sup> there remains opportunity to further reduce the occurrence of these events. An eQCM-based Hospital Harm – Postoperative Venous Thromboembolism measure would enable

hospitals to more reliably assess harm reduction efforts and modify their quality improvement efforts in near real-time. The measure would also help to identify hospitals that have persistently high postoperative VTE rates. The proposed measure concept will ensure that postoperative acute VTE events are tracked and that hospitals are incentivized to reduce the incidence of postoperative VTE. The eCQM would also be able to identify cases from an all-payer population, as it would not be solely dependent upon claims-based ICD-10-CM coded data.

Adoption of this eCQM has the potential to improve the quality of care for surgical patients and, therefore, advance the quality of care in patient safety, which is a priority area identified by the National Quality Strategy.<sup>28</sup> Although this measure would be an adapted version of an existing measure for perioperative VTE (PSI 12), re-specification as an eCQM would fill a gap in measurement for the all-payer population. Additionally, with a systematic EHR-based patient safety measure in place, hospitals can more reliably assess harm reduction efforts and modify their efforts in near real-time. In addition, greater achievements in reducing postoperative VTEs and enhancing hospital performance on patient safety outcomes can be expected.

### **2.2.2 Performance Scores**

TBD.

### **2.2.3 Summary of Data Indicating Opportunity**

Despite reductions in postoperative VTE in recent years reported by AHRQ, the rate of postoperative VTE in hospitals remains high in the United States.<sup>26</sup> The American College of Chest Physicians (ACCP) estimates the cumulative untreated 35-day postoperative risk of VTE is 4.3% (PE 1.5%, DVT 2.8%) after major orthopedic surgery.<sup>9</sup> The ACCP estimates this risk decreased to 1.8% (PE 0.55%, CVT 1.25%) when patients were treated with low molecular weight heparin.<sup>9</sup> Moreover, one study found, that Medicare's implementation of a policy to not reimburse hospitals for cases of hospital acquired PE or DVT was associated with a 35% lower incidence of these adverse events.<sup>27</sup> These findings suggest that 1) there remains room for improvement, and 2) a reimbursement policy that penalizes poor patient safety outcomes can be a significant driver in reducing the incidence of HA-VTE.

At this time, this measure has not gone through the testing process.

### **2.2.4 Disparities**

Significant racial disparities in the incidence of VTE have been documented in the literature. Using hospital discharge data for California residents in 1996, the incidence of VTE in the African American population has been estimated to be over 35% greater than the incidence in

the Caucasian population (141/100,000 adults vs. 103/100,000 adults). In contrast, the incidence of VTE in the Hispanic population has been estimated to be approximately 40% lower (61.5/100,000 adults), and the incidence in the Asian Pacific Islander population has been estimated to be nearly 70% lower (29/100,000 adults) than the incidence in the Caucasian population.<sup>29</sup> These disparities indicate that there may be room for improvement in VTE care for the African American population.

At this time, this measure has not gone through the testing process.

### **2.2.5 Provide summary of data if no or limited data**

Not applicable

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## **3. Scientific Acceptability**

### **3.1 DATA SAMPLE DESCRIPTION**

Electronic Health Records

#### **3.1.1 What Type of Data Were Used for Testing?**

Abstracted from Electronic Health Records.

Measure tested with data from: At this time, this measure is still being specified and has not gone through the testing process.

#### **3.1.2 Identify the Specific Dataset**

TBD.

#### **3.1.3 What Are the Dates of the Data Used in Testing?**

TBD.

#### **3.1.4 What Levels of Analysis Were Tested?**

TBD.

#### **3.1.5 How Many and Which Measured Entities were Included in the Testing and Analysis?**

TBD.



### **3.1.6 How Many and Which Measured Patients Were Included in the Testing and Analysis?**

TBD.

### **3.1.7 Sample Differences If applicable**

TBD.

### **3.1.8 What are the social risk factors that were available and analyzed?**

Not applicable.

## **3.2 RELIABILITY TESTING (FOR REFERENCE ONLY)**

### **3.2.1 Level of Reliability Testing**

TBD. At this time, this measure is still being specified and has not gone through the testing process.

### **3.2.2 Method of Reliability Testing**

TBD.

### **3.2.3 Statistical Results from Reliability Testing**

TBD.

### **3.2.4 Interpretation**

TBD.

## **3.3 VALIDITY TESTING (FOR REFERENCE ONLY)**

TBD. At this time, this measure is still being specified and has not gone through the testing process.

### **3.3.1 Level of Validity Testing**

TBD.

### **3.3.2 Method of Validity Testing**

TBD.

### **3.3.3 Statistical Results from Validity Testing**

TBD.

### **3.3.4 Interpretation**

TBD.

## **3.4 EXCLUSION ANALYSIS (FOR REFERENCE ONLY)**

TBD.

### **3.4.1 Method of Testing Exclusions**

TBD.

### **3.4.2 Statistical Results from Testing Exclusions**

TBD.

### **3.4.3 Interpretation**

TBD.

## **3.5 RISK ADJUSTMENT OR STRATIFICATION FOR OUTCOME OR RESOURCE USE MEASURE (FOR REFERENCE ONLY)**

This measure does not include risk adjustment or risk stratification.

### **3.5.1 Methods of Controlling for Differences**

TBD.

### **3.5.2 Rationale Why Risk Adjustment is Not Needed**

TBD.

### **3.5.3 Conceptual, Clinical, and Statistical Methods**

TBD.

#### **3.5.4 Conceptual Model of Impact of Social Risks**

TBD.

#### **3.5.5 Statistical Results**

TBD.

#### **3.5.6 Analyses and Interpretation in Selection of Social Risk Factors**

TBD.

#### **3.5.7 Methods Used to Develop the Statistical Model or Stratification Approach**

TBD

#### **3.5.8 Statistical Risk Model Discrimination Statistics**

TBD.

#### **3.5.9 Statistical Risk Model Calibration Statistics**

TBD.

#### **3.5.10 Statistical Risk Model Calibration – Risk decile plots or calibration curves**

TBD.

#### **3.5.11 Results of Risk Stratification Analysis**

TBD.

#### **3.5.12 Interpretation**

TBD.

#### **3.5.13 Optional Additional Testing for Risk Adjustment**

TBD.

### **3.6 IDENTIFICATION OF MEANINGFUL DIFFERENCES IN PERFORMANCE (FOR REFERENCE ONLY)**

TBD. At this time, this measure is still being specified and has not gone through the testing process. Method

TBD.

#### **3.6.1 Statistical Results**

TBD.

#### **3.6.2 Interpretation**

TBD.

### **3.7 COMPARABILITY OF MULTIPLE DATA SOURCES/METHODS (FOR REFERENCE ONLY)**

Not applicable.

#### **3.7.1 Method**

Not applicable.

#### **3.7.2 Statistical Results**

Not applicable.

#### **3.7.3 Interpretation**

Not applicable.

### **3.8 MISSING DATA ANALYSIS AND MINIMIZING BIAS (FOR REFERENCE ONLY)**

TBD. At this time, this measure is still being specified and has not gone through the testing process.

#### **3.8.1 Method**

TBD.

### **3.8.2 Missing Data Analysis**

TBD.

### **3.8.3 Interpretation**

TBD.

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## **4. Feasibility**

### **4.1 DATA ELEMENTS GENERATED AS BYPRODUCT OF CARE PROCESSES**

Data elements are from the electronic health record. At this time, this measure is still being specified and has not gone through the testing and feasibility process.

### **4.2 ELECTRONIC SOURCES**

Data elements are generated for the measure scores through the electronic health record during the provision of care. At this time, this measure is still being specified and has not gone through the testing and feasibility process.

#### **4.2.1 Data Elements Electronic Availability**

TBD. Once the measure is specified, a list of data elements will be provided.

#### **4.2.2 Path to Electronic Capture**

TBD.

#### **4.2.3 eCQM Feasibility**

TBD. At this time, this measure is still being specified and has not gone through the testing and feasibility process.

### **4.3 DATA COLLECTION STRATEGY**

TBD.

#### **4.3.1 Data Collection Strategy Difficulties (optional)**

TBD.

#### **4.3.2 Fees, Licensing, Other Requirements**

TBD.

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## **5. Usability and Use**

### **5.1 USE**

At this time, this measure is still being specified and has not gone through the testing and feasibility process.

#### **5.1.1 Current and Planned Use**

##### Public reporting – CMS HACRP

- Purpose - TBD
- Geographic area - Nationwide
- Number and percentage of accountable entities and patients included - TBD
- Level of measurement – Facility
- Setting – Hospital

##### Payment program – CMS HACRP

- Purpose- TBD
- Geographic area - Nationwide
- Number and percentage of accountable entities and patients included - TBD
- Level of measurement – Facility
- Setting – Hospital

##### Quality improvement internal to a specific organization

- Purpose - TBD
- Geographic area - Nationwide
- Number and percentage of accountable entities and patients included - TBD

- Level of measurement – Facility
- Setting – Hospital

#### **5.1.1.1 Reasons for Not Publicly Reporting or Use in Other Accountability Application**

Not applicable.

#### **5.1.1.2 Plan for Implementation**

TBD. At this time, this measure is still being specified and has not gone through the testing and feasibility process.

### **5.1.2 Feedback on the measure by those being measured or others**

TBD.

#### **5.1.2.1 Technical Assistance Provided During Development or Implementation**

TBD.

#### **5.1.2.2 Technical Assistance with Results**

TBD.

#### **5.1.2.3 Feedback on Measure Performance and Implementation**

TBD.

#### **5.1.2.4 Feedback from Providers being Measure**

TBD.

#### **5.1.2.5 Feedback from Other Users**

TBD.

#### **5.1.2.6 Consideration of Feedback**

TBD.

## **5.2 USABILITY**

At this time, this measure is still being specified and has not gone through the testing and feasibility process.



### 5.2.1 Improvement

TBD.

### 5.2.2 Unexpected Findings

TBD.

#### 5.2.2.1 Unexpected Benefits

TBD.

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## 6. Related and Competing Measures

### 6.1 RELATION TO OTHER NQF-ENDORSED MEASURES

There is only one existing NQF-endorsed VTE outcome measure for the surgical population that is a claims-based measure – “PSI 12: Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (NQF #0450). This measure was first endorsed in 2008 and is endorsed as a stand-alone measure and also as a component of the PSI 90: Patient Safety and Adverse Event Composite (NQF #0531). PSI 12 is a claims-based measure that uses ICD-10-CM codes to identify patients with a secondary discharge diagnosis code for proximal deep vein thrombosis (DVT) or pulmonary embolism (PE) out of all adults (over 18 years of age) with any procedure code for a qualifying operating room procedure.

The proposed *de novo* measure, which is a specification of AHRQ PSI 12, would be the first NQF-endorsed venous thromboembolism outcome eCQM.

### 6.2 HARMONIZATION

The proposed eCQM focuses on a different population than the existing PSI 12. The dimensions of harmonization can include numerator, denominator, exclusions, calculation, and data source and collection instructions. Below includes specific information pertaining to the claims-based measure PSI 12.

- **Numerator** – The numerator for PSI 12 includes only patients with a secondary discharge diagnosis code for proximal DVT or PE {VTE event could occur before surgery or after surgery}. The numerator for the proposed eCQM includes

postoperative patients with an imaging study and a therapeutic anticoagulation intervention within 24 hours after imaging study.

- **Denominator** – The denominator for PSI 12 includes adult (over 18 years of age) perioperative patients. The denominator for the proposed eCQM includes adult (over 18 years of age) postoperative patients.
- **Exclusions** – PSI 12 excludes cases with: 1) a principal diagnosis or a secondary diagnosis of DVT or PE that is indexed “present on admission =Y”; 2) cases in which interruption of vena cava is the only operating room procedure or in which the date of interruption of vena cava occurs before or on the same day as the first operating room procedure; 3) patients with any diagnosis of major brain and spinal injury; 4) cases with any listed procedure code for extracorporeal membrane oxygenation (ECMO); 5) cases where a procedure for pulmonary arterial thrombectomy occurs before or on the same day as the first operating room procedure or where the only operating room procedure was for pulmonary arterial thrombectomy; and 6) obstetric discharges. The exclusions for the proposed eCQM are still in development.
- **Calculation** – PSI 12 is calculated directly using claims data from hospital records. The proposed measure is an eCQM and the ratio calculation is still under development.
- **Data Source and Collection** – PSI 12 uses claims to identify VTE events, which differs from the proposed measure which will be an eCQM. The PSI 12 measure is only able to be calculated using Medicare claims data, while this Hospital Harm – Postoperative Venous Thromboembolism Rate measure provides the opportunity to assess the rate of VTE in a much larger, all-payer patient population.
- **Population Differences** – The Hospital Harm – Postoperative Venous Thromboembolism rate measure has a different target population than NQF #0450, “PSI 12: Perioperative Pulmonary or Deep Vein Thrombosis Rate.” The target population for NQF #0450 includes adult (over 18 years of age) perioperative patients, while the target population for the proposed measure includes adult postoperative patients. The process for identification of VTE also varies between the proposed measure and NQF #0450. The proposed eCQM would identify VTE through the presence of a postoperative diagnostic imaging study followed by therapeutic intervention for VTE within 24 hours following the diagnostic imaging study. NQF #0450 identifies VTE through secondary discharge diagnosis codes for proximal DVT or PE.

### 6.3 COMPETING MEASURES

Not applicable.

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## 7. Appendix

TBD.

### **Other Additional Information**

Ad.1. Working Group/Expert Panel Involved in Measure Development  
List the working group/panel members' names and organizations  
Describe the members' role in measure development

### **Measure Developer/Steward Updates and Ongoing Maintenance**

Ad.2. Year the Measure Was First Released  
Ad.3. Month and Year of Most Recent Revision  
Ad.4. What is your frequency for review/update of this measure?  
Ad.5. When is your next scheduled review/update for this measure?  
Ad.6. Copyright Statement  
Ad.7. Disclaimers  
Ad.8. Additional Information/Comments

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