



# Lack of Standardized Coding Limits Accuracy of Electronic Clinical Quality Measure for Pulmonary Embolism Diagnosis

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## INTRODUCTION

- ASH Guidelines for diagnosis of PE start with risk assessment using a pretest probability tool (PTP) followed by D-dimer testing or imaging, depending on risk level.
- There are no existing electronic clinical quality measures (eCQM) to encourage broader use of a validated PTP scoring tool in emergency departments (EDs)
- The Centers for Medicare & Medicaid Services require reporting of eCQMs which consist of value sets or lists of standardized codes linked to patient data within the electronic health record.

## AIM

To develop an eCQM, which required investigation into standardized coding (i.e., CPT, LOINC, SNOMEDCT) for CTPA and D-dimer test results for accurate measure scores across institutions

## RESULTS

- 270,214 encounters were identified
- Each institution identified CTPA with site-specific codes (Table 1).
- The Full CTPA Value Set identified 55% more encounters than the site-specific codes

**Table 1.** Coding linked to CTPA from Emergency Department Encounters at 3 Institutions

Definition Group	Site 1			Site 2			Site 3		
	# Cases	# PTP (%)	# PE+ (%)	# Cases	# PTP (%)	# PE+ (%)	# Cases	# PTP (%)	# PE+ (%)
<b>A Initial population for analysis</b>	37,949	122 (0.3%)	86 (0.2%)	106,158	646 (0.6%)	937 (0.9%)	126,107	2,507 (2.0%)	482 (0.4%)
<b>B Full CTPA Value Set</b>	1,890	27 (1.4%)	67 (3.5%)	9,848	159 (1.6%)	686 (7.0%)	3,316	31 (0.9%)	126 (3.8%)
<b>C Only LOINC 88322-3</b>	1,169	24 (2.1%)	60 (5.1%)	0	N/A	N/A	N/A	N/A	N/A
<b>D Only CPT 71275</b>	1,356	27 (2.0%)	61 (4.5%)	7,415	156 (2.1%)	638 (8.6%)	5,701	2,280 (40%)	356 (6.3%)
<b>E LOINC 88322-3 or CPT 71275</b>	1,357	27 (2.0%)	61 (4.5%)	7,415	156 (2.1%)	638 (8.6%)	5,701	2,280 (40%)	356 (6.3%)
<b>F Only site-specific codes: Site 1 – 111552, 86706, 111593, or 96922 Site 2 – 5587 or 206 Site 3 – order code 142167</b>	1,357	27 (2.0%)	61 (4.5%)	6,270	139 (2.2%)	587 (9.4%)	4,255	2,248 (51.6%)	332 (7.6%)

PTP: Pre-test probability; PE=pulmonary embolism; CTPA= CT Pulmonary Angiogram; CPT=Current Procedural Terminology Codes; LOINC=Logical Observation Identifiers Names and Codes

- CPT code 71275 had the best sensitivity and specificity, but still had false positives (PPV 82%) (Table 2).

**Table 2.** Sensitivity and Specificity of CT Pulmonary Angiogram Code (CPT 71275)

		Site-Specific Codes (Site 1: 111552, 86706, 111593, or 96922; Site 2: 5587 or 206; Site 3: 142167)		
		With Test	Without Test	Total
<b>CPT 71275</b>	<b>With CPT 71275</b>	11,927 (True Positive)	2,545 (False Positive)	14,472 (82% PPV)
	<b>Without CPT 71275</b>	1 (False Negative)	255,741 (True Negative)	255,742 (100% NPV)
	<b>Total</b>	11,928 (100% Sensitivity)	258,286 (99% Specificity)	270,214

### D-Dimer Coding

- D-dimer values were identified as LOINC code 48065-7 and 91556-1 at Site 1 and 48067-3 at Site 2.
- SNOMEDCT codes were not used at any site despite being the way other eCQMs identify elevated D-dimer results.
- Each site used different D-dimer tests with different normal ranges.
- None of the sites had an electronically extractable positive indicator for D-dimer.

## Administrative codes for CTPA and D-dimer are Not Accurate nor Widely Used for Development of Electronic Clinical Quality Measures

## TERMS & ABBREVIATIONS

PE- Pulmonary Embolism  
ED- Emergency Department  
PTP- Pretest Probability Tool  
CTPA- CT Pulmonary Angiography  
eCQM- Electronic Clinical Quality Measure  
LOINC- Logical Observation Identifiers Names and Codes

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## METHODS

- Value sets identifying CTPA and D-dimers were reviewed from existing eCQMs.
- All ED encounters were analyzed from 38 centers between 9/12/2022-1/11/2023
- Imaging types were reviewed from CPT codes and LOINC.
- Number of ED encounters, PTP use, and diagnosis of PE were determined using different codes.
- Sensitivity, specificity, positive and negative predictive value (PPV; NPV) were calculated.

## CONCLUSIONS

- Due to persistent false positives for CPT Code 71275 for identification of CTPA, applying this code leads to inclusion of patients for whom PTP is either not required or recommended.
- Coding for an abnormal D-dimer test result are not standardized across institutions.
- Administrative codes cannot be used to develop eCQMs whose aim is to evaluate whether CTPA is ordered appropriately based on the PTP risk level and laboratory testing.

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