

Measure Title: Interpretation of CT Pulmonary Angiography (CTPA) for Pulmonary Embolism

<p>Measure Purpose</p>	<p>This measure promotes consistent reporting of key findings in CTPA exams for pulmonary embolism—embolus location, right heart strain, and embolic burden—to guide appropriate treatment and avoid unnecessary anticoagulation. It also addresses the underreporting of incidental coronary artery calcium (CAC) on chest CTs, which limits cardiovascular risk assessment. Standardized reporting improves clinical decision-making, reduces overtreatment, and supports value-based care</p>
<p>Measure Description</p>	<p>Percentage of final reports for patients aged 18 years and older undergoing CT pulmonary angiography (CTPA) with a finding of PE that specify the branching order level of the most proximal level of embolus (i.e. main, lobar, interlobar, segmental, subsegmental); AND right ventricle to left ventricle (RV/LV) ratio, when assessable. If the RV/LV ratio is ≥ 1.0, report the specific ratio value, as this may be associated with increased risk for adverse outcomes, and if the RV/LV ratio is < 1.0, report that the ratio is within normal limits, optionally including a range (e.g., 0.7–0.9) to support clinical context.</p>
<p>Rationale</p>	<p>Background Pulmonary embolism (PE) is a serious and potentially life-threatening condition that requires immediate diagnosis and risk assessment. The preferred imaging method for diagnosing PE is CT pulmonary angiography (CTPA), which confirms the presence of emboli and provides valuable predictive information about patient outcomes and disease severity.²</p> <p>Two important imaging features that help in understanding patient outcomes are the branching level or anatomical location of the embolus, and right heart strain, measured by the ratio of the right to left ventricle (RV/LV). The branching level of the most proximal embolus (such as in the main, lobar, or segmental arteries) indicates the clot burden, and the RV/LV ratio is a validated measure of right ventricular dysfunction associated with increased mortality risks.⁶</p> <p>Care Gap Although these imaging findings are clinically meaningful, they are inconsistently documented in CTPA reports. A 2022 study found that, although right heart strain was observed in up to 40 percent of cases, the RV/LV ratio was only documented in four percent of the reports.⁷ Earlier studies have similarly shown variability and omissions in reporting key prognostic indicators such as embolus location and right heart strain.⁴ This lack of standardization may hinder the timely recognition of high-risk PE and delay appropriate management. In busy clinical settings, unstructured reporting increases the</p>

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	<p>risk that key predictive factors are missed or not communicated effectively to treating clinicians.</p> <p>Clinical Justification</p> <p>The anatomical location of the embolus reflects the extent of vascular obstruction and has been shown to correlate with clinical outcomes and mortality risk,³ while the RV/LV ratio—when greater than 1.0—is a validated indicator of right ventricular strain and adverse outcomes.^{5,6} Documenting these elements in the final CTPA report aligns with evidence-based guidelines and supports clinical decisions regarding anticoagulation, thrombolysis, and level-of-care planning. Standardized reporting ensures that essential findings are clearly conveyed, improving coordination between radiologists and referring providers.</p> <p>Financial Impact</p> <p>Delayed recognition of severe PE can lead to clinical decline, prolonged hospital stays, and costly interventions. In contrast, early identification of central emboli and right heart strain allows for timely treatment, potentially reducing complications, ICU admissions, and readmissions. Measuring these indicators supports value-based care by promoting consistent documentation of key prognostic indicators, improving patient outcomes, and reducing unnecessary variation in PE management.⁸</p>
Denominator	All final reports for patients aged 18 years or older undergoing CT pulmonary angiography (CTPA) with a finding of pulmonary embolism
Denominator Exclusions	None
Numerator	<p>Final reports that specify the following elements:</p> <ol style="list-style-type: none"> 1. Branching order level of the most proximal level of embolus (i.e. main, lobar, interlobar, segmental, subsegmental), AND 2. Right ventricle to left ventricle (RV/LV) ratio, when assessable: <ul style="list-style-type: none"> • If the RV/LV ratio is ≥ 1.0, report the specific ratio value, as this may be associated with increased risk for adverse outcomes. • If the RV/LV ratio is < 1.0, report that the ratio is within normal limits, optionally including a range (e.g., 0.7–0.9) to support clinical context. <p>Numerator Note: This measure does not require or imply a diagnostic determination of right heart strain.</p>
Numerator Exception	Instances in which right heart strain assessment is not assessable due to technical limitations (e.g., scanner protocols) suboptimal image quality due to motion artifact, or incomplete visualization of cardiac structures.

Evidence	<p>The following evidence statement is quoted verbatim from the referenced clinical guideline.</p> <ol style="list-style-type: none">1. Konstantinides, S. V., Torbicki, A., Agnelli, G., Danchin, N., Fitzmaurice, D., Galiè, N., Gibbs, J. S. R., Huisman, M. V., Humbert, M., Kucher, N., Lang, I. M., Lankeit, M., Lekakis, J., Maack, C., Mayer, E., Meneveau, N., Perrier, A., Pruszczyk, P., Rasmussen, L. H., Schindler, T. H., Svitil, P., Vonk Noordegraaf, A., Zamorano, J. L., & Zompatori, M. (2014). 2014 ESC guidelines on the diagnosis and management of acute pulmonary embolism. <i>European Heart Journal</i>, 35(43), 3033–3069, 3069a–3069k. <p>“CT pulmonary angiography allows direct visualization of emboli in the pulmonary arteries, including their location (main, lobar, segmental, or subsegmental branches), and provides an alternative diagnosis in many patients.”</p> <p>“Right ventricular enlargement (RV/LV diameter ratio >0.9 or >1.0) on CT pulmonary angiography is associated with increased early mortality and adverse outcomes in patients with acute PE. Therefore, it should be reported when assessable.”</p> <p>The following references are cited in the rationale statement.</p> <ol style="list-style-type: none">2. Doğan H, de Roos A, Geleijins J, Huisman MV, Kroft LJM. The role of computed tomography in the diagnosis of acute and chronic pulmonary embolism. <i>Diagn Interv Radiol</i>. 2015;21:307-316.3. Vedovati, MC, Germini F, Agnelli G, Becattini C. Prognostic role of embolic burden assessed at computed tomography angiography in patients with acute pulmonary embolism: systematic review and meta-analysis. <i>Journal of Thrombosis and Haemostasis</i>. 2013;11:2092-2102.4. Abujudeh HH, Kaewlai R, Farsad K, Orr E, Gilman M, Shepard JO. Computed tomography pulmonary angiography: an assessment of the radiology report. <i>Acad Radiol</i>. 2009;16:1309-13155. Hanmandlu A, Mannari A, Abidov A. Diagnostic and Prognostic Value of RV Strain Defined as RV/LV Ratio on Chest CT in Acute Pulmonary Embolism: A Systematic Review. <i>Echocardiography</i>. 2025 Mar;42(3):e70107. doi: 10.1111/echo.70107. PMID: 40028725.6. Lanham, S., Maiter, A., Swift, A. J., Dwivedi, K., Alabed, S., Evans, O., Sharkey, M. J., Matthews, S., & Johns, C. S. (2022). The reproducibility of manual RV/LV ratio measurement on CT pulmonary angiography. <i>BJR Open</i>, 4(1), 20220041. https://doi.org/10.1259/bjro.202200417. Jackson Chornenki, N. L., Poorzargar, K., Shanjer, M., Mbuagbaw, L., Crowther, M., & Siegal, D. M. (2020). Detection of right ventricular dysfunction in acute pulmonary embolism by CT scan: A systematic review and meta-analysis. <i>Blood</i>, 136(Supplement 1), 25–26. https://doi.org/10.1182/blood-2020-1384648. Konstantinides, S. V., Meyer, G., Becattini, C., Bueno, H., Geersing, G. J.,
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	<p>Harjola, V. P., Huisman, M. V., Humbert, M., Jennings, C. S., Jiménez, D., Kucher, N., Lang, I. M., Lankeit, M., Lorusso, R., Mazzolai, L., Meneveau, N., Ní Áinle, F., Prandoni, P., Pruszczyk, P., ... & ESC Scientific Document Group. (2020). 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). <i>European Heart Journal</i>, 41(4), 543– 603. https://doi.org/10.1093/eurheartj/ehz405</p>
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