

# One-year Pulmonary Embolism (PE) Incidence and Risk Stratification Calculated via a Radiology-Initiated PE Response Team (PERT)

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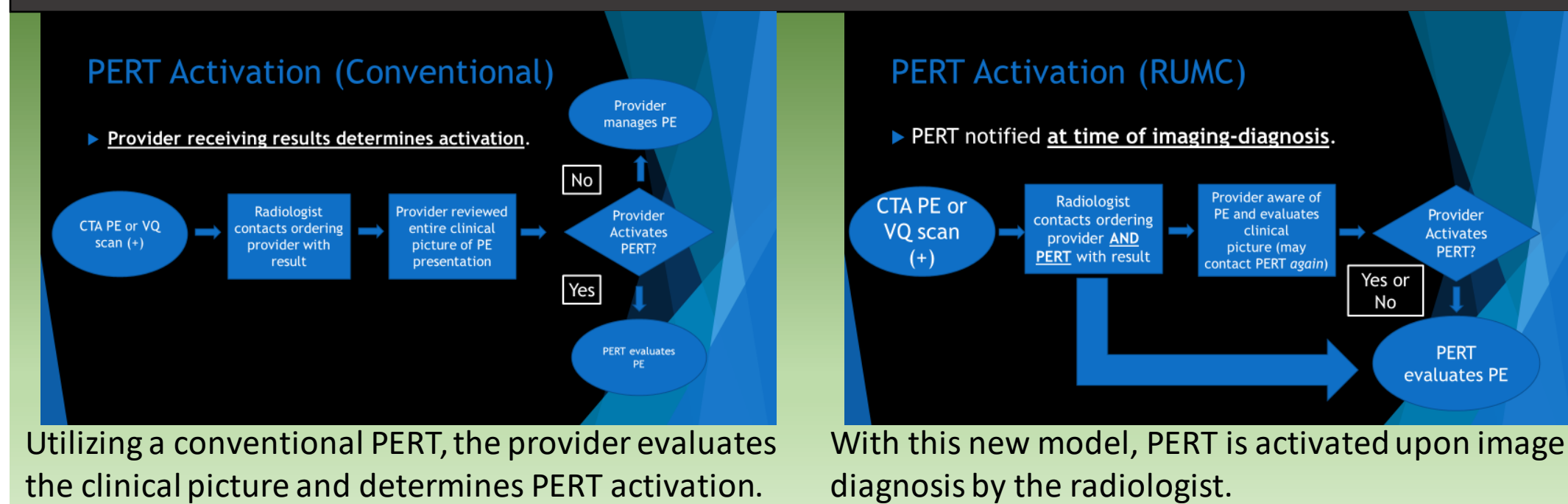
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## Introduction

In the United States alone, close to 600,000 cases of pulmonary embolism (PE) occur per year with about 200,000 resulting in death [1, 2]. PE falls under the spectrum of venous thromboembolic (VTE) disease, which includes deep vein thrombosis (DVT). PE treatment has evolved over the last decade, with a shift toward endovascular treatment for intermediate- or high-risk PE patients. PE is categorized as high-risk or massive if the patient is hemodynamically unstable [1]. Intermediate-risk or submassive PE occurs in the absence of hemodynamic instability and can be classified as intermediate-high-risk, defined by right ventricular (RV) dysfunction on echocardiogram (echo) or computed tomography (CT) along with elevated serum cardiac markers [3-4], or intermediate-low-risk, defined by either RV dysfunction or elevated cardiac markers, or, in the absence of either sign, a Pulmonary Embolism Severity Index (PESI) score class III or higher [1, 5]. Pulmonary embolism (PE) is a multifactorial disease posing great risk for short- and long-term morbidity and mortality. Published data on risk stratification, PE Response Team (PERT) utilization, and treatment outcomes are variable and unknown. This single academic center review describes a unique radiology-initiated PERT and demonstrates the ability to calculate PE incidence and risk stratification, allowing for long-term follow-up and quality outcome evaluation.

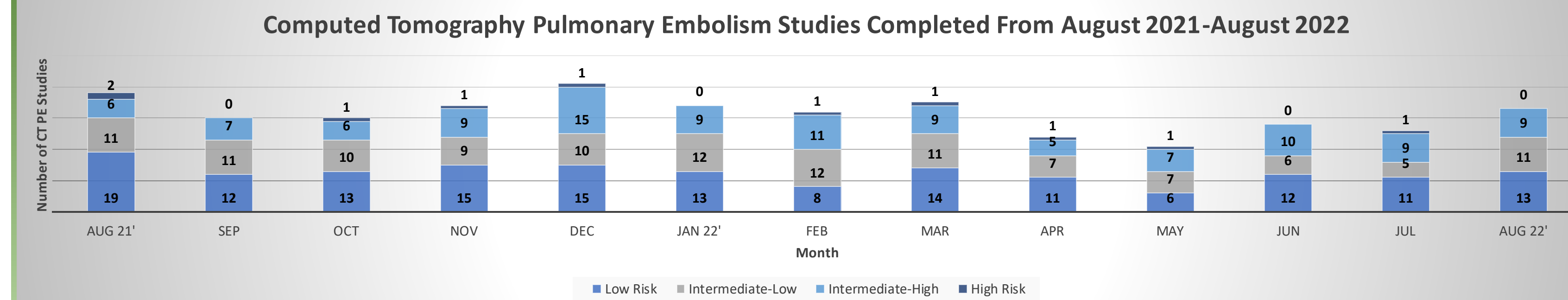
## PERT Activation Algorithms



## Materials and Methods

Our institutional PERT went live in August 2021. Uniquely, our PERT was "activated" at time of PE imaging diagnosis. PE cases were stratified according to American Heart Association PE criteria index ranked low, intermediate-low, intermediate-high, and high risk. Patients undergoing therapy beyond systemic anticoagulation including tissue plasminogen activator (tPA) administration, aspiration thrombectomy, catheter-directed thrombolysis, and/or surgical embolectomy were followed. ICU length of stay (LOS), hospital LOS, and all cause in hospital mortality were measured for patients undergoing therapy beyond anticoagulation.

## CT PE Studies Completed



	Low-risk	Intermediate-low	Intermediate-high	High risk	Total
Number of Patients (%)	162 (39.9)	122 (30)	112 (27.6)	10 (2.5)	406
Intervention beyond AC (%)	0 (0)	1 (3)	26 (81)	5 (16)	32

## Catheter Directed Thrombolysis



Figure 1: This fluoroscopic image of the chest shows thrombolysis catheters terminating in the distal interlobar pulmonary arteries. Thrombolytic agents (tPA) are infused to eliminate clot burden and restore perfusion. In general, tPA is administered for 4-24 hours prior to removal weighing adequate clot dissolution with hemorrhage risk.

## Mechanical Embolectomy

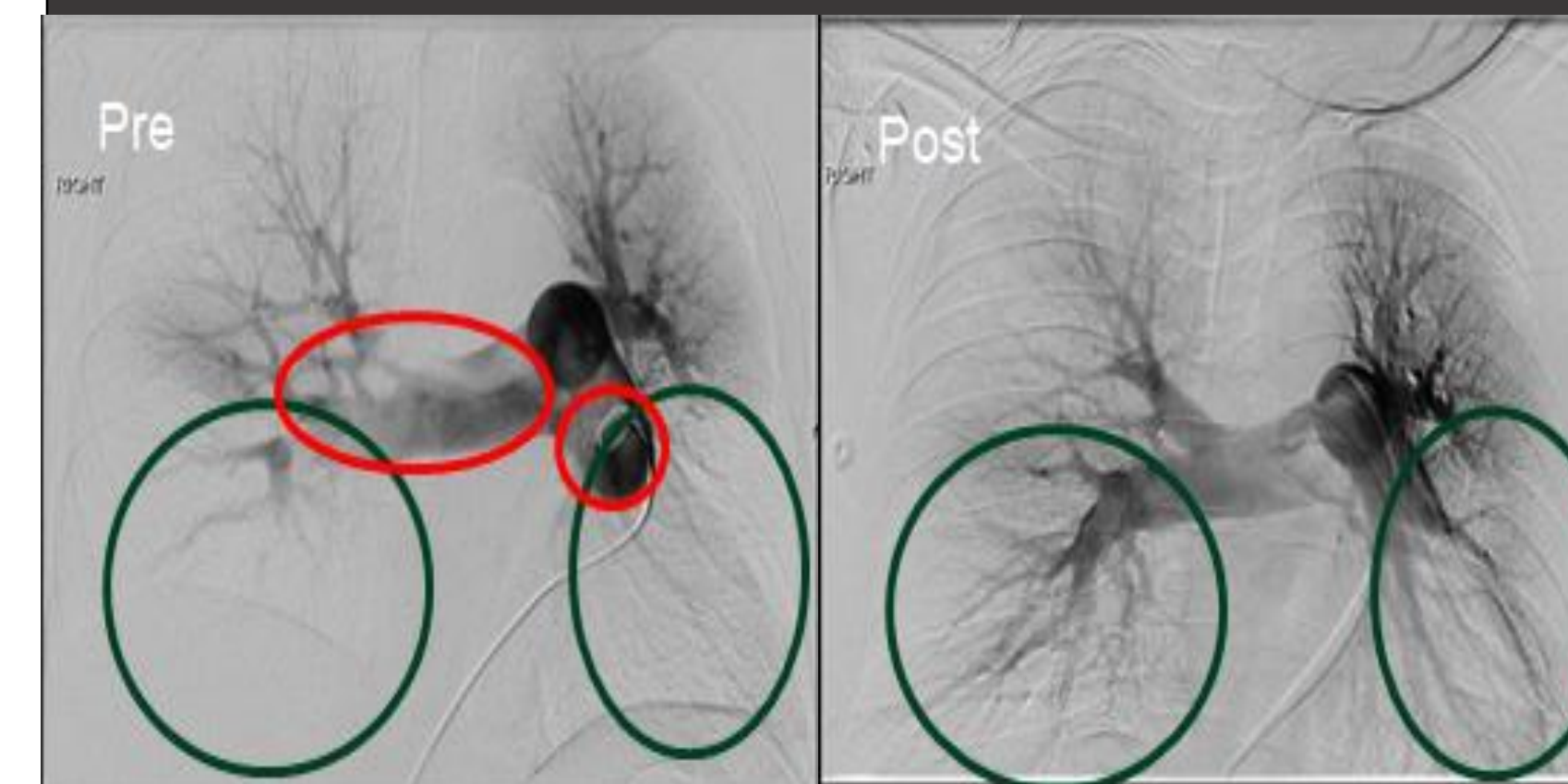


Figure 2: Pre (left) and post (right) suction thrombectomy angiograms are shown. The red circles indicate a saddle embolus. Green circles outline the bilateral lower lobes showing little perfusion pre procedure (left) and near complete resolution of flow post embolectomy (right). A 24-Fr suction catheter was used, mean PAP decreased from 33 mmHg pre to 23 mmHg post, and tachycardia resolved immediately.

## Results

- Imaging diagnosis of PE was made in 406 patients over the study period.
- Of these, 162 ranked low-risk, 122 intermediate-low, 112 intermediate-high, and 10 high risk.
- A total of 32 patients underwent therapy beyond systemic anticoagulation (AC).
- Of those patients receiving interventional therapy 1 was intermediate-low risk, 26 intermediate-high risk, and 5 high risk.
- In patients receiving therapy beyond systemic AC mean ICU LOS was 89 hours, mean hospital LOS was 6.3 days, and all cause hospital mortality was 3.3%.
- Based on incidence data, this academic institution is considered a high-volume center for PE [6].

## Conclusion

Multidisciplinary care teams can effectively be enacted by radiologists at the time of imaging diagnosis and provide an efficient way to confirm disease incidence, expedite care, and monitor patient outcomes. This model was successfully applied to PE at our institution and can be applied to other imaging-specific diagnoses.

## References

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