



# The Use of CTPA in ED and Inpatient Settings for Evaluation of PE: Are We Choosing Wisely?

Bethany Roy<sup>1</sup>, Jacob Nelson<sup>1</sup>, Sven Olson<sup>1</sup>, D. Alexander Perry<sup>1</sup>, Erin Baldwin<sup>2</sup>, Shannon Lee<sup>2</sup>, David Jones<sup>2</sup>, Jeffrey Dueker<sup>1</sup>, Matthew DiVeronica<sup>3</sup>, Shona Hunsaker<sup>3</sup>, Renee Segura<sup>3</sup>

1. Department of Internal Medicine 2. Department of Emergency Medicine, Oregon Health and Sciences University 3. Portland VA Health Care System, Department of Hospital and Specialty Medicine



## Objective/Aim

To decrease computed tomography pulmonary angiography (CTPA) overuse in patients with low pretest probability of pulmonary embolism (PE).

## Background

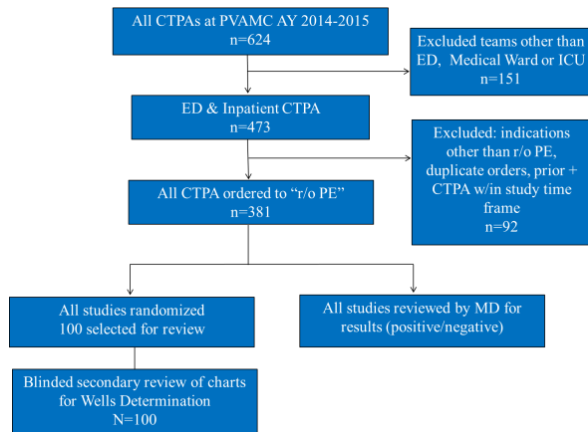
The ACP Choosing Wisely initiative recommends obtaining a D-dimer as the initial diagnostic test in patients with a low pretest probability of venous thromboembolism.

## Current State

Frequently, the initial test for evaluation of PE is CTPA without consistent documentation of PE risk.<sup>1</sup> A simple algorithm using a dichotomized Wells score and D-dimer can safely rule out PE and avoid exposing "low-probability" patients to unnecessary harms and costs associated with CTPA.<sup>2</sup>

## Methods

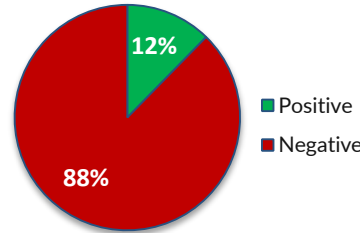
- Interviews about processes for PE probability assessment and CTPA ordering were held with resident and attending physicians practicing in inpatient and emergency department settings
- Chart review methods are described in the flowchart below



## Results

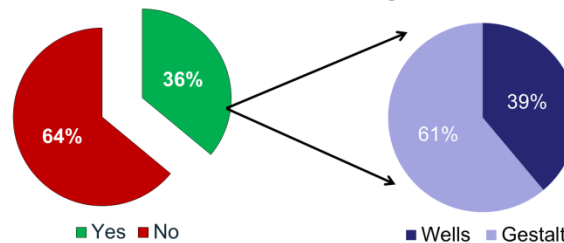


### CTA Positivity

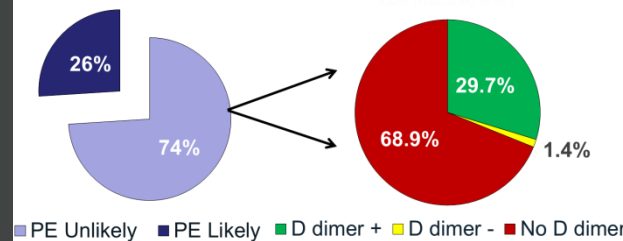


N=381

### Presence and Type of Documented Clinical Decision Making (n=100)

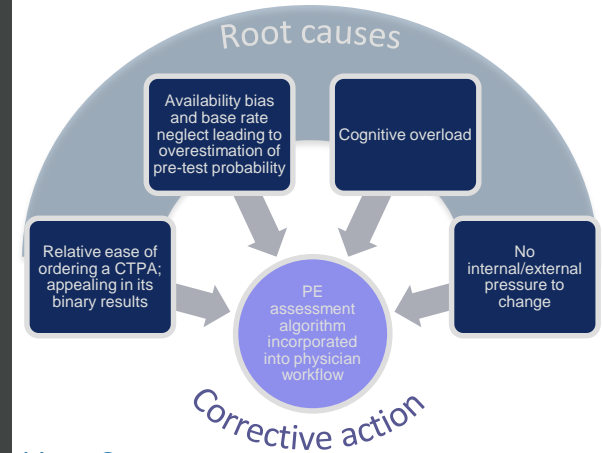


### Blinded Reviewer Wells Score and Use of D-Dimer



## Conclusions

- There is a lack of documentation of pre-test probability for PE in patients who receive CTPA studies
- In cases where a pre-test probability is documented, only a minority use a standardized tool, while the remaining document a gestalt assessment of clinical factors for decision making
- Using a validated algorithm<sup>2</sup> which suggests that low risk patients with a negative D-dimer can be effectively ruled out for PE, there was potential overuse in 51 of 100 patients reviewed in our sample, which represent a probable missed opportunity to have avoided a CTPA



## Next Steps

- This EMR-embedded algorithm will include base rates, calculation of pre-test probability, and prompts for next steps in assessment.
- Age-adjusted D-dimer<sup>3</sup> will be incorporated, as well.
- We plan to retrospectively evaluate our use of D-dimer testing, looking particularly for the overall positivity rate

## References

- Costantino, MM, et al. "CT angiography in the evaluation of acute pulmonary embolus." *Am J Roentgenol.* 2008 Aug; 191(2):471-4.
- Christopher Study Group. "Effectiveness of Managing Suspected Pulmonary Embolism Using an Algorithm Combining Clinical Probability, D-Dimer Testing, and Computed Tomography." *JAMA.* 2006 Jan; 295(2):172-9.
- Raja, AS, et al. "Evaluation of Patients With Suspected Acute Pulmonary Embolism." *Ann Intern Med.* 2015 Nov; 163(9): 701-712.