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# Choosing Wisely: Identifying Rates of Appropriate Imaging in ED Patients Evaluated for PE



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## Background

- Pulmonary embolism (PE) can present with nonspecific symptoms, making diagnosis challenging.
- Multiple validated risk-stratification tools and clinical guidelines exist for diagnosis of PE.
- CT pulmonary angiography (CTPA) is a powerful noninvasive modality for detection and represents the current standard for diagnosis.
- As with any other diagnostic test, there is a potential for over-utilization of imaging.
- A *Choosing Wisely* guideline issued in concert with the American College of Radiology recommends: "Don't image for suspected pulmonary embolism without moderate or high pre-test probability."

## Problem Statement

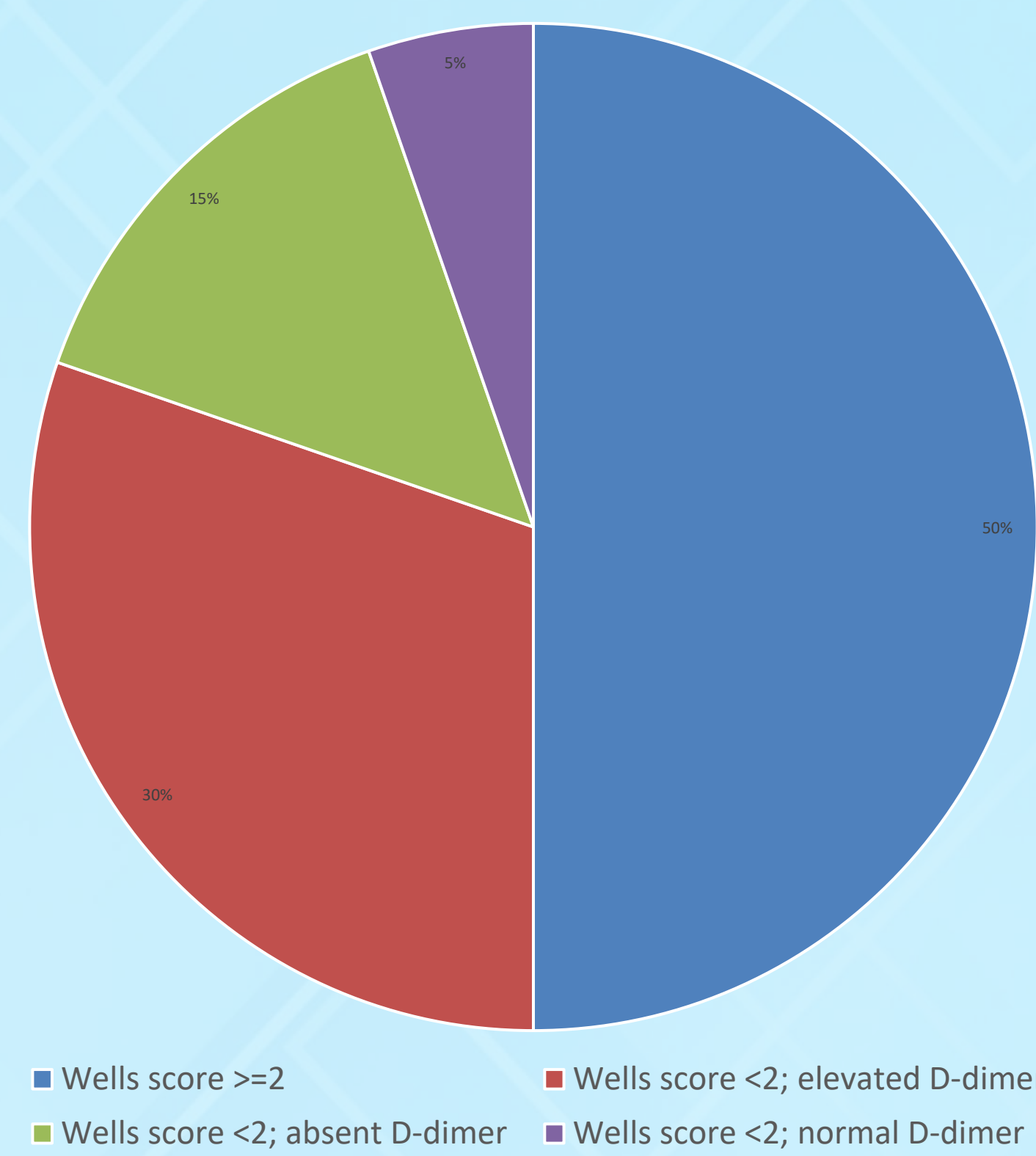
- We will identify the proportion of patients presenting to LVH-CC who received CT imaging for PE and evaluate for the presence of quantitative data (Wells scores, D-dimer values) supporting the order.

## Methods

- A retrospective study consisting of data queries of the network *Epic* EMR was performed.
- Patients presenting to LVH-CC ED in 2019 with discretely recorded Wells scores and who received CT chest with PE protocol were identified and included for review.
- Data were sorted by Wells score and D-dimer values to evaluate for quantitative evidence supporting the imaging order.
- Risk stratification of included patients was based on original Wells three-tier classification.
- A Wells scores  $\geq 2$  was considered sufficient evidence on its own.
- For patients with Wells scores  $< 2$ , D-dimer lab values associated with the encounter were reviewed, if present. Values above the reference range were considered to be elevated.
- Additional data for each patient encounter were reviewed including ordering provider, ED disposition, and final diagnosis.

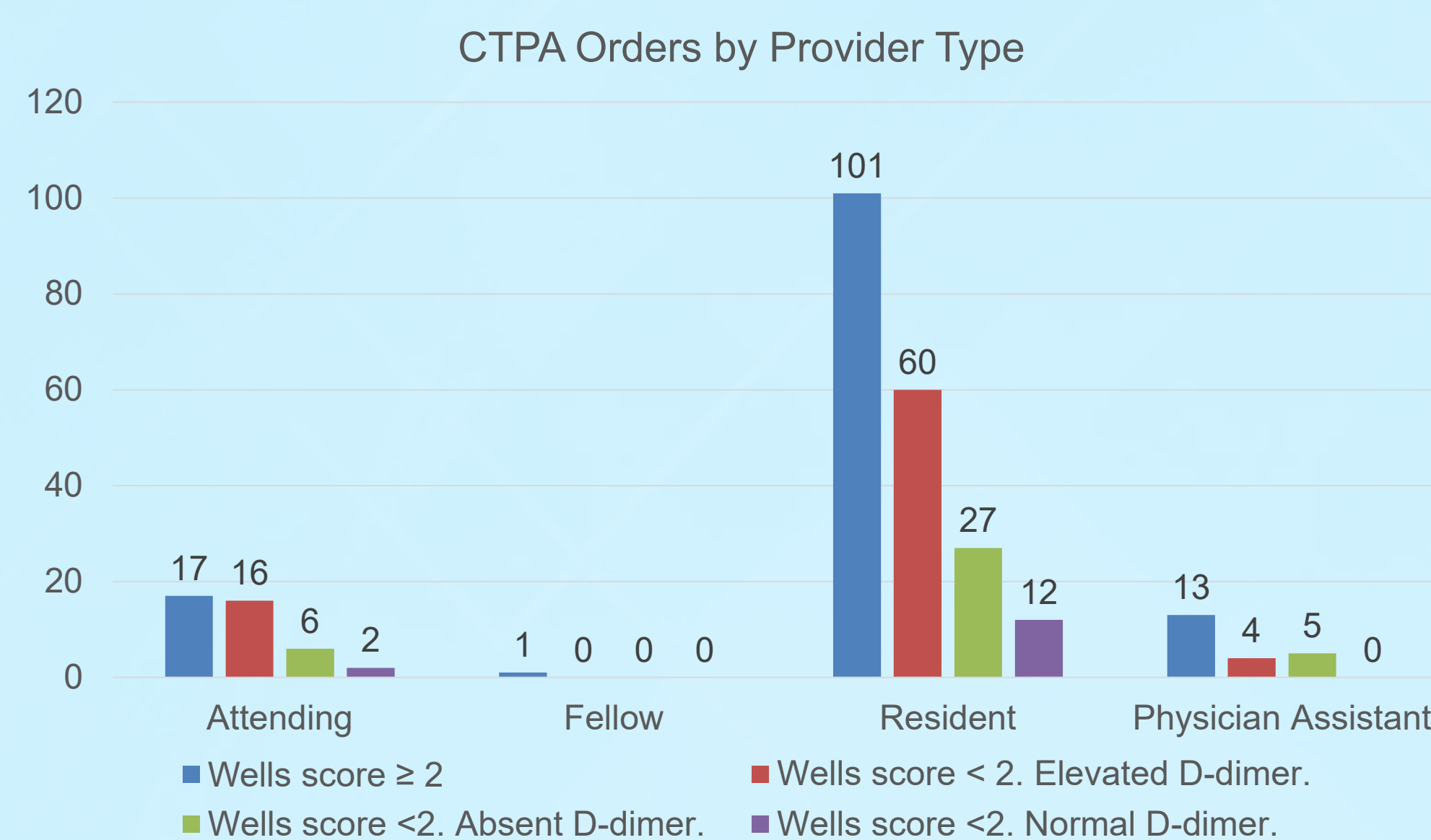
## Results

- 264 patients meeting our criteria were identified (Figure 1).
  - 132 patients had a Wells score  $\geq 2$ .
  - 80 patients had a Wells score  $< 2$  and an elevated D-dimer value.
  - 38 patients had a Wells score  $< 2$  and an absent D-dimer value.
  - 14 patients had a Wells score  $< 2$  and a normal D-dimer value.



• Figure 1. Breakdown of Wells score and D-dimer value for the patient population of interest.

- The breakdown of studies by ordering provider was also reviewed (Figure 2).
- Resident physicians ordered the majority of studies (200/264; 75.7%).



- Figure 2. CTPA ordering by type of provider.
- Patient Disposition: of the 264 patients, 17 patients were admitted and had a final diagnosis of MS175 or MS176 (pulmonary embolism with or without major complication and comorbidity, respectively).

## Discussion

- Method considers those patients who were risk-stratified using Wells score.
- Of patients reviewed, most cases had quantitative evidence in support of imaging (80%).
- Only 5% of identified patients received imaging with Wells score  $< 2$  and normal D-dimer.
- Patients may also have been assessed using other validated clinical tools not measured.
- There are ongoing broader initiatives within the network regarding standardization evaluation and management of PE i.e. development of care pathways.
- Ordering patterns may be re-assessed as future interventions are piloted.
- Rapid assessment now and in the future of adherence to clinical guidelines may assist in demonstrating quality of patient care.

## Conclusions

- The majority of patients presenting to the LVH-CC ED in 2019 with documented Wells scores who received CTPA had a quantitative indication for the study, whether by Wells score or positive D-dimer values.
- Future re-examination of CTPA utilization may be considered if implementation of a care pathway for the evaluation of PE is implemented.

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