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## Clinical features from the history and physical examination that predict the presence or absence of pulmonary embolism in symptomatic emergency department patients: results of a prospective, multi-center study

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## Abstract:

**Study Objective**—Prediction rules for pulmonary embolism (PE) employ variables explicitly shown to estimate the probability of PE. However, clinicians often use variables that have not been similarly validated, yet are implicitly believed to modify probability of PE. The objective of this study was to measure the predictive value of 13 implicit variables. **Methods**—Patients were enrolled in a prospective cohort study from 12 centers in the United States; all had an objective test for PE (D-dimer, CT angiography, or V/Q scan). Clinical features including 12 predefined previously validated (explicit) variables and 13 variables not part of existing prediction rules (implicit) were prospectively recorded at presentation. The primary outcome was VTE (venous thromboembolism: PE or deep venous thrombosis), diagnosed by imaging up to 45 days after enrollment. Variables with adjusted odds ratios from logistic regression with 95% confidence intervals not crossing unity were considered significant. **Results**—7,940 patients (7.2% VTE+) were enrolled. Mean age was 49±17 years and 67% were female. Eight of 13 implicit variables were significantly associated with VTE; those with an adjusted OR >1.5 included non-cancer related thrombophilia (1.99), pleuritic chest pain (1.53), and family history of VTE (1.51). Implicit variables that predicted no VTE outcome included: substernal chest pain, female gender, and smoking. Nine of 12 explicit variables predicted a positive outcome of VTE, including unilateral leg swelling, recent surgery, estrogen, hypoxemia and active malignancy. **Conclusions**—In symptomatic outpatients being considered for possible PE, non-cancer related thrombophilia, pleuritic chest pain, and family history of VTE increase probability of PE or DVT. Other variables that are part of existing pretest probability systems were validated as important predictors in this diverse sample of US Emergency department patients.

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