Mayo-eMERGE Venous Thromboembolism Phenotype Algorithm

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Case/Control **Algorithm description:** The algorithm comprises exclusively on NLP-based named entity detection (Step #1).

- If there is a "positive hit" on the NLP execution, the subject is considered a "true positive" case.
- If there is a "negative hit" on the NLP execution, execute Step #2 using ICD-9 codes.
    - If "positive hit" on Step #2, then exclude the subject.
    - If "negative hit" on Step #2, then the subject is considered a "true negative" control.

Step 1: NLP-based execution

In the algorithm there needs to be one of the following two conditions to be considered a case:

1) At least one non-negated mention from Table A, Column 1 (Disorder related mentions) and Table A, Column 2 (Anatomical site related mentions) either in the SAME or adjacent sentences in a 'section of interest' OR
2) At least one non-negated term from the following list in a 'section of interest' from the Table B, Column 1 (Explicit "Stand-alone" mentions) and/or Table C, Column 1 (Other mentions) without any of the exclusion terms (Table B, Column 2).

Table A List of disorder and anatomical related mentions (derived from the Mayo NLP algorithm)

Disorder related mentions	Anatomical site related mentions
clot	cerebral sinus
emboli	inferior vena cava
embolism	ivc
phlebitis	pulmonary artery
thrombi	pulmonary arteries
thrombi	pulmonary
thromboemboli	superior vena cava
thromboembolic	svc
thromboembolism	transverse sinus
thrombophlebitis	vein
thromboses	veins
thrombosis	venous
thrombus	

Table B List of explicit stand-alone mentions and exclusion terms (derived from the Mayo NLP algorithm)

Explicit "Stand-alone" mentions	Exclusion related mentions
deep vein thrombosis	gonadal vein
deep venous thrombosis	ovarian vein
dvt	prostatic vein
pe	
pulmonary embolism	
pulmonary embolus	
pulmonary emboli	
pulmonary thromboemboli	
vein thrombosis	
venous thrombosis	
venous thromboembolism	
vte	
inferior vena cava thrombosis	
ivc thrombosis	
svc thrombosis	
superior vena cava thrombosis	

Table C: Alternate list of related terms (derived from the VU NLP algorithm)

Other mentions that can be considered "stand-alone" explicit terms for VTE NLP discovery
Pulmonary Embolism
Deep vein thrombosis of lower limb
Acute PE
CALF THROMBOSIS
DEEP VENOUS THROMBOSIS CHRONIC
Deep venous thrombosis distal
Deep venous thrombosis proximal
Thromboembolism
Thrombosis
Thrombophlebitis
Pulmonary thrombosis
Venous Thrombosis
Occlusive thrombus

Non-occlusive thrombus
Non-occlusive thrombus
Non occlusive thrombus
Pulmonary venous thrombosis
Deep thrombophlebitis
Postoperative deep vein thrombosis
Deep venous thrombosis of upper extremity
Deep venous thrombosis of pelvic vein
Pulmonary venous thrombosis
Thrombus
Splenic vein thrombosis
Deep vein thrombosis
Superior Vena Cava Thrombosis

Step 2: **Exclusion codes for use of patient as a VTE control:**

V12.51   Personal history of venous thrombosis and embolism

453, 453.0 , 453.1, 453.2

453.4   Deep vein thrombosis, unspecified

453.40   Venous embolism and thrombosis of unspecified deep vessels of
                       Lower extremity

453.41   Venous embolism and thrombosis of deep vessels of proximal lower
                       Extremity

453.42   Deep Vein thrombosis, distal

453.8   Embolism and thrombosis of other specified veins

453.81, 453.82, 453.83, 453.84, 453.85, 453.86, 453.87, 453.89

453.6, 453.50, 453.75, 453.51, 453.79, 453.77, 453.52, 453.5

453.82, 453.7, 453.71, 453.73, 453.74, 453.76

415.1   Pulmonary embolism and infarction

415.11   Iatrogenic pulmonary embolism and infarction

415.19   Other pulmonary embolism and infarction

452   Portal vein thrombosis

451.12   Septic pulmonary emboli