AAVBC

AMERICAN ACADEMY OF VALUE BASED CARE

DVT and Pulmonary Embolism Quick Reference Guide

2026

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1 CLINICAL SNAPSHOT

Definition: **Venous thromboembolism** (**VTE**) encompasses two presentations of one disease: **deep vein thrombosis** (**DVT**), in which a thrombus forms in a deep vein (most often the lower extremity), and **pulmonary embolism** (**PE**), in which a thrombus travels to and **obstructs the pulmonary arteries**.[1,2] The two share the pathophysiology of **Virchow's triad**: venous stasis, hypercoagulability, and endothelial injury; most patients have **several concurrent contributors** rather than a single cause.[3,4] Two distinctions drive management: **DVT location** (proximal = popliteal, femoral, or iliac; carries far higher recurrence and embolization risk than isolated distal/calf DVT, up to **4.8-fold**),[5] and **the provoking context**: **provoked** (a transient major reversible factor such as surgery or hospitalization), **unprovoked** (no identifiable trigger, the highest long-term recurrence risk), or **cancer-associated** (active malignancy, roughly **20%** of incident VTE).[4,6,7]

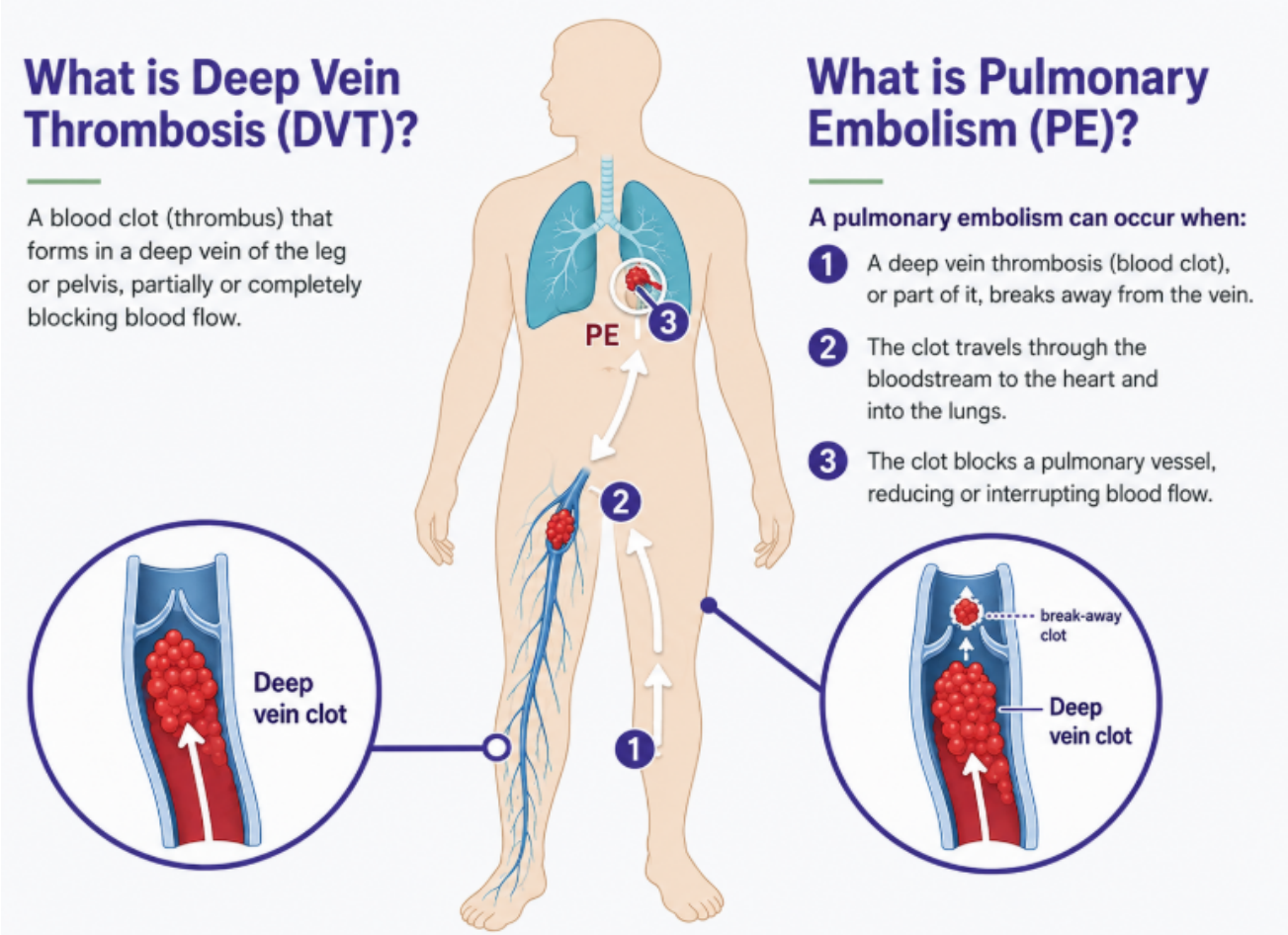
ICD-10 Codes:

VTE coding follows an axis of **acuity -> anatomic location -> laterality -> type/severity**, and the most consequential step is **documenting acuity correctly**.[8] Acute lower-extremity DVT is reported with **I82.4-** subcodes by vein (**I82.41-** femoral, **I82.42-** iliac, **I82.43-** popliteal, **I82.44-** tibial, **I82.45-** peroneal); **chronic DVT** is reported with the **I82.5-** series (**I82.51-** femoral, **I82.52-** iliac, **I82.53-** popliteal, **I82.54-** tibial, **I82.55-** peroneal); the 7th character **specifies laterality** (1 = right, 2 = left, 3 = bilateral, 9 = unspecified).[8] PE is reported with **I26.-**: **I26.02** (saddle embolus) and **I26.09** (other PE) **with acute cor pulmonale** (right heart strain), versus **I26.92**/**I26.99** and the subsegmental codes **I26.93**/**I26.94 without** acute cor pulmonale → the record must state whether acute cor pulmonale is **present or absent**.[8] **Chronic PE** is **I27.82**.[8] Acute DVT, acute PE, and chronic PE all risk-adjust; the **resolved-clot status codes do not**: **Z86.711** (personal history of PE) and **Z86.718** (personal history of other venous thrombosis) carry no HCC, and **Z79.01** (long-term anticoagulant use) is the **essential secondary code** documenting ongoing therapy and medical necessity.[8] **Complications are coded separately and map independently to their own HCC categories**: post-thrombotic syndrome **I87.0-** (specify laterality and severity) and chronic thromboembolic pulmonary hypertension **I27.2-**.

Prevalence and Burden: VTE incidence rises **exponentially with age**, reaching as high as **1 per 100 persons per year** in adults older than 80, and adults aged **65 and older account for more than 60%** of all VTE events, placing the disease squarely in the **Medicare population**.[9–11] An estimated **900,000** VTE events occur in the United States each year, according to CDC estimates, resulting in approximately **100,000** deaths.[12,13] Outcomes in older adults are serious: in Medicare beneficiaries, cancer-associated VTE carries a 30-day mortality of **6.0%**[5] and a 1-year mortality of **34.7%**.[14] Among elderly patients followed after a first event, the 3-year cumulative incidence of recurrent VTE is **14.8%**, and recurrences are frequently fatal: a case-fatality rate of **20.5%**, which rises to **23%** for unprovoked and **29%** for cancer-related recurrences.[15] **Chronic sequelae are common**: post-thrombotic syndrome develops in **20-50%** of patients after symptomatic DVT, and chronic thromboembolic pulmonary hypertension affects **~3%** after acute PE.[9,16–18]

↔ MAKING CONNECTIONS

For additional context on **anticoagulant utilization**, please consult the **AAVBC Anticoagulant Therapy Utilization Management QRG**.



HCC/RAF V28 Mapping

ICD-10 CODE(S)[8]	HCC CATEGORY (V28)[19]	RAF (CNA)*[20]	DOCUMENTATION REQUIREMENT[19,21,22]
I82.41-/I82.42-/I82.43- Acute embolism and thrombosis of femoral/ iliac/popliteal vein	**HCC 267** DVT and Pulmonary Embolism	0.294	Active acute lower-extremity DVT **confirmed by imaging**; specify **vein** (femoral, iliac, popliteal) and **laterality** (right, left, bilateral); iliac and femoral are proximal with the highest recurrence and embolization risk; **document**: imaging modality and date
I82.51-/I82.52-/I82.53- Chronic embolism and thrombosis of femoral/ iliac/popliteal vein	**HCC 267** DVT and Pulmonary Embolism	0.294	Chronic DVT = clot **still visible on imaging** beyond the acute window; use the chronic series (**I82.5-**) when the thrombus persists on repeat imaging; same HCC as acute; specify **vein** and **laterality**; **document**: imaging confirmation of persistent thrombus

ICD-10 CODE(S)[8]	HCC CATEGORY (V28)[19]	RAF (CNA)*[20]	DOCUMENTATION REQUIREMENT[19,21,22]
I26.02/I26.09 PE with acute cor pulmonale (saddle/other)	**HCC 267** DVT and Pulmonary Embolism	0.294	PE **with acute cor pulmonale**; **document**: right-heart strain explicitly (RV dilation, troponin elevation, or hemodynamic compromise); this distinction drives **I26.0-** vs **I26.9-** code selection; specify **saddle** vs **other location**
I26.92/I26.93/I26.94/ I26.99 PE without acute cor pulmonale (saddle, single/multiple subsegmental, other)	**HCC 267** DVT and Pulmonary Embolism	0.294	PE **without acute cor pulmonale**; state that acute cor pulmonale is **absent**; specify saddle (**I26.92**), single subsegmental (**I26.93**), multiple subsegmental (**I26.94**), or other (**I26.99**); **document**: imaging confirmation
I27.82 Chronic pulmonary embolism	**HCC 267** DVT and Pulmonary Embolism	0.294	Chronic pulmonary embolism = **persistent organized thrombus** on imaging **without meeting hemodynamic criteria for CTEPH**; distinct from CTEPH (**I27.24**); **document**: the chronic thromboembolic state and imaging evidence
Z86.711/Z86.718 Personal history of PE/ venous thrombosis	No HCC	—	**AVOID** for active disease: use only when the **clot has resolved** and is no longer present on imaging; carries no HCC; pair with **Z79.01** if anticoagulation continues for secondary prevention
Z79.01 Long-term (current) use of anticoagulants	No HCC	—	Essential secondary code documenting **ongoing anticoagulant therapy**; pair with the active VTE code or history code; **specify**: agent, dose, and renal function–based dosing rationale
I87.0- Postthrombotic syndrome (specify laterality and complication)	No HCC	—	PTS does not map to an HCC in V28; document as a **discrete complication of prior DVT**, not the index clot; **specify**: laterality and complication type (uncomplicated, with ulcer, with inflammation, with ulcer and inflammation); use **Villalta scale** for severity grading

ICD-10 CODE(S)[8]	HCC CATEGORY (V28)[19]	RAF (CNA)*[20]	DOCUMENTATION REQUIREMENT[19,21,22]
I27.24 Chronic thromboembolic pulmonary hypertension	**HCC 226** Pulmonary Hypertension	0.36	CTEPH (Group 4 PH) **confirmed by right heart catheterization and V/Q scan**; distinct from chronic PE (**I27.82**); **document**: mPAP, PVR, imaging evidence of organized thrombi, and surgical candidacy assessment; **code separately** from the index PE

ABBREVIATIONS: ICD-10-CM = International Classification of Diseases, 10th Revision, Clinical Modification; HCC = Hierarchical Condition Category; CMS-HCC V28 = CMS Hierarchical Condition Category Model, Version 28; RAF = Risk Adjustment Factor; CNA = Community Non-Dual Eligible, Aged segment; DVT = deep vein thrombosis; PE = pulmonary embolism; RV = right ventricular; CTEPH = chronic thromboembolic pulmonary hypertension; VTE = venous thromboembolism; PTS = post-thrombotic syndrome; PH = pulmonary hypertension; mPAP = mean pulmonary arterial pressure; PVR = pulmonary vascular resistance; V/Q = ventilation/perfusion; CMS = Centers for Medicare & Medicaid Services

***RAF values represent the Community Non-Dual Eligible Aged (CNA) coefficient from the 2026 CMS-HCC model;[10] values vary across patient populations based on eligibility and care setting**

Risk-Adjusted Care Resources per Patient/Year[19,20]

Risk-adjusted care resource allocation — MA base rate (~$10,402.34) × RAF coefficient

VENOUS THROMBOEMBOLISM

$3.1K

HCC 267 · RAF 0.294

AAVBC PERSPECTIVE

***From the AAVBC's perspective**, value-based care in venous thromboembolism (VTE) begins with **preventing pulmonary embolism** through early recognition of deep vein thrombosis (DVT), followed by **deliberate reassessment** rather than automatic discontinuation of anticoagulation. Primary care **should not** treat VTE as a **fixed 3-month episode**. At 3 to 6 months, every patient should undergo a documented reassessment of recurrence and bleeding risk, beginning with whether the event was **provoked or unprovoked** and whether provoking risk factors persist.[17,23] Validated recurrence tools can support individualized decisions regarding extended-phase anticoagulation, reducing preventable recurrent VTE while **avoiding unnecessary treatment**.[1]*

***The PCP's role extends beyond initiating anticoagulation**. Rather than defaulting to apixaban, clinicians should also consider **generic dabigatran as a lower-cost DOAC for appropriate patients** with preserved renal function (Cockcroft-Gault creatinine clearance greater than 30 mL/min), balancing efficacy, safety, adherence, and affordability.[11,21] Just as importantly, the decision to **continue or stop anticoagulation** should be **explicitly documented**, even when therapy is discontinued, reinforcing longitudinal accountability and high-value VTE management.[17,23]*

2 RECOGNITION AND DIAGNOSIS

Medicare Screenings and Surveillance (Adult and Geriatric)

There is no population-based VTE screening test; evaluation is symptom- or risk-triggered.[17,24] Coverage applies to diagnostic workup and monitoring, not screening. **Medicare Part B** covers the following diagnostic tests and monitoring **when medically necessary**:

TEST	FREQUENCY[17,21,24,25]	CPT/ HCPCS	CLINICAL INDICATION*[1,17,21,24]
Compression ultrasonography (lower extremity)	**At suspected DVT**; serial study if initial negative and pretest probability high	93970/ 93971	**Preferred confirmatory test for suspected DVT**; distinguishes proximal from distal involvement; specify vein and laterality
D-dimer (quantitative)	**At evaluation** when pretest probability is low or intermediate	85379	Use the **age-adjusted cutoff** (age × 10 µg/L for patients >50) **to safely exclude VTE** and reduce unnecessary imaging; do not obtain in high pretest probability
CT pulmonary angiography (CTPA)	**At suspected PE** with positive D-dimer or "PE likely" Wells score	71275	**Standard confirmatory imaging for PE**; defines clot burden and right-heart strain; also evaluates for signs of **chronic thromboembolic disease** on index scan
Ventilation/ perfusion (V/Q) scan	**When CTPA is contraindicated** (contrast allergy, renal impairment); and at **≥3 months** post-PE if persistent symptoms†	78582	**Alternative PE imaging**; negative predictive value for excluding CTEPH **approaches 100%**; preferred screening modality for CTEPD
Echocardiography (TTE with Doppler)	**At intermediate/ high-risk PE** for RV assessment; and at **≥3 months** post-PE if persistent symptoms†	93306	**Assesses RV dysfunction acutely**; adjunctive test for CTEPH screening → TTE alone is **insufficient** (one-third of confirmed CTEPH cases have normal TTEs); **obtain V/Q concurrently**
INR (prothrombin time)	**At least weekly** during warfarin initiation; every **4–12 weeks** once stable‡	85610	Maintain **INR 2.0–3.0** on a vitamin K antagonist (warfarin); **home INR testing** (G0248/G0249) available for eligible Medicare beneficiaries

TEST	FREQUENCY[17,21,24,25]	CPT/ HCPCS	CLINICAL INDICATION*[1,17,21,24]
Renal function (CrCl for DOAC dosing)	**Baseline**; every **6–12 months** (≥every 6 months if age ≥75, CKD, or CrCl ≤60); more frequently if CrCl declining	80048/ 80053	Use the **Cockcroft-Gault equation** (the method used in DOAC pivotal trials) to dose-adjust direct oral anticoagulants; **recheck interval** can be individualized as CrCl ÷ 10 in months
Cancer evaluation after unprovoked VTE§	Age- and sex-appropriate screening after an unprovoked event	(per screen)	Unprovoked VTE may be the first sign of **occult malignancy** (4–10% diagnosed within 1 year); perform thorough history, physical examination, and guideline-appropriate cancer screening; **routine CT/PET-CT is not recommended**

ABBREVIATIONS: CPT = Current Procedural Terminology; HCPCS = Healthcare Common Procedure Coding System; DVT = deep vein thrombosis; VTE = venous thromboembolism; CTPA = CT pulmonary angiography; PE = pulmonary embolism; V/Q = ventilation/perfusion; CTEPH = chronic thromboembolic pulmonary hypertension; CTEPD = chronic thromboembolic pulmonary disease; TTE = transthoracic echocardiography; RV = right ventricular; INR = international normalized ratio; DOAC = direct oral anticoagulant; CrCl = creatinine clearance; CKD = chronic kidney disease; CT = computed tomography; PET-CT = positron emission tomography–computed tomography; AHA = American Heart Association; ACC = American College of Cardiology; ACCP = American College of Chest Physicians
All tests are covered under Medicare Part B when medically necessary
† The 2026 AHA/ACC PE Guideline recommends diagnostic evaluation at ≥3 months in patients with persistent or new-onset dyspnea after acute PE; V/Q scan and TTE should both be obtained, as TTE alone is insufficient to exclude CTEPD
‡ The ACCP suggests INR testing frequency of up to 12 weeks (rather than every 4 weeks) for patients with consistently stable INRs (Grade 2B)
§ The 2026 AHA/ACC PE Guideline gives a Class 1 recommendation for thorough history, physical examination, and age-appropriate cancer screening in patients with PE without identifiable risk factors, and a Class 3 (No Benefit) recommendation against routine imaging with CT or PET-CT to diagnose undetected cancer

Subtle Early Signs in Older Adults (>65)

SIGN/ SYMPTOM[17,21,24,26]	CLINICAL SIGNIFICANCE[17,21,26,27]
Unilateral leg swelling, calf pain, warmth, or discoloration	**Classic DVT presentation**; in older adults **do not dismiss** as muscle strain, venous insufficiency, or 'normal aging' **without considering DVT** and compression ultrasound
Sudden, unexplained dyspnea— often the only symptom	**The most common presentation of PE**; isolated breathlessness in an older adult is **frequently misattributed** to heart failure or COPD before PE is considered
Syncope or near-syncope	**Can be the presenting feature of PE**, particularly hemodynamically significant PE; unexplained syncope in an older adult warrants **consideration of PE** rather than reflexive cardiac or neurologic attribution

SIGN/ SYMPTOM[17,21,24,26]	CLINICAL SIGNIFICANCE[17,21,26,27]
Pleuritic chest pain, tachypnea, or tachycardia	**Suggestive of PE**; tachycardia may be the only abnormal vital sign and is easily ascribed to anxiety or deconditioning
Hemoptysis	**May reflect pulmonary infarction from PE**; should prompt evaluation rather than attribution to bronchitis
Reduced mobility, prolonged sitting, or recent hospitalization	**Immobility is the strongest geriatric VTE risk factor** and a common antecedent; a new leg or respiratory symptom in a recently immobilized older adult deserves a **low threshold for testing**
New dyspnea or exertional limitation months after a PE	Persistent breathlessness beyond 3 months after PE may signal **chronic thromboembolic pulmonary hypertension** and warrants echocardiographic screening

ABBREVIATIONS: DVT = deep vein thrombosis; PE = pulmonary embolism; COPD = chronic obstructive pulmonary disease; VTE = venous thromboembolism; CTEPH = chronic thromboembolic pulmonary hypertension

Geriatric Risk Factors

FACTOR	RISK SIGNAL	NOTES
Immobilization	OR **2.46** (95% CI 1.85-3.27) in elderly[27,28]	The strongest risk factor in the geriatric population; **recent hospitalization or bed rest** is a frequent antecedent[27,29]
Sedentary lifestyle/ impaired mobility	Sedentary (**≥20 h/day sitting**) OR **4.0**; impaired mobility OR **3.0**; ADL disability OR **2.9**[27]	**Functional impairment** is a dominant, modifiable geriatric VTE driver in adults 70 and older[1,27]
Frailty	HR **1.63** vs non-frail (63% higher VTE risk)[30,31]	**Frailty** independently **raises VTE risk** and complicates anticoagulation decisions[17,32]
Active cancer	~20% of incident VTE; pancreatic aHR **3.20**, hepatobiliary **2.37**, lung **1.78**[29,33]	Cancer markedly raises both **recurrence and bleeding risk**; unprovoked VTE may be its **first sign**[17,34]
Prior VTE	Up to **4.8x** recurrence with proximal vs distal index DVT[5,17]	A previous event is among the strongest **predictors of another**; location of the index clot matters[5,17]
Male sex	HR **2.2** (95% CI 1.7-2.8) for recurrence vs women[35]	Persists after adjusting for hormone-associated VTE in women (adjusted HR 1.8)[35,36]

FACTOR	RISK SIGNAL	NOTES
Obesity with poor muscle strength	OR **14.57** (95% CI 5.16-41.15) for recurrent VTE (with prior VTE)[14]	The **combination amplifies risk** far beyond either factor alone in older persons[14]
Autoimmune disease	**1.7-fold** higher recurrent VTE risk[17]	A persistent risk factor; **extended anticoagulation** may be reasonable[17,29]
Age over 65 (after stopping anticoagulation)	HR **5.28** (95% CI 3.03-9.21) for recurrent VTE/arterial events vs age <50[4,17]	Age itself is a strong independent predictor once anticoagulation is discontinued[17,32]

ABBREVIATIONS: OR = odds ratio; CI = confidence interval; ADL = activities of daily living; HR = hazard ratio; VTE = venous thromboembolism; aHR = adjusted hazard ratio; DVT = deep vein thrombosis

Diagnostic Systems for DVT and PE

VTE diagnosis in US primary care relies on a **sequential strategy**: **clinical prediction** rules estimate pretest probability, **D-dimer testing excludes VTE** in low-probability patients, and **imaging confirms** the diagnosis when indicated.[4,10,37] **For older adults**, two key challenges modify this pathway: the **Wells scores** perform **better in younger patients without comorbidities**, and D-dimer specificity **declines with age**, necessitating age-adjusted thresholds.[21,37,38] Once PE is confirmed, severity scoring (**PESI**/**sPESI**) and the **Hestia criteria** determine whether outpatient management is safe, a decision endorsed by the 2026 AHA/ACC PE Guideline.[17]

Primary Pretest Probability System: Wells Scores

The Wells Score for DVT is a 10-item rule that assigns points for clinical risk factors and physical findings; a **score ≤1** classifies DVT as "unlikely" (prevalence ~4%), while **≥2** classifies it as "likely" (prevalence ~27%).[4,10] T**he Wells Score for PE** is a 7-item rule; a **score ≤4** classifies PE as "unlikely" and guides D-dimer testing, while **>4** classifies PE as "likely" and warrants direct imaging with CTPA.[10,17] Both scores were validated in outpatient populations and **perform best in younger patients without comorbidities** or prior VTE.[37] **In inpatients**, the Wells DVT score discriminates only slightly better than chance (AUC 0.60), and **direct imaging is recommended**.[39]

Wells Score for DVT

CRITERION	POINTS
Active cancer (treatment ongoing, within 6 months, or palliative)	+1
Paralysis, paresis, or recent plaster cast on lower extremities	+1
Recently bedridden >3 days or major surgery within past 4 weeks	+1
Localized tenderness along the deep venous system	+1
Swelling of entire leg	+1

CRITERION	POINTS
Calf swelling >3 cm compared with asymptomatic side	+1
Unilateral pitting edema	+1
Collateral superficial veins (non-varicose)	+1
Previously documented DVT	+1
Alternative diagnosis at least as likely as DVT	−2
Score interpretation: ≤1 = DVT unlikely → proceed to D-dimer; ≥2 = DVT likely → proceed to compression ultrasonography[4,10]	
ABBREVIATIONS: DVT = deep vein thrombosis	

Wells Score for PE

CRITERION	POINTS
Clinical signs and symptoms of DVT (leg swelling, pain with palpation)	+3
PE is the most likely diagnosis (or equally likely)	+3
Heart rate >100 bpm	+1.5
Immobilization ≥3 days or surgery in the previous 4 weeks	+1.5
Previous DVT or PE	+1.5
Hemoptysis	+1
Active cancer (on treatment, treated in last 6 months, or palliative)	+1
Score interpretation: ≤4 = PE unlikely → proceed to D-dimer; >4 = PE likely → proceed directly to CTPA[10,17]	
ABBREVIATIONS: DVT = deep vein thrombosis; PE = pulmonary embolism; CTPA = CT pulmonary angiography	

D-Dimer Testing: Age-Adjusted Thresholds

The standard D-dimer cutoff of 500 µg/L has high sensitivity but **declining specificity with age**, making it less useful in older adults.[10,38] The age-adjusted D-dimer threshold (patient's age × 10 µg/L for patients ≥50 years) maintains equivalent sensitivity while **improving specificity across all age groups above 50**.[10,38] This threshold is now endorsed by major guidelines for PE and was prospectively validated for DVT in a 2026 JAMA study, which demonstrated a **VTE failure rate of 0.3%** (95% CI, 0.1%–1.1%) and **zero events** among patients with D-dimer above 500 µg/L but below their age-adjusted cutoff.[38] For **patients ≥75 years**, the age-adjusted approach increases the proportion who can **safely avoid imaging** from **5.5% to 16.6%**, effectively **restoring the diagnostic yield of D-dimer** to levels comparable to the general population.[38]

Alternative strategies for PE include the **PEGeD** and **YEARS rules**, which use a D-dimer threshold of **1000 ng/mL** in patients with low clinical probability, achieving missed-diagnosis rates of **0.05%–0.6%** with **14%–18% absolute reductions** in chest imaging.[40]

PE Severity Stratification: PESI, sPESI, and Hestia Criteria

After PE is confirmed, **risk stratification determines disposition**. The 2026 AHA/ACC PE Guideline recommends using validated PE-specific risk scores (PESI, sPESI, or Hestia) to identify **low-risk patients** suitable for **outpatient management**.[17] An important caveat **for older adults**: the original PESI uses age in years as a direct score component, meaning **patients ≥66 years automatically score ≥Class II**, and the sPESI assigns 1 point for age >80, which alone classifies a patient as **high-risk**.[17] Physician judgment and shared decision-making frequently overrode score recommendations in both arms.[17] Notably, these risk stratification systems use **chronological age** as a fixed scoring input and **do not incorporate measures of biological age**, functional status, or frailty; these factors may meaningfully **alter prognosis in older adults** and clinicians should **weigh them alongside the numerical score**.

PESI Score Components

CRITERION	POINTS
Age	Age in years
Male sex	+10
Cancer	+30
Heart failure	+10
Chronic lung disease	+10
Heart rate ≥110 bpm	+20
Systolic BP <100 mmHg	+30
Respiratory rate ≥30/min	+20
Temperature <36°C	+20
Altered mental status	+60
O_2 saturation <90%	+20
Class I (≤65 pts): very low risk, 30-day mortality ~1.6% **Class II (66–85 pts): low risk, ~3.5%** **PESI Class I–II identifies candidates for outpatient management** **Class III–V (≥86 pts): intermediate to high risk**	
ABBREVIATIONS: BP = blood pressure; PESI = Pulmonary Embolism Severity Index	

Simplified PESI (sPESI)

CRITERION	POINTS
Age >80 years	1
History of cancer	1
Chronic cardiopulmonary disease	1
Systolic BP <100 mmHg	1
Heart rate ≥110 bpm	1
O_2 saturation <90%	1
Score of 0 = low risk (30-day mortality ~1%); ≥1 = high risk	

ABBREVIATIONS: BP = blood pressure; sPESI = simplified Pulmonary Embolism Severity Index

The Hestia criteria take a complementary approach: an 11-item bedside checklist that identifies **practical barriers to safe outpatient management** (hemodynamic instability, active bleeding risk, need for IV analgesia >24 hours, CrCl <30 mL/min, pregnancy, etc.). Any single positive criterion **excludes outpatient treatment**.[17] In the **HOME-PE trial**, outpatient-managed patients had a 30-day composite adverse-event rate of **1.3%** (Hestia arm) and **1.1%** (sPESI arm), with no significant difference between strategies.[17] **Physician judgment** and **shared decision-making** frequently overrode score recommendations in both arms.[17]

Other Relevant Diagnostic and Monitoring Tools

SYSTEM	KEY FEATURES	PRIMARY USE
Compression ultrasonography (CUS)[4,10]	**Preferred confirmatory imaging for suspected DVT**; sensitivity **~94%** for proximal DVT; identifies **proximal vs. isolated distal DVT**; serial testing when initial study is negative but clinical suspicion remains	**First-line DVT imaging** in outpatients and inpatients
CT pulmonary angiography (CTPA)[17,40]	**Standard confirmatory test for PE**; confirms clot burden and RV strain; wide availability; alternative diagnoses may be identified; lower radiation with contemporary protocols	**First-line PE imaging** when pretest probability is high or D-dimer is elevated

SYSTEM	KEY FEATURES	PRIMARY USE
V/Q scintigraphy[4,17]	**Alternative to CTPA** when contrast is contraindicated (e.g., severe renal insufficiency, contrast allergy); excellent diagnostic yield especially with SPECT; **preferred in pregnancy** to reduce breast radiation	PE imaging **when CTPA is contraindicated**
Echocardiography (TTE)[17]	**Inadequate for PE diagnosis** but essential for **RV function assessment** in confirmed PE (RV/LV ratio, TAPSE, McConnell sign); guides escalation to advanced therapies	**Risk stratification in confirmed PE**, especially hemodynamically unstable patients
PERC (PE Rule-Out Criteria)[17,40]	When all criteria are met in a patient with low gestalt probability (<15%), **PE can be excluded** without D-dimer testing; not applicable to most older adults (age <50 required)	**Rule-out of PE** in very low-risk patients; primarily useful in ED settings
Revised Geneva Score[4,10]	**Alternative to Wells PE score**; similar effectiveness; may be slightly more objective (no subjective "PE most likely" item); validated in ED and outpatient settings	**Pretest probability assessment for PE**, particularly when clinician objectivity is preferred
Troponin/BNP[17,41]	Elevated troponin or BNP/NT-proBNP in confirmed PE indicates **myocardial injury and RV strain**; troponin adds prognostic value beyond sPESI in high-risk patients; used to distinguish **intermediate-low** from **intermediate-high risk**	**Risk stratification** in hemodynamically stable PE (intermediate-risk category refinement)

ABBREVIATIONS: CTPA = CT pulmonary angiography; CT = computed tomography; DVT = deep vein thrombosis; PE = pulmonary embolism; RV = right ventricular; V/Q = ventilation/perfusion; SPECT = single-photon emission computed tomography; TTE = transthoracic echocardiography; LV = left ventricular; TAPSE = tricuspid annular plane systolic excursion; PERC = Pulmonary Embolism Rule-Out Criteria; HR = heart rate; SpO_2 = peripheral oxygen saturation; VTE = venous thromboembolism; ED = emergency department; BNP = B-type natriuretic peptide; NT-proBNP = N-terminal pro-B-type natriuretic peptide; sPESI = simplified Pulmonary Embolism Severity Index

CLINICAL PEARL: SAFELY REDUCING UNNECESSARY VTE IMAGING IN OLDER ADULTS

D-dimer specificity declines with age — at a fixed 500 µg/L threshold, only **1 in 18 adults over 75** with suspected DVT **can be ruled out without imaging**.[4,38] The age-adjusted D-dimer (**age × 10 µg/L for patients >50**) **restores diagnostic utility**: in a prospective study of 3,205 patients with suspected DVT, the age-adjusted threshold increased the proportion of **patients ≥75 safely discharged** without ultrasound from **5.5% to 16.6%**, with a 3-month VTE failure rate of **just 0.3%**.[38] For suspected PE, the **ADJUST-PE trial** showed the same formula produced a **23%** absolute reduction in chest imaging, with a **missed-PE rate of 0.3%**.[40] The 2026 AHA/ACC PE Guideline and the ACP endorse age-adjusted D-dimer strategies as safe in patients with **low-to-intermediate pretest probability**, with <2% missed VTE at 3 months.[17] Critically, the age-adjusted threshold only applies when a validated clinical prediction rule (Wells, Revised Geneva) first classifies the patient as "unlikely" or "non-high probability"; **it does not replace clinical judgment**, and patients with high pretest probability should proceed directly to imaging **regardless of D-dimer**.[4,17] For suspected PE specifically, the **PEGeD** and **YEARS** algorithms offer an alternative approach: in patients with **low clinical probability** and no YEARS criteria, a raised D-dimer threshold of 1,000 ng/mL can be used, further reducing imaging by **14–18%** with failure rates **below 1%**.[40,42]

Clues to Dig Deeper

CLINICAL CLUE[4,17,40,43]	WHY IT MATTERS*[17,26,44,45]	NEXT DIAGNOSTIC STEP*[5,17,21,38]
Unexplained dyspnea or tachycardia in an older adult	PE is frequently **misattributed to**: heart failure, COPD, or anxiety; the single most valuable behavior is to **keep PE on the differential**	**Apply the Wells PE score**; age-adjusted D-dimer if 'unlikely'; CTPA if 'likely' or D-dimer positive
Unilateral leg swelling or calf pain	Classic DVT, easily dismissed as **strain or venous insufficiency in older patients**	Wells DVT score and compression ultrasonography; **do not rely on clinical impression alone**
Syncope without a clear cardiac or neurologic cause	Can be the presenting feature of **hemodynamically significant PE**	**Consider PE in the syncope workup**; CTPA when probability supports it
Unprovoked VTE	May be the first manifestation of **occult malignancy** and signals a need for extended anticoagulation	Age- and sex-appropriate **cancer screening**; plan a duration reassessment rather than a fixed 3-month stop

CLINICAL CLUE[4,17,40,43]	WHY IT MATTERS*[17,26,44,45]	NEXT DIAGNOSTIC STEP*[5,17,21,38]
Persistent dyspnea more than 3 months after PE	Suggests **chronic thromboembolic pulmonary hypertension**, an under-recognized and treatable sequela	**Screening echocardiography**; refer for V/Q and right-heart catheterization if right-heart pressures are elevated
New or worsening renal function on a DOAC	Under- or over-anticoagulation results when **dosing is not adjusted** to current clearance	Recalculate creatinine clearance by **Cockcroft-Gault** and adjust the agent or dose
Recurrent VTE while on therapeutic anticoagulation	Represents treatment failure and warrants specialist evaluation (including for **cancer** or **antiphospholipid syndrome**)	**Confirm adherence and dosing**; refer to hematology; consider switching agent or IVC filter per guideline

ABBREVIATIONS: COPD = chronic obstructive pulmonary disease; PE = pulmonary embolism; CTPA = CT pulmonary angiography; DVT = deep vein thrombosis; VTE = venous thromboembolism; DOAC = direct oral anticoagulant; IVC = inferior vena cava; V/Q = ventilation/perfusion; FDA = Food and Drug Administration
***Consult FDA labels for the most up-to-date dosage information, contraindications, and drug-drug interactions**

Common Oversights

OVERSIGHT/ SHORTCUT[17,24,43,46]	WHY IT MATTERS – WHAT TO DO INSTEAD*[17,23,38,47]
Attributing new dyspnea to heart failure or COPD without considering PE	Isolated breathlessness is the **most common PE presentation in older adults**; keep PE on the differential and apply a pretest-probability rule before anchoring on a chronic diagnosis
Not using the age-adjusted D-dimer cutoff	A fixed 500 micrograms/L threshold **sends many older patients to unnecessary imaging**; the **age x 10 cutoff** for those over 50 safely excludes VTE and reduces avoidable scans
Dismissing unilateral leg swelling as strain or 'normal aging'	Delays DVT diagnosis and **risks embolization**; apply the Wells DVT score and **obtain compression ultrasound**
Treating the 3-month mark as a default stop date	**For unprovoked VTE** the recurrence risk after stopping is **high** (**~30-40%** at 10 years); reassess the duration decision rather than discontinuing reflexively
Not screening for CTEPH after PE	Persistent dyspnea beyond 3 months may reflect **chronic thromboembolic pulmonary hypertension**; ask about exertional limitation and screen with echocardiography

OVERSIGHT/ SHORTCUT[17,24,43,46]	WHY IT MATTERS – WHAT TO DO INSTEAD*[17,23,38,47]
Mis-dosing a DOAC for renal function	Estimating clearance with the wrong method or failing to recheck leads to **under- or over-anticoagulation**; use Cockcroft-Gault and reassess periodically
Withholding anticoagulation because of fall risk	Falls are the most-cited reason to withhold yet a patient would need roughly **295 falls per year** for subdural-hematoma risk to **outweigh benefit**; anticoagulation should generally not be withheld and a DOAC is preferred
Missing occult cancer or a hypercoagulable cause in unprovoked VTE	Unprovoked VTE may **herald malignancy** and changes the duration decision; pursue age-appropriate cancer screening and consider the persistent-risk profile
Stopping anticoagulation at the first minor bleed without reassessment	Permanent discontinuation exposes the patient to **recurrent VTE**; weigh reduced-dose extended therapy and adjunctive PPI against the bleeding risk rather than abandoning treatment

ABBREVIATIONS: COPD = chronic obstructive pulmonary disease; PE = pulmonary embolism; VTE = venous thromboembolism; DVT = deep vein thrombosis; CTEPH = chronic thromboembolic pulmonary hypertension; DOAC = direct oral anticoagulant; PPI = proton pump inhibitor; FDA = Food and Drug Administration
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Key Differentials in Elderly

PRESENTATION	DIFFERENTIAL[4,17,24,48]	KEY TESTS[17,21,49,50]
Unilateral painful, swollen leg	**DVT**; muscle strain; venous insufficiency; cellulitis; Baker cyst; lymphedema (cellulitis, Baker cyst, and lymphedema are standard mimics not individually cited in the source set)	**Wells DVT score**; compression ultrasonography; clinical exam for skin and infection signs
Acute dyspnea with or without chest pain	**PE**; **acute coronary syndrome**; heart failure exacerbation; pneumonia; COPD exacerbation; anxiety (ACS, CHF, and COPD are standard mimics consistent with the sources)	**Wells PE score**; **age-adjusted D-dimer**; CTPA; ECG and troponin to evaluate cardiac causes
Syncope in an older adult	**PE**; arrhythmia; orthostatic hypotension; aortic stenosis; neurologic causes	**Include PE in the workup**; CTPA when probability supports it; cardiac and orthostatic evaluation
Persistent dyspnea after a treated PE	**CTEPH**; post-PE functional impairment; deconditioning; **recurrent PE**	**Screening echocardiography**; **V/Q scan** and right-heart catheterization if pressures elevated

PRESENTATION	DIFFERENTIAL[4,17,24,48]	KEY TESTS[17,21,49,50]
Recurrent VTE despite anticoagulation	**Treatment failure**; nonadherence; occult cancer; antiphospholipid syndrome; subtherapeutic dosing	**Confirm adherence and dose**; hematology referral; **cancer** and antiphospholipid evaluation

ABBREVIATIONS: DVT = deep vein thrombosis; PE = pulmonary embolism; ACS = acute coronary syndrome; COPD = chronic obstructive pulmonary disease; CTPA = CT pulmonary angiography; ECG = electrocardiogram; CTEPH = chronic thromboembolic pulmonary hypertension; V/Q = ventilation/perfusion; VTE = venous thromboembolism; CT = computed tomography; RV = right ventricular; LV = left ventricular

Comorbidity Screening

CONDITION	PREVALENCE/ ASSOCIATION[21,30,43,51]	SCREENING APPROACH[17,52–54]
Active cancer (per site)	**~20%** of incident VTE; 1-year mortality **34.7%** in Medicare beneficiaries with cancer-associated VTE	Pursue **age-appropriate cancer screening** after unprovoked VTE; coordinate oncology; anticoagulate while cancer is active
Chronic kidney disease	**Common in older adults**; alters anticoagulant clearance and bleeding risk	Estimate creatinine clearance by **Cockcroft-Gault**; favor apixaban in significant CKD; monitor renal function periodically
Heart failure	Both a **VTE risk factor** and a **consequence of PE** (acute cor pulmonale)	Recognize that **HF raises PE severity scores** and reduces outpatient eligibility; manage volume and right-heart status
Atrial fibrillation	When coexisting with VTE, requires **full therapeutic anticoagulation**	Use a **full treatment dose** (not a reduced VTE-prevention dose); reconcile any antiplatelet therapy
Post-thrombotic syndrome	Develops in **20-50%** of patients after symptomatic DVT	Assess with the **Villalta score**; compression stockings and exercise are mainstays; refer for ulceration
Frailty and falls	Frailty raises **VTE risk** (HR 1.63) and complicates bleeding-risk assessment	Assess falls and function; **do not withhold anticoagulation for fall risk alone**; favor a DOAC and **address home hazards**
Polypharmacy and bleeding risk	Concurrent NSAIDs, aspirin, and supplements **compound bleeding risk**	**Reconcile medications each visit**; deprescribe where possible; consider a proton pump inhibitor on extended therapy

ABBREVIATIONS: VTE = venous thromboembolism; CKD = chronic kidney disease; PE = pulmonary embolism; HF = heart failure; DVT = deep vein thrombosis; DOAC = direct oral anticoagulant; NSAID = nonsteroidal anti-inflammatory drug; HR = hazard ratio; PPI = proton pump inhibitor

⚠ RED FLAG — EMERGENCY/ACTIVATE CRISIS RESPONSE

These emergency conditions require **immediate intervention**:

- **High-risk (massive) PE** (AHA/ACC Category E):[17,40,55] Sustained SBP <90 mmHg for >15 minutes, cardiogenic shock, or cardiac arrest = **~20% 30-day mortality**
  - → **IV unfractionated heparin**; systemic thrombolysis (Class 1); activate PERT; catheter-directed therapy, surgical embolectomy, or VA-ECMO if thrombolysis contraindicated or fails
- **Phlegmasia cerulea dolens**:[56–58] Cyanotic, massively swollen limb with absent pulses and impending venous gangrene = mortality **~19%**
  - → Emergent anticoagulation plus catheter-directed thrombolysis or mechanical thrombectomy (Grade 1A); surgical thrombectomy if lysis is contraindicated; anticoagulation alone is insufficient
- **Incipient cardiopulmonary failure** (AHA/ACC Category D):[17,55] Normotensive shock, transient hypotension, or impending respiratory failure with PE
  - → **IV heparin**; PERT activation; thrombolysis or catheter-directed therapy may be considered (Class 2a–2b); VA-ECMO if refractory
- **Active major bleeding on anticoagulation**:[59,60] ICH or hemodynamically significant GI bleeding = ICH on anticoagulation carries 30-day mortality **approaching 50%**
  - → Hold anticoagulation; administer specific reversal agent (idarucizumab, andexanet alfa, or 4-factor PCC); emergent neurosurgical or GI consultation

⚠ RED FLAG — URGENT (SAME- OR NEXT-DAY)

These urgent conditions require expedited evaluation and intervention:

- **Intermediate-high-risk (submassive) PE** (AHA/ACC Category C3):[40,55] Hemodynamically stable with both RV dysfunction and elevated troponin
  - → **PERT assessment** (Class 1); ICU or step-down monitoring; catheter-directed therapy if clinical deterioration
- **Extensive iliofemoral DVT with limb-threatening symptoms**:[21,61] Severe pain, swelling, and functional impairment from common femoral or iliac vein thrombosis
  - → Therapeutic anticoagulation; consider **catheter-directed thrombolysis** at an experienced center for limb salvage and PTS reduction
- **Recurrent VTE while therapeutically anticoagulated**:[62] Evaluate for cancer, antiphospholipid syndrome, nonadherence, or subtherapeutic dosing
  - → Confirm adherence and dosing; hematology referral; consider switching agent class or IVC filter
- **Suspected heparin-induced thrombocytopenia** (HIT):[34,63,64] ≥50% platelet drop 5–10 days after heparin exposure, especially with new thrombosis
  - → **Discontinue all heparin**; start non-heparin anticoagulant (argatroban if critically ill; DOAC or fondaparinux if stable); send HIT immunoassay
- **Suspected CTEPH ≥3 months after PE**:[17,49] Persistent exertional dyspnea **despite anticoagulation** = prevalence **~3%**; TTE alone is insufficient (one-third of cases have normal TTEs)
  - → **V/Q scintigraphy** (~100% NPV); if perfusion defects present, refer to a CTEPH center for CTPA and right-heart catheterization

3 MEAT DOCUMENTATION ESSENTIALS

VTE documentation translates an **acute event with a long anticoagulation tail** into a record that supports continuity, safe medication management, and **accurate representation of clinical complexity**. The most common gaps are **mis-stating acuity** (carrying an "acute DVT" label forward when the clot has resolved or become chronic), omitting the anatomic location and laterality that define proximal versus distal disease, failing to document whether acute cor pulmonale is present in PE, and not recording the duration decision and its **rationale at the 3–6 month reassessment**.[21,61,62] Each gap **obscures the clinical picture** and complicates coordination with anticoagulation management, hematology, and the emergency setting. Outpatient VTE codes have particularly low positive predictive values for acute events (**~31%**), underscoring the **importance of explicit acuity documentation at each encounter**.[65]

***Case vignette**: A 74-year-old man is seen for a chronic-care visit eight months after an **unprovoked left popliteal DVT**, for which he takes apixaban. He reports good adherence and no bleeding. **Past medical history**: chronic kidney disease (stage 3), hypertension, and a remote fall. He has had no recurrent leg symptoms. The prior note simply reads "DVT, on Eliquis (apixaban),"*

*coded as **acute DVT**. Repeat compression ultrasound today shows no residual thrombus; creatinine clearance by Cockcroft-Gault is 48 mL/min.*

MONITOR: "Eight months of apixaban for unprovoked left proximal DVT; adherence confirmed, no bleeding or recurrent symptoms. Repeat ultrasound: no residual thrombus — index DVT resolved. **CrCl 48 mL/min by Cockcroft-Gault**. No post-thrombotic syndrome on exam."

EVALUATE: "Bleeding risk reassessed for extended-phase decision (age 74, CKD, prior fall, concomitant medications). **CrCl 48 confirms apixaban appropriate**; renal trajectory warrants surveillance. **Occult-malignancy screening reviewed** given unprovoked event. No symptoms suggestive of CTEPH."

ASSESS: "Diagnoses updated → personal history of DVT, left popliteal vein, resolved (**Z86.718**) with long-term anticoagulant use (**Z79.01**); the prior acute DVT code (**I82.432**) is no longer appropriate at eight months with negative ultrasound. Had thrombus persisted on imaging, the correct code would be chronic embolism and thrombosis of left popliteal vein (**I82.532**), which maps to the CMS-HCC vascular hierarchy. Also document CKD stage 3 (**N18.3**) and hypertension (**I10**). The unprovoked nature supports extended-phase anticoagulation rather than a fixed 3-month stop."

TREAT: "Transitioned apixaban to **reduced-dose extended regimen** (2.5 mg twice daily) for secondary prevention per 2026 AHA/ACC Class 1 recommendation. Discussed extended-therapy rationale with patient → documented deliberate decision to **continue with regular 3-6 month reassessment interval** given unprovoked event rather than defaulting to a fixed stop date. **Referred to oncology** for age- and sex-appropriate occult-malignancy evaluation given unprovoked VTE. **Reviewed fall prevention**: discussed home hazard modifications (loose rugs, grab bars, lighting), continued physical therapy referral; anticoagulation **not withheld** for fall risk. Renal-function surveillance and bleeding-risk reassessment planned at each visit; next CrCl in 3 months. Return in 3 months or sooner for new symptoms."

Clinical Documentation Elements

- **Document acuity explicitly**: Acute (**I82.4-/I26.0-**), chronic (**I82.5-/I27.82**), or resolved (history **Z86.711/Z86.718**) → acuity governs both the code and HCC mapping[61,65]
- **Specify the anatomic location and laterality for DVT**: Femoral, iliac, popliteal; right/left/bilateral; proximal location carries the **higher recurrence risk**[21,61]
- **For PE, state whether acute cor pulmonale is present or absent**: this distinction selects the **I26** subcode and reflects right-heart strain[8,17]
- **Record the provoking context**: Provoked, unprovoked, or cancer-associated → drives the anticoagulation duration decision[4,17]
- **Document the anticoagulant, dose, and renal function**: Creatinine clearance by **Cockcroft-Gault**; add **Z79.01** for long-term anticoagulant use[1,66]
- **Document the duration decision and its rationale at the 3-6 month reassessment**: Continue, reduce dose, or stop → explicit directions rather than implying 3 months is a default endpoint[17,23]
- **Identify and document bleeding-risk factors**: Prior bleeding, anemia, fall risk, concomitant antiplatelet or NSAID use + tool used (VTE-BLEED, DOAC score, HAS-BLED)[1,67]

- **Document complications discretely**: Post-thrombotic syndrome (**I87.0-**) and CTEPH (**I27.2-**) → note any functional limitation prompting CTEPH screening after PE[17,53]

Reframing Common Documentation Shortcuts

INSTEAD OF...	DOCUMENT…*[8,17,23,53,61]
'DVT, on Eliquis'	'Personal history of left popliteal DVT, resolved on repeat ultrasound (**Z86.718**); long-term apixaban for secondary prevention (**Z79.01**)'
'Acute DVT' (carried forward by habit)	**Reassess acuity**: 'Chronic left popliteal DVT, thrombus persistent on imaging (**I82.532**)' if still present, or history **Z86.718** if resolved
'PE'	'Acute pulmonary embolism with acute cor pulmonale (**I26.09**)' or 'without acute cor pulmonale (**I26.99**)' → state **right-heart strain status**
'On a blood thinner'	'Apixaban 5 mg twice daily; CrCl 48 mL/min (Cockcroft-Gault); long-term anticoagulant use (**Z79.01**)'
'Provoked vs unprovoked not stated'	'Unprovoked proximal DVT → extended-phase anticoagulation planned; duration reassessed at this visit'
'Continue meds' at 3 months	'**3-month reassessment**: unprovoked event, low bleeding risk - continue extended therapy (reduced-dose apixaban 2.5 mg BID after 6 months)'
'Leg swelling, chronic'	'Post-thrombotic syndrome, left lower extremity **(I87.01**) → compression therapy; Villalta score documented'
'Short of breath since PE'	'Persistent dyspnea 4 months post-PE → screening echocardiogram for CTEPH ordered (**I27.2**- if confirmed)'

ABBREVIATIONS: DVT = deep vein thrombosis; PE = pulmonary embolism; CrCl = creatinine clearance; BID = twice daily; CTEPH = chronic thromboembolic pulmonary hypertension; PTS = post-thrombotic syndrome; VTE = venous thromboembolism; FDA = Food and Drug Administration
***Consult FDA labels for the most up-to-date dosage information, contraindications, and drug-drug interactions**

DOCUMENTATION REMINDER IS COMPREHENSIVE CODING

Every VTE encounter should document the **acuity** (acute, chronic, or resolved) and, for DVT, the **location and laterality**;[21,34,61] for PE, **whether acute cor pulmonale is present**;[17] the **provoking context** (provoked, unprovoked, cancer-associated); the **anticoagulant, dose, and renal function** with **Z79.01** for ongoing therapy; the **duration decision** at the 3-6 month reassessment; and any **complication** (post-thrombotic syndrome, CTEPH).[17,21,23,53] **Reassess acuity at each visit** so the code reflects the true clinical state rather than a label carried forward.

4 TREATMENT AND REFERRAL QUICK GUIDE

VTE treatment is driven by PE severity, the provoking context, renal function, and bleeding risk.[4,17] Anticoagulation is initiated promptly, but the **PCP's highest-value contributions** are **recognizing VTE early**, selecting and dosing the anticoagulant **safely for renal function and bleeding risk**, making a deliberate **duration decision at 3-6 months** rather than defaulting to a stop, **screening for CTEPH** after PE, and supporting adherence to **prevent recurrence**.[1,17,21,24,43] **In older adults** the risk-benefit balance is delicate: anticoagulant-related major bleeds are roughly **3 times more likely to be fatal** than recurrent VTE, so agent choice and dose adjustment matter.[4,43,68]

↔ MAKING CONNECTIONS

For additional context on **anticoagulant utilization**, please consult the **AAVBC Anticoagulant Therapy Utilization Management QRG**.

Therapy Escalation Criteria

TRIGGER	ACTION*[17,21,23,34]
Suspected DVT (unilateral leg swelling/pain)	**Apply the Wells DVT score**; D-dimer if unlikely; compression ultrasound if likely or D-dimer positive
Suspected PE (dyspnea, pleuritic pain, syncope)	**Apply the Wells PE score**; age-adjusted D-dimer if unlikely; CTPA if likely or D-dimer positive
Confirmed VTE, hemodynamically stable	Start a **direct oral anticoagulant** (first-line over a vitamin K antagonist for most patients)
High-risk (massive) PE	**Emergency transfer**; systemic thrombolysis, catheter-directed therapy, or embolectomy; engage a PE response team
Intermediate-risk (submassive) PE	**Hospitalize**; monitor for deterioration; PE response team for right-ventricular dysfunction or elevated troponin
Cancer-associated VTE	**DOAC** (apixaban, rivaroxaban, or edoxaban) for most; favor LMWH for luminal GI/GU malignancy; continue while cancer is active
Significant renal impairment (CrCl <30)	Favor apixaban or a vitamin K antagonist; dose-adjust by **Cockcroft-Gault**; avoid dabigatran
Antiphospholipid syndrome	**Use a vitamin K antagonist** → DOACs are not recommended in triple-positive antiphospholipid syndrome

TRIGGER	ACTION*[17,21,23,34]
Recurrent VTE on therapeutic anticoagulation	Confirm adherence and dose; refer to hematology; consider switching agent or an IVC filter
3-6 month reassessment	Decide continue, reduce dose, or stop based on provoking context and bleeding risk → **do not** default to stopping
Persistent dyspnea >3 months after PE	**Screen for CTEPH with echocardiography**; refer for V/Q and right-heart catheterization if pressures elevated

ABBREVIATIONS: DVT = deep vein thrombosis; PE = pulmonary embolism; CTPA = CT pulmonary angiography; VTE = venous thromboembolism; DOAC = direct oral anticoagulant; LMWH = low-molecular-weight heparin; GI = gastrointestinal; GU = genitourinary; CrCl = creatinine clearance; IVC = inferior vena cava; CTEPH = chronic thromboembolic pulmonary hypertension; V/Q = ventilation/perfusion; FDA = Food and Drug Administration
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AHA/ACC and ASH Guideline-Aligned Anticoagulation by Setting and Patient Profile

SETTING/CLASS	PREFERRED OPTION(S)*[1,17,23,34]	KEY NOTES*[21,62,69,70]
First-line anticoagulation (most patients)	A **direct oral anticoagulant** over a vitamin K antagonist (Class I, Level A)	DOACs are preferred for efficacy, fixed dosing, and no routine monitoring; reserve VKA for **specific indications**
Apixaban (Eliquis)	**10 mg** twice daily x 7 days, then **5 mg** twice daily; extended phase 2.5 mg or 5 mg twice daily	Lowest renal excretion (27%) and **favorable bleeding profile** across age, cancer, CKD, and frailty subgroups
Rivaroxaban (Xarelto)	**15 mg** twice daily **x 21 days**, then **20 mg** once daily; extended phase **10 mg** once daily	**Once-daily maintenance** may aid adherence; take with food; **higher GI bleeding** than apixaban in older adults
Edoxaban (Savaysa)	**60 mg** once daily (30 mg if CrCl 15-50, weight ≤60 kg, or a P-gp inhibitor) after ≥5 days of LMWH	**Requires a parenteral LMWH lead-in**; reasonable in cancer-associated VTE
Generic dabigatran	**150 mg** twice daily after ≥5 days of LMWH	**Highest renal excretion** (80%); dyspepsia is common (up to 17%) and drives discontinuation; **avoid in CrCl <30**
LMWH + vitamin K antagonist (warfarin)	LMWH bridge until INR ≥2.0 for ≥24 h; warfarin target **INR 2.0-3.0**	**Reserve for**: antiphospholipid syndrome, severe CKD, or significant DOAC interactions

SETTING/CLASS	PREFERRED OPTION(S)*[1,17,23,34]	KEY NOTES*[21,62,69,70]
Cancer-associated VTE	Apixaban, rivaroxaban, or edoxaban **for most**; LMWH for luminal GI/GU malignancy	Continue anticoagulation while cancer is active; coordinate with oncology
High-risk (massive) PE	**Systemic thrombolysis**; catheter-directed therapy; surgical embolectomy	**For hemodynamic instability**; engage a PE response team and transfer immediately
Extended-phase secondary prevention	Reduced-dose **apixaban 2.5 mg** BID or **rivaroxaban 10 mg** daily after ≥6 months	**For unprovoked VTE** or persistent risk factors with acceptable bleeding risk
IVC filter/catheter-directed therapy	IVC filter when **anticoagulation is contraindicated or fails**; catheter-directed therapy for limb-threatening iliofemoral DVT	Not a substitute for anticoagulation; reserve for specific indications

ABBREVIATIONS: DOAC = direct oral anticoagulant; VKA = vitamin K antagonist; CKD = chronic kidney disease; GI = gastrointestinal; CrCl = creatinine clearance; P-gp = P-glycoprotein; LMWH = low-molecular-weight heparin; INR = international normalized ratio; GU = genitourinary; PE = pulmonary embolism; VTE = venous thromboembolism; BID = twice daily; IVC = inferior vena cava; FDA = Food and Drug Administration
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Anticoagulant Treatment Durations

CLINICAL SCENARIO[4,9,11,17,62]	PREFERRED ANTICOAGULANT*[4,9,11,17,62]	DURATION*[9,17,62,71]	KEY NOTES*[4,62,70,73,74]
Provoked DVT/PE — major transient risk factor (surgery, major trauma, prolonged immobilization ≥3 days)	**DOAC preferred over VKA**; apixaban or rivaroxaban allow oral-only initiation without LMWH bridge	**3 months**, then stop	**Low recurrence risk** (~1%/year after stopping); **no benefit to extending beyond 3–6 months**; annualized recurrence <1%/year for surgical provocation
Provoked DVT/PE — minor transient risk factor (estrogen therapy, minor surgery, long-haul travel, minor leg injury)	**DOAC preferred**	**3 months**, then reassess	**Recurrence risk is intermediate**; CHEST 2021 suggests against extended-phase therapy but decision should incorporate **patient preference and individual risk**

CLINICAL SCENARIO[4,9,11,17,62]	PREFERRED ANTICOAGULANT*[4,9,11,17,62]	DURATION*[9,17,62,71]	KEY NOTES*[4,62,70,73,74]
Unprovoked DVT/PE — first episode	**DOAC preferred**; after ≥6 months of full-dose therapy, transition to **reduced-dose** DOAC	**3–6 months initial**, then indefinite (no predefined stop date)	10-year recurrence risk **~36%** if anticoagulation stopped; men at higher risk than women; **HERDOO2 score** may identify low-risk women who can safely stop; reassess annually balancing recurrence vs. bleeding risk
Recurrent unprovoked VTE (≥2 episodes)	**DOAC preferred for extended phase**; reduced-dose apixaban or rivaroxaban after initial treatment	**Indefinite**	High recurrence risk; **strong recommendation for extended anticoagulation** across all major guidelines (CHEST, AHA/ACC 2026, ESC)
Inherited thrombophilia — low-risk (heterozygous Factor V Leiden, heterozygous prothrombin G20210A)	**DOAC preferred if VTE occurred**; treat the VTE event, not the thrombophilia alone	Duration based on whether VTE was **provoked or unprovoked** (same as above categories)	Thrombophilia alone **does not mandate anticoagulation**; presence of thrombophilia may tip the balance toward **extended therapy in borderline cases**; routine thrombophilia testing after provoked VTE is generally not recommended
Inherited thrombophilia — high-risk (homozygous Factor V Leiden, combined defects, antithrombin deficiency, protein C/S deficiency with VTE)	**DOAC acceptable for most**; consider VKA if recurrent events on DOAC or complex thrombophilia	**Indefinite** after first unprovoked VTE	These are **persistent risk factors**; treat as unprovoked VTE with extended-phase anticoagulation; **antithrombin deficiency** may require LMWH acutely with hematology consultation

CLINICAL SCENARIO[4,9,11,17,62]	PREFERRED ANTICOAGULANT*[4,9,11,17,62]	DURATION*[9,17,62,71]	KEY NOTES*[4,62,70,73,74]
Antiphospholipid syndrome (APS)	**Warfarin** (INR 2.0–3.0) — DOACs are **contraindicated**, especially in triple-positive APS	Indefinite	Rivaroxaban was inferior to warfarin in RCTs (TRAPS, ASTRO-APS); DOACs associated with **higher thrombotic events**; LMWH bridge until INR therapeutic; higher-intensity warfarin (INR 3–4) not superior and increases bleeding
Cancer-associated VTE	**DOACs for most**; LMWH preferred for luminal GI/GU malignancies due to increased mucosal bleeding risk with DOACs	**Indefinite while cancer is active** or under treatment	DOACs reduce recurrent VTE by **~34%** vs. LMWH with non-significant increase in major bleeding; coordinate with oncology; **reassess near end of life**
Severe renal impairment (CrCl <30 mL/min)	**Warfarin** (INR 2.0–3.0) with LMWH bridge; **dabigatran contraindicated** at CrCl <30; apixaban may be used with caution per FDA labeling	Per underlying indication	Factor Xa inhibitors have limited data at **CrCl <15–30**; **apixaban** has lowest renal excretion (27%) among DOACs
Pregnancy	**LMWH** throughout pregnancy	Through ≥**6 weeks postpartum** (minimum **3 months** total)	DOACs and warfarin cross the placenta and are **contraindicated**; warfarin is teratogenic (especially weeks 6–12); **LMWH does not cross placenta**; can transition to DOAC or warfarin postpartum if not breastfeeding (warfarin is safe in breastfeeding)
Mechanical heart valve	**Warfarin** — DOACs are contraindicated	**Indefinite**	Dabigatran was associated with increased thromboembolic and bleeding events vs. warfarin in the **RE-ALIGN trial**; **all DOACs carry a contraindication** for mechanical valves

CLINICAL SCENARIO[4,9,11,17,62]	PREFERRED ANTICOAGULANT*[4,9,11,17,62]	DURATION*[9,17,62,7]	KEY NOTES*[4,62,70,73,74]

ABBREVIATIONS: DOAC = direct oral anticoagulant; VKA = vitamin K antagonist; CKD = chronic kidney disease; GI = gastrointestinal; CrCl = creatinine clearance; P-gp = P-glycoprotein; LMWH = low-molecular-weight heparin; INR = international normalized ratio; GU = genitourinary; PE = pulmonary embolism; VTE = venous thromboembolism; BID = twice daily; IVC = inferior vena cava; FDA = Food and Drug Administration
***Consult FDA labels for the most up-to-date dosage information, contraindications, and drug-drug interactions**

CLINICAL PEARL: ANTICOAGULANT SELECTION AND COST STEWARDSHIP IN VTE

DOACs, warfarin, and heparin-based agents each maintain distinct roles in VTE management depending on patient characteristics, renal function, and clinical setting — newer oral anticoagulants **do not simply "replace" older therapies across all indications**.[11,21] Indirect comparisons show **no differences** in recurrent VTE or VTE-related death **among the four DOACs**; the choice between them should consider comorbidities (CKD favoring apixaban), adverse-effect profile, cost, and patient preference.[21,75] Apixaban has the most favorable bleeding profile in network meta-analyses (major or clinically relevant non-major bleeding: RR **0.47** vs rivaroxaban, **0.69** vs dabigatran), though **no head-to-head randomized trial for VTE has been conducted**.[46,75,76] Despite this, brand-name apixaban (Eliquis) accounted for **~73%** of Medicare Part D anticoagulant spending in 2023 (**~$18.3 billion** of $25.1 billion), while generic dabigatran represented **~1%** (~$256 million).[77] **Generic dabigatran is an excellent value-based option** for appropriate patients (those with CrCl >30 mL/min, no significant P-glycoprotein interactions, and tolerance of twice-daily dosing with a parenteral lead-in) offering the **same noninferiority for recurrent VTE** and lower overall bleeding than warfarin demonstrated in the **RE-COVER trials**, at **a fraction of brand-name DOAC cost**.[11,21,78,79] Lower out-of-pocket costs may **improve adherence** on a chronic therapy, **reducing preventable bleeding events** and rehospitalizations. **Anticoagulant selection should balance** clinical efficacy, patient safety, renal function, and cost stewardship, with therapy **personalized to the individual patient** rather than driven by prescribing inertia or formulary defaults.[21,46]

Non-Pharmacologic Care and Supportive Interventions

INTERVENTION	TARGET/RECOMMENDATION[1,17,47,80]	NOTES[17,28,35]
Early mobilization	Encourage **ambulation as tolerated** after acute VTE	Bed rest is **not required** for most patients with DVT or stable PE
Compression therapy for PTS	**Graduated compression stockings** and **exercise** for symptomatic post-thrombotic syndrome	**Mainstay of PTS management**; prevention evidence is mixed
Fall-risk reduction	**Remove home hazards**, improve lighting, add grab bars; PT/OT for high-risk patients	**Reduce fall risk** rather than withholding anticoagulation

INTERVENTION	TARGET/RECOMMENDATION[1,17,47,80]	NOTES[17,28,35]
Travel prophylaxis	**Calf exercises** and hydration for **prolonged travel**; compression or LMWH only if substantially higher risk	Routine pharmacologic prophylaxis is **not advised** for average-risk travelers
Adherence support	Pill organizers, reminders, and **caregiver involvement**	Missed DOAC doses **raise recurrence risk**; adherence is essential
Smoking cessation and weight management	Counsel on **modifiable risk** where appropriate	Obesity combined with poor muscle strength sharply **raises recurrence risk** in older persons

ABBREVIATIONS: DVT = deep vein thrombosis; PE = pulmonary embolism; VTE = venous thromboembolism; PTS = post-thrombotic syndrome; PT = physical therapy; OT = occupational therapy; LMWH = low-molecular-weight heparin; DOAC = direct oral anticoagulant

Medication Safety and Key Interactions

DRUG/CLASS	INTERACTION/TOXICITY*[4,17,81,82]	CLINICAL ACTION*[1,17,54,59]
Apixaban	**Bleeding** (lowest among options); renal/hepatic dosing considerations	**Preferred in CKD and frailty**; reduce to 2.5 mg BID per criteria; recheck CrCl periodically
Rivaroxaban	Higher GI bleeding in adults ≥75 than apixaban; **absorption requires food** at the 15-20 mg doses	Take with food; weigh GI bleeding risk in older adults; **consider a PPI**
Dabigatran	Dyspepsia/GI intolerance (up to **17%**); **80% renal excretion**; PML not relevant → bleeding and GI are the issues	**Avoid if CrCl <30**; counsel on dyspepsia; **do not** stop abruptly without a plan
Warfarin	**Narrow therapeutic window**; numerous food (vitamin K) and drug interactions	**Target INR 2.0-3.0**; consistent vitamin K intake; frequent INR during changes
DOACs with strong P-gp/CYP3A4 inducers (e.g., rifampin)	Inducers markedly **lower DOAC levels** and risk treatment failure	**Avoid the combination**; a vitamin K antagonist is preferred when a strong inducer is required
Concomitant antiplatelets/ NSAIDs	**Additive bleeding risk**, especially gastrointestinal	**Deprescribe where possible**; add a PPI; reconcile medications each visit

DRUG/CLASS	INTERACTION/TOXICITY*[4,17,81,82]	CLINICAL ACTION*[1,17,54,59]
Any DOAC in moderate-severe CKD	Drug accumulation and bleeding if not dose-adjusted	Estimate clearance by **Cockcroft-Gault** (the trial method), not MDRD/CKD-EPI; favor apixaban
Anticoagulation around bleeding events	Intracranial hemorrhage 30-day mortality **~41%**; GI is the most common site; **bleeding predictors include**: age ≥75 (HR 1.64), active cancer (HR 3.06), prior major bleed (HR 2.38), and anemia (HR 1.75)	**Reverse and stabilize acute major bleeds**; reassess (reduced-dose extended therapy + PPI) rather than abandoning treatment

ABBREVIATIONS: BID = twice daily; CKD = chronic kidney disease; CrCl = creatinine clearance; GI = gastrointestinal; PPI = proton pump inhibitor; CYP3A4 = cytochrome P450 3A4; P-gp = P-glycoprotein; DOAC = direct oral anticoagulant; INR = international normalized ratio; NSAID = nonsteroidal anti-inflammatory drug; MDRD = Modification of Diet in Renal Disease; CKD-EPI = Chronic Kidney Disease Epidemiology Collaboration; HR = hazard ratio; FDA = Food and Drug Administration
***Consult FDA labels for the most up-to-date dosage information, contraindications, and drug-drug interactions**

When to Refer

CRITERION	SPECIALIST[17,49,61,83]	URGENCY[17,57]
High-risk (massive) PE; hemodynamic instability	Emergency department/PE response team	**Emergent**
Phlegmasia cerulea dolens (limb-threatening DVT)	Emergency department/vascular	**Emergent**
Active major bleeding on anticoagulation	Emergency department	**Emergent**
Intermediate-risk (submassive) PE	Hospital admission/PE response team	**Urgent** (same day)
Extensive iliofemoral DVT	Interventional radiology/vascular	**Urgent** (same/next day)
Recurrent VTE on therapeutic anticoagulation	Hematology	**Urgent** (within days)
Unprovoked VTE in a younger or recurrent patient	Hematology (thrombophilia/ duration)	Expedited
Suspected antiphospholipid syndrome	Hematology/rheumatology	Expedited
Persistent dyspnea >3 months after PE (CTEPH)	Pulmonary hypertension center	Expedited

CRITERION	SPECIALIST[17,49,61,83]	URGENCY[17,57]
Post-thrombotic syndrome with ulceration	Vascular/wound care	Routine

ABBREVIATIONS: CTEPH = chronic thromboembolic pulmonary hypertension; DVT = deep vein thrombosis; PE = pulmonary embolism; VTE = venous thromboembolism

Follow-Up Timing

CATEGORY	FREQUENCY[1,17]	LABS/MONITORING*[1,17,25]
Renal function on a DOAC	**Baseline**; **every 3-6 months** if 65+ or CKD; annually if stable	Creatinine clearance by **Cockcroft-Gault**; adjust agent/dose; **favor apixaban in CKD**
INR on warfarin	**Weekly** during initiation; **every 4 weeks** when stable	**Target INR 2.0-3.0**; home INR for eligible patients
Complete blood count	**Baseline**; with bleeding or anemia; **annually** on extended therapy	**Hemoglobin <100 g/L** marks elevated extended-phase bleeding risk
Bleeding-risk assessment	**Every visit**	**VTE-BLEED** or DOAC score for extended-therapy decisions; **document**: falls, cognition, polypharmacy, GI symptoms
Duration reassessment	**At 3-6 months**, then periodically	Decide continue, reduce dose, or stop by **provoking context and bleeding risk**
PE severity tracking	**At diagnosis** and follow-up	**PESI/sPESI** to guide setting of care and de-escalation
CTEPH screening after PE	Ask about dyspnea/functional limitation at every visit for **≥1 year**	**Screening echocardiogram** if symptomatic; refer if right-heart pressures elevated

ABBREVIATIONS: DOAC = direct oral anticoagulant; CKD = chronic kidney disease; INR = international normalized ratio; GI = gastrointestinal; VTE = venous thromboembolism; PE = pulmonary embolism; PESI = Pulmonary Embolism Severity Index; sPESI = simplified PESI; CTEPH = chronic thromboembolic pulmonary hypertension; FDA = Food and Drug Administration
***Consult FDA labels for the most up-to-date dosage information, contraindications, and drug-drug interactions**

Comorbidity Management

COMORBIDITY	APPROACH*[17,83–85]	CAUTION*[46,52,71,86]
Chronic kidney disease	**Dose-adjust all DOACs**; favor apixaban; serial creatinine clearance	Use **Cockcroft-Gault**; **avoid dabigatran if CrCl <30**

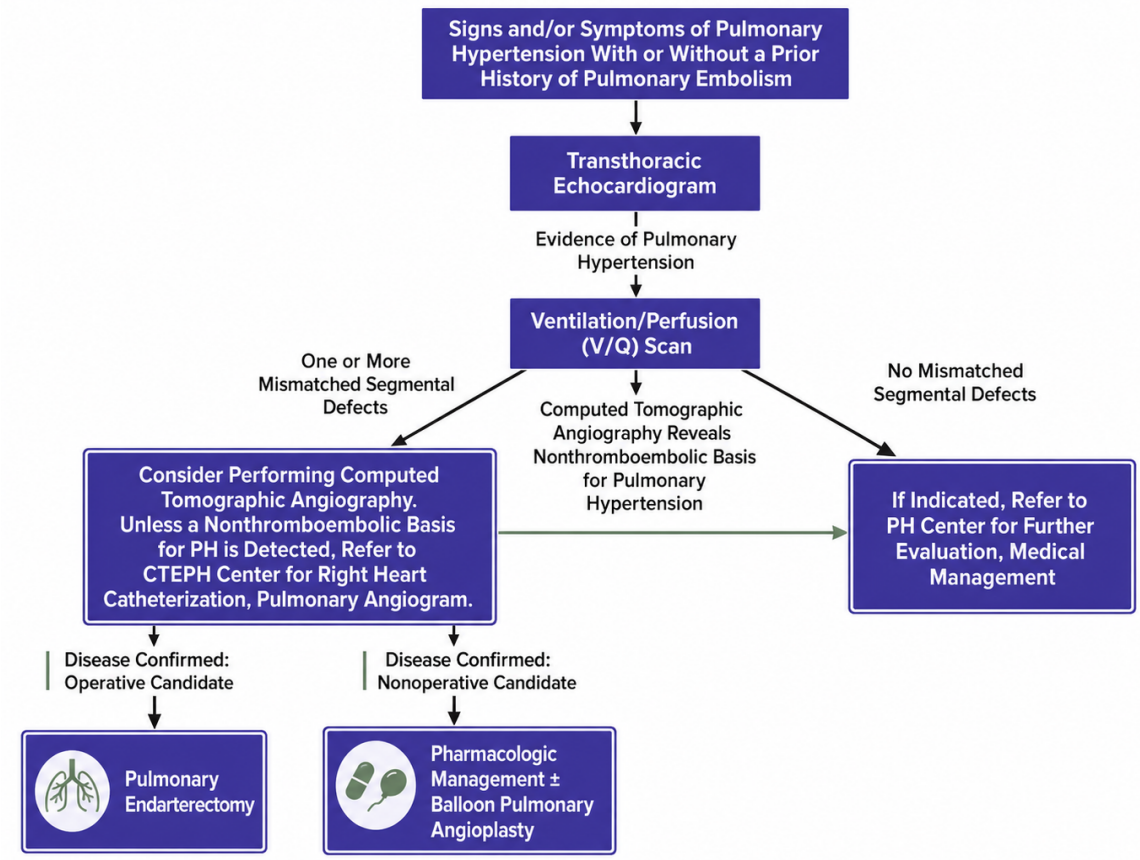
COMORBIDITY	APPROACH*[17,83–85]	CAUTION*[46,52,71,86]
Active cancer	**DOAC for most**; LMWH for luminal GI/GU malignancy; anticoagulate while cancer active	1-year mortality is high (**34.7%** in Medicare); **coordinate oncology** and screen when **VTE is unprovoked**
Heart failure	**Manage volume and right-heart status**; recognize HF as both cause and consequence of PE	**HF raises PE severity scores** and reduces outpatient eligibility
Atrial fibrillation	**Maintain full therapeutic anticoagulation** when AF coexists with VTE	**Do not** use a reduced VTE-prevention dose; **reconcile antiplatelets**
Falls and frailty	**Address home hazards**; PT/OT; favor a DOAC	**Do not withhold anticoagulation** for fall risk alone (**~295 falls/yr** would be needed to offset benefit)
Post-thrombotic syndrome	**Compression stockings and exercise**; refer for ulceration	Develops in **20-50%** after symptomatic DVT; assess with the **Villalta score**
Polypharmacy	**Reconcile medications each visit**; deprescribe interacting agents	NSAIDs, aspirin, and supplements **compound bleeding risk**

ABBREVIATIONS: DOAC = direct oral anticoagulant; CrCl = creatinine clearance; GI = gastrointestinal; GU = genitourinary; LMWH = low-molecular-weight heparin; VTE = venous thromboembolism; PE = pulmonary embolism; HF = heart failure; AF = atrial fibrillation; PT = physical therapy; OT = occupational therapy; DVT = deep vein thrombosis; NSAID = nonsteroidal anti-inflammatory drug; FDA = Food and Drug Administration
***Consult FDA labels for the most up-to-date dosage information, contraindications, and drug-drug interactions**

CLINICAL PEARL: POST-PE DYSPNEA IS NOT ALWAYS DECONDITIONING → SCREEN FOR CTEPH AT 3 MONTHS

Chronic thromboembolic pulmonary hypertension (**CTEPH**) develops in approximately **3%** of patients after acute PE, but diagnosis is frequently delayed because persistent dyspnea is attributed to deconditioning, heart failure, or lung disease.[17,18] **Up to half** of post-PE patients report ongoing dyspnea or functional impairment at 3 months **despite therapeutic anticoagulation**.[17] The 2026 AHA/ACC PE Guideline recommends a diagnostic evaluation at ≥3 months in **any patient with persistent symptoms**; echocardiogram alone is **insufficient** (one-third of confirmed CTEPH cases have normal TTEs), so **V/Q perfusion scanning** should be obtained alongside TTE, as its negative predictive value for excluding CTEPH **approaches 100%**.[17] This single screening step: asking about exertional dyspnea at the 3-month anticoagulation visit and ordering V/Q + TTE when present → identify a **potentially curable form of pulmonary hypertension** (surgical pulmonary thromboendarterectomy carries ~2% mortality at expert centers) **before** irreversible right heart failure develops.[17,87] Older adults are at particular risk given higher PE incidence and comorbid overlap that **masks CTEPH symptoms**.[17]

Diagnosis Pathway



Cost-Smart Options

DOACs are preferred over warfarin for most patients with NVAF and VTE because **reduced bleeding and fewer hospitalizations are the true cost-savers**, not the drug price itself.[17,46] In Medicare patients aged ≥65, apixaban was associated with significantly **lower major bleeding** (HR 0.57) and **lower bleeding-related medical costs** versus warfarin; dabigatran also showed lower major bleeding risk (HR 0.80) and lower bleeding-related costs.[88] **Generic dabigatran** (~$70/mo; all doses available) and **generic rivaroxaban** (2.5 mg BID dose only) are now available in US pharmacies; no generic apixaban is expected **until ~2028**. The **Inflation Reduction Act** caps Medicare Part D out-of-pocket spending at **$2,000/year** starting in 2025.[89,90] Appropriate agent selection, renal-function-based dosing, and a deliberate duration decision remain essential.[17]

BRAND (EST. COST)[91,92]	GENERIC/ ALTERNATIVE (EST. COST)*[91,93,94]	EST. SAVINGS	COST-SMART TIP*[46,90,93]
Brand apixaban (Eliquis) (~$550–$570/ mo)	Generic dabigatran (**~$70/mo**) for eligible patients (CrCl >30); generic rivaroxaban (**2.5 mg only**)	**~$480–$500/ mo** vs. generic dabigatran	No generic apixaban in US pharmacies expected until **~2028**; **generic dabigatran** is an excellent value-based alternative for patients without renal contraindications or GI intolerance; use **co-pay cards** (private) or **Part D cap** (Medicare) for brand apixaban
Brand rivaroxaban (Xarelto) (~$540–$550/ mo)	Generic rivaroxaban (**2.5 mg only**); generic dabigatran (**~$70/mo**)	**Substantial**; verify formulary pricing	Generic rivaroxaban available only at **2.5 mg** for extended VTE prevention
Brand edoxaban (Savaysa) (~$380/mo; ~11% Part D coverage)	Generic dabigatran (**~$70/mo**)	**~$310/mo** vs. generic dabigatran	Low Part D coverage limits access; both require **parenteral lead-in**; generic dabigatran is a reasonable alternative with adequate renal function
Brand dabigatran (Pradaxa) (~$525/mo)	Generic dabigatran (**~$70/mo**)	**~$455/mo**	Most straightforward brand-to-generic DOAC switch; identical molecule; **widely available**; CrCl must be >30
Full-dose extended therapy (apixaban 5 mg BID or rivaroxaban 20 mg daily beyond 6 mo)	**Reduced-dose extended**: apixaban 2.5 mg BID or rivaroxaban 10 mg daily after ≥6 months	~50% dose reduction	**Reduced-dose regimens**: maintain secondary prevention efficacy with lower bleeding risk and **proportionally lower cost**
Any brand DOAC with high Part D OOP costs	Part D **$2,000/yr OOP cap** (2025+); monthly smoothing (**~$167/mo**); co-pay cards for privately insured (apixaban to **~$10/mo**)	Up to **thousands/yr**	**Medicare patients**: discuss Part D cap and monthly payment option; privately insured: check **manufacturer co-pay cards**; Medicare/Medicaid **ineligible** for co-pay cards

BRAND (EST. COST)[91,92]	GENERIC/ ALTERNATIVE (EST. COST)*[91,93,94]	EST. SAVINGS	COST-SMART TIP*[46,90,93]
Generic warfarin (~$8–$12/mo)	Already the lowest-cost option	Baseline comparator	**Reserve for**: antiphospholipid syndrome, severe CKD (CrCl <15–30), mechanical valves, or significant DOAC interactions; **low drug cost but higher monitoring burden**

ABBREVIATIONS: BID = twice daily; CrCl = creatinine clearance; CKD = chronic kidney disease; DOAC = direct oral anticoagulant; GI = gastrointestinal; INR = international normalized ratio; IRA = Inflation Reduction Act; OOP = out-of-pocket; VTE = venous thromboembolism; FDA = Food and Drug Administration
Costs are approximate US estimates and vary by institution, payer, region, and pharmacy. Total cost reflects combined patient and plan spending; out-of-pocket costs depend on insurance type and formulary tier. Verify current pricing at the point of dispensing
***Consult FDA labels for the most up-to-date dosage information, contraindications, and drug-drug interactions**

Patient Education and Adherence

VTE patient education is distinguished by **two features**: DVT and PE are the **same disease on a single spectrum**, and anticoagulation is **a long-term commitment** where adherence directly determines whether the patient re-clots or bleeds.[1,17] **In older adults**, the additional challenge is that fall risk, renal changes, polypharmacy, and cost barriers **all threaten sustained adherence**, and the **psychological impact** of a clot event (anxiety, post-traumatic stress, loss of confidence) often persists well beyond clot resolution and deserves attention **at every visit**.[95] The 2026 AHA/ACC PE Guideline **recommends screening for** depression, anxiety, and post-traumatic stress disorder during follow-up, noting that many patients report **a lack of support and information after PE**.[17] **Education should emphasize**: the diagnosis in plain language (what a clot is, why DVT and PE are the same disease), why doses must never be skipped or doubled, the warning signs that require emergency or same-day care, warfarin-specific dietary and interaction counseling where relevant, fall-hazard reduction at home rather than stopping anticoagulation, and cost-support resources (Part D cap, co-pay cards) to prevent cost-related nonadherence.

DOCUMENTATION REMINDER: PATIENT EDUCATION

Document the following education topics, the patient and caregiver(s) present, materials provided, and patient understanding (**teach-back method**):

- **Diagnosis in plain language**:[1,11] DVT and PE are the **same disease**; anticoagulation prevents recurrence, not just treats the initial clot; document that patient understands their specific event
- **Adherence and missed doses**:[1,96] Never skip or double a dose → missed doses **raise clot risk**, double doses **raise bleeding risk**; take a missed dose the same day but **never double the next**; no routine lab monitoring for DOACs makes strict adherence critical
- **Warning symptoms requiring emergency care**:[1,11] PE signs (sudden dyspnea, chest pain, tachycardia, hemoptysis, syncope → call 911); DVT signs (sudden unilateral leg swelling/pain → same-day evaluation); bleeding emergencies (uncontrolled bleeding, sudden severe headache/confusion)
- **Warfarin-specific counseling**:[1] Consistent vitamin K intake; report new OTC medications, aspirin, NSAIDs, or herbal supplements; **regular INR monitoring**
- **DOAC-specific counseling**:[1] Rivaroxaban 15/20 mg with food; dabigatran in original container, swallowed whole; apixaban loading-to-maintenance transition
- **Fall prevention**:[47] Do not stop anticoagulation for fall risk; **reduce home hazards** (rugs, lighting, grab bars); PT/OT referral for high-risk patients; DOAC preferred over warfarin given lower ICH risk
- **Psychological well-being**:[17,95] Screen for anxiety, depression, and post-traumatic stress; **acknowledge the emotional impact**; refer to behavioral health when distress is identified
- **Cost-support resources**:[1] Discuss **Part D $2,000/yr OOP cap**, manufacturer co-pay cards (privately insured only), and **generic alternatives** (dabigatran, rivaroxaban) where appropriate
- **Caregiver assessment**:[1,17] Document caregiver understanding of warning symptoms, medication schedule, and duration plan; **screen for caregiver burden**

Quality Metrics Tie-In

No MA Star/HEDIS measure directly targets outpatient VTE diagnosis or anticoagulation management in MY2026. The two most **VTE-relevant MIPS measures** are **#514** Diagnostic Delay of VTE in Primary Care (the only national measure directly evaluating PCP recognition of VTE, where diagnostic delay >24 hours was associated with increased all-cause mortality)[97] and **#480** Risk-Standardized Complication Rate Following Elective Primary THA/TKA, where **PE** is the **second most common complication** reported (0.75%).[98] **The PCP's quality impact** is otherwise indirect: cross-cutting HEDIS measures for medication review, functional status, advance care planning, transitions of care, and all-cause readmissions **all apply to the VTE care trajectory** given the polypharmacy burden, fall risk, and the 3–6 month duration reassessment that defines the long anticoagulation tail.[4,17,21]

MEASURE	STANDARD	APPLICABILITY TO VTE*[17,47,97,99]
MIPS #514: Diagnostic Delay of VTE in Primary Care (DOVE eCQM)	(**Inverse measure**: lower is better) Percentage of patients aged ≥18 with documented VTE symptoms in primary care who are diagnosed with VTE **more than 24 hours and within 30 days** of the index visit when symptoms first presented	**The only national quality measure** directly evaluating PCP recognition of **DVT/PE**; diagnostic delay >24 hours was associated with increased all-cause mortality; the most common reason for delay was **practitioner recognition**, not imaging access; benchmarking DOVE rates and integrating clinical decision support may **reduce missed diagnoses**
MIPS #480: Risk-Standardized Complication Rate Following Elective Primary THA/TKA	(**Inverse measure**: lower is better) **Denominator**: Medicare FFS beneficiaries ≥65 undergoing elective primary THA/TKA; **Numerator**: composite of medical and surgical complications **within 90 days** (acute MI, PE, surgical site bleeding (**30 days**), infection, death (**30 days**)); risk-adjusted for age, sex, and 29 comorbidities **Exclusions**: >2 THA/TKA procedures, patients leaving hospital against medical advice	PE is the second most common complication reported (0.75%); **PCP role**: perioperative VTE prophylaxis coordination, comorbidity optimization, and post-discharge medication reconciliation to **prevent VTE events**
HEDIS COA: Care for Older Adults — Medication Review	**Denominator**: MA enrollees ≥66, continuously enrolled **Numerator**: 2 sub-measures documented annually: (**1**) functional status assessment, (**2**) medication review, **Exclusions**: hospice, ESRD	Anticoagulant polypharmacy is **common in VTE patients** (DOAC + antiplatelets, NSAIDs, PPIs); documented medication review should **reconcile anticoagulant dose** against current renal function, confirm deprescribing of interacting agents, and verify adherence
HEDIS COA: Care for Older Adults — Functional Status Assessment	**Denominator**: enrollees ≥66 **Numerator**: functional status assessment documented annually **Exclusions**: hospice, ESRD	Fall-risk screening and gait assessment **directly satisfy this sub-measure**; VTE patients on anticoagulation require documented fall-risk evaluation at each visit → anticoagulation **should not be** withheld for fall risk alone, but hazards should be addressed

MEASURE	STANDARD	APPLICABILITY TO VTE*[17,47,97,99]
HEDIS TRC: Transitions of Care	**Denominator:** enrollees ≥18 with inpatient discharge **Numerator:** 4 sub-measures within 30 days: (**1**) notification of inpatient admission, (**2**) receipt of discharge information, (**3**) patient engagement after discharge, (**4**) medication reconciliation post-discharge **Exclusions:** hospice	VTE hospitalizations (PE, extensive DVT) **require post-discharge medication reconciliation** to confirm correct DOAC dose, renal function, and duration plan; **early PCP follow-up** within 1–2 weeks reduces preventable readmissions
HEDIS ACP: Advance Care Planning	**Denominator:** enrollees ≥66 **Numerator:** advance care plan or surrogate decision-maker documented, **OR** documentation that ACP was discussed but patient declined **Exclusions:** hospice	Massive PE carries **~30% 30-day mortality**; ACP is particularly relevant for frail older adults with unprovoked VTE and competing comorbidities; billable as CPT 99497/99498 during AWV with no patient copay
HEDIS PCR: Plan All-Cause Readmissions	**Denominator:** enrollees ≥18 with acute inpatient discharge **Numerator:** unplanned readmission within 30 days (lower is better) **Exclusions:** planned readmissions (maintenance chemotherapy, transplant), hospice, psychiatric	Good anticoagulation management, CTEPH screening, and structured post-discharge follow-up r**educe avoidable VTE-related readmissions**; bleeding events and recurrent VTE are the most common preventable readmission drivers

ABBREVIATIONS: MIPS = Merit-based Incentive Payment System; VTE = venous thromboembolism; PCP = primary care physician; DVT = deep vein thrombosis; PE = pulmonary embolism; eCQM = electronic clinical quality measure; DOVE = Diagnostic Delay of VTE; FFS = fee-for-service; THA = total hip arthroplasty; TKA = total knee arthroplasty; MI = myocardial infarction; HEDIS = Healthcare Effectiveness Data and Information Set; COA = Care for Older Adults; MA = Medicare Advantage; ESRD = end-stage renal disease; DOAC = direct oral anticoagulant; NSAID = nonsteroidal anti-inflammatory drug; PPI = proton pump inhibitor; CKD = chronic kidney disease; TRC = Transitions of Care; ACP = advance care planning; CPT = Current Procedural Terminology; AWV = Annual Wellness Visit; PCR = Plan All-Cause Readmissions; CTEPH = chronic thromboembolic pulmonary hypertension; HCC = Hierarchical Condition Category; RAF = Risk Adjustment Factor; PSI = Patient Safety Indicator; FDA = Food and Drug Administration
***Consult FDA labels for the most up-to-date dosage information, contraindications, and drug-drug interactions**

5 CODING REMINDERS AND CASE EXAMPLES

Coding Specificity

ELEMENT[1,17,21,57]	DOCUMENTATION REQUIREMENT[4,8,17,61]
Acuity	State **acute** (**I82.4-/I26.0-**), **chronic** (**I82.5-/I27.82**), or **resolved** (history **Z86.711/Z86.718**); acuity governs both code and HCC
DVT location and laterality	Specify **vein** (femoral **I82.41-**, iliac **I82.42-**, popliteal **I82.43-**) and **laterality** (right/left/bilateral)
PE: acute cor pulmonale status	Document whether acute cor pulmonale is **present** (**I26.02/I26.09**) or **absent** (**I26.92/I26.93/I26.94/I26.99**)
Long-term anticoagulant use	Add **Z79.01** whenever the patient remains on anticoagulation; pair with the active or history VTE code
Resolved clot: use history codes	When the clot is **no longer present on imaging**, code **Z86.711/Z86.718** (no HCC) rather than an unsupported acute code
Provoking context	**Document**: provoked, unprovoked, or cancer-associated; this drives the **duration decision**
Complications coded distinctly	Post-thrombotic syndrome (**I87.0-**, specify laterality/severity) and CTEPH (**I27.2-**) as **separate diagnoses**
Avoid carrying 'acute' forward	**Reassess acuity at each visit**; **do not** copy an acute DVT/PE code into a note when the event has resolved **or** become chronic

ABBREVIATIONS: CTEPH = chronic thromboembolic pulmonary hypertension; DVT = deep vein thrombosis; HCC = Hierarchical Condition Category; ICD-10 = International Classification of Diseases, 10th Revision; PE = pulmonary embolism; VTE = venous thromboembolism

Annual Clinical Review and Confirmation

- **Annual review**:[17] Acute DVT and PE are time-limited events; a chronic DVT (**I82.5-**) or chronic PE (**I27.82**) still visible on imaging is **reassessed annually with MEAT**; once the clot resolves, the condition transitions to a history code (**Z86.71-**) and is no longer reported as active VTE
- **Visit modality**: Face-to-face **or** synchronous audio-video telehealth qualifies; chart updates without an encounter **do not satisfy MEAT**

- **Acuity Verification**:[8,17] Confirm thrombus status **before** accepting a carried-forward acute code; acute DVT → **I82.4-**; chronic DVT → **I82.5-**; resolved → **Z86.718**; acute PE → **I26.0-**/**I26.9-**; chronic PE → **I27.82**; resolved → **Z86.711**; an acute code on a patient whose clot resolved months ago **misrepresents the clinical state** and creates audit liability
- **Active disease vs. history**:[8,17] **Z86.711** (history of PE) and **Z86.718** (history of venous thrombosis) apply only when the event is no longer active; a patient with a persistent thrombus, active complications (PTS, CTEPH), or ongoing treatment for an unresolved clot **retains the appropriate active or chronic code**
- **Complication and comorbidity carry-forward**:[8,17] Independently code each year they are addressed: post-thrombotic syndrome (**I87.0-**); CTEPH (**I27.2-**); CKD affecting DOAC dosing (**N18.-**); bleeding history; fall risk (**R29.6**); long-term anticoagulant use (**Z79.01**); each documents the complexity driving anticoagulation decisions
- **Avoid rollover**:[8,17,21] Do not copy forward last year's acute code **without reassessment**; **update**: thrombus status, anticoagulant with current renal function (Cockcroft-Gault), duration decision (continue/reduce/stop with rationale), complications (PTS severity, CTEPH screening), and bleeding risk factors

Good Documentation — EHR Tips

- **EHR TIP — Smartphrase]** Build a **.vte_visit dot phrase** that **auto-populates**: acuity-specific ICD-10 code (**I82.4-** acute, **I82.5-** chronic, **Z86.718** resolved), vein and laterality, PE subcode with cor pulmonale status (**I26.01** vs **I26.09**), anticoagulant agent and dose, CrCl by Cockcroft-Gault, **Z79.01** long-term anticoagulant use, duration decision with rationale, bleeding-risk score (VTE-BLEED/DOAC), and CTEPH symptom screen. **Separate .vte_acute phrase for acute encounters**: acuity, vein/laterality, provocation status, cor pulmonale present/absent, initial anticoagulant selection with renal dosing, cancer screening plan if unprovoked, and disposition. **Eliminates unspecified** "DVT on Eliquis" **coding** and supports MEAT documentation in a single paste
- **[EHR TIP — Alert]** Filter "**VTE Active**" = **I82.4-/I82.5-** on problem list without hematology or PCP visit in 12 months. "**Acuity-to-HCC Check**" = confirms acute/chronic specificity (HCC 267 for **I82.4-/I82.5-**); flags **Z86.718** (resolved history, no HCC) miscoded as active disease, and flags acute codes persisting >6 months without imaging reassessment for acuity upgrade. "**Anticoagulation Monitoring Due**" = active DOAC without CrCl recheck in 6 months. "**Duration Decision Due**" = 3–6 month flag prompting continue/reduce/stop decision with documented rationale
- **[EHR TIP — Best Practice] Pin acuity-, vein-, and laterality-specific code with imaging date** (e.g., "Personal history of left popliteal DVT, resolved, **Z86.718**, ultrasound confirmed [date]"), **not** "DVT, on Eliquis." Add structured "VTE Acuity" field (acute/chronic/resolved) linked to problem list; require entry before **I82.x**/**Z86.718** selection. Code comorbidities individually (CKD **N18.x**, fall risk **R29.6**, anemia **D64.x**). Document anticoagulant with **Z79.01** and renal dosing rationale. Track PE patients for CTEPH symptoms

(dyspnea, functional limitation) **at every visit for ≥1 year**. Flag **nonadherence** with **Z91.19**

- **[EHR TIP — Workflow] Fire BPA when**: acuity not reassessed at follow-up (offer acute → chronic → resolved pathway); CrCl not rechecked within 6 months on DOAC; duration decision not documented by 3–6 months; bleeding-risk score (VTE-BLEED/DOAC) not completed at initiation; CTEPH symptom screen not documented within 12 months post-PE; cancer screening not addressed for unprovoked VTE; no MEAT-documented encounter in 12 months. Flag **unspecified I82.401 persisting >30 days** without vein/laterality for specificity upgrade
- **[EHR TIP — Order Set]** "**VTE Follow-Up Comprehensive**": CBC, CMP with CrCl (Cockcroft-Gault), repeat duplex ultrasound (if acuity reassessment due), bleeding-risk score update, CTEPH symptom screen (dyspnea/functional class), fall-risk assessment, adherence and teach-back documentation, duration-decision prompt, cancer screening review if unprovoked. "**Acute VTE Initial**": weight-based anticoagulation per renal function, CBC/CMP/coagulation studies, bilateral lower-extremity duplex or CTPA, provocation assessment, cor pulmonale evaluation (troponin, BNP, echocardiogram if submassive/massive PE), oxygen if SpO_2 <95%, fall-risk screen, patient education with bleeding/recurrence warning signs

Brief Case Examples

SUCCESS: ACUITY REASSESSED, SPECIFIC CODING, COORDINATED CARE

SCENARIO

A 74-year-old male, 8 months after an unprovoked left popliteal DVT, on apixaban; CKD stage 3, hypertension, remote fall. Repeat ultrasound shows no residual thrombus; CrCl 48 mL/min by Cockcroft-Gault.

Documentation: "Personal history of left popliteal DVT, resolved on repeat ultrasound (**Z86.718**). Long-term apixaban for secondary prevention of unprovoked VTE (**Z79.01**). CKD stage 3 → apixaban dose appropriate for **CrCl 48**. 3–6 month duration decision: continue extended therapy, **reduced-dose apixaban** 2.5 mg BID after 6 months. Bleeding risk documented; fall prevention addressed **without withholding anticoagulation**. Cancer screening reviewed given unprovoked event. Return [interval] or sooner for new symptoms."

Outcome: Z86.718 + **Z79.01** mapped with full clinical course documented. **Acuity correctly reassessed to resolved** → history code used, **no unsupported acute DVT code carried forward**. Had the thrombus persisted, chronic left popliteal DVT (**I82.532**) would map to HCC 267 accurately. **Every MEAT element present**: laterality- and vein-specific diagnosis with imaging confirmation, acuity reassessment with ultrasound correlation, renal-adjusted anticoagulant dosing with CrCl documented, duration decision with extended-therapy rationale, bleeding and fall risk assessment linked to anticoagulation management (fall prevention addressed without withholding therapy), occult malignancy screening given unprovoked event, and follow-up interval with return criteria.

PITFALL: ACUTE CODE CARRIED FORWARD, COMPLEXITY OMITTED

SCENARIO

A 72-year-old with known DVT, on apixaban. Presents for routine follow-up. PMH includes CKD and a remote fall.

Documentation as written: "72-year-old, DVT, on Eliquis (apixaban). Continue meds. Acute DVT (I82.401)."

Consequence: (**1**) Acuity not reassessed: acute, unspecified DVT code carried forward by habit → the clot may have resolved (history **Z86.718**, no HCC) or become chronic (**I82.5-**), and neither vein nor laterality is documented. (**2**) Duration decision unrecorded and long-term anticoagulant use (**Z79.01**) omitted. (**3**) CKD, bleeding risk, fall history, and cancer screening went uncoded, understating true complexity and the rationale for dose adjustment and monitoring. (**4**) No imaging correlation, renal function, or anticoagulation safety plan documented. **No MEAT elements present** beyond a bare, inaccurate diagnosis label.

RAF Impact: An unsupported acute code **creates audit exposure**: if the thrombus has resolved, no HCC 267 should be mapped (CNA RAF 0.294), and the record **misrepresents the clinical state**. The omission of acuity, location, and the duration rationale weakens continuity, quality reporting, anticoagulation safety, and audit defensibility.

Fix: Reassess and document from imaging and clinical record; code all active comorbidities; specify acuity, vein, and laterality. **Corrected documentation**: "Personal history of left popliteal DVT, resolved on repeat ultrasound (**Z86.718**). Long-term apixaban (**Z79.01**). CKD stage 3 → dose appropriate for CrCl [value]. 3–6 month reassessment: continue extended therapy. Bleeding risk and fall prevention documented. Cancer screening reviewed. Return [interval] or sooner for new symptoms." Or, **if the clot persists**: "Chronic left popliteal DVT (**I82.532**)." Coding after fix: **Z86.718** + **Z79.01** (or **I82.532** if chronic) + CKD + fall risk replaces **I82.401** = acuity-accurate, site-specific, lateralized coding with full clinical picture preserved.

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