



ER Coagulation Testing QI Project to Improve Test Ordering Practice

*The following has been adapted from Dr. M. Sholzberg, University Health Network, Toronto

PT/INR Prothrombin Time International Normalized Ratio
aPTT Activated Partial Thromboplastin Time
TT Thrombin Time



90% of information available to a physician with regard to risk of bleeding disorder and hemorrhage is from a thorough clinical / family bleeding history.

The [ISTH-SSC Bleeding Assessment Tool](https://bleedingscore.certe.nl) is simple and very useful in this regard

<https://bleedingscore.certe.nl>



Coagulation testing should **NOT** be used as a screening test as results will not, in the absence of a significant personal or family bleeding history, predict bleeding risk. Coagulation testing should be used as diagnostic tests in the context of the clinical bleeding history.

Always consider severe thrombocytopenia and acquired (e.g. medication) or congenital platelet dysfunction in patients with suspected bleeding disorder or severe hemorrhage

Consider PT/INR if:

- ✓ On Warfarin therapy and level is clinically relevant
- ✓ On Rivaroxaban and anti-Xa assay is not available and is clinically relevant
- ✓ To assess synthetic status in the setting of severe liver dysfunction (Fibrinogen may also be helpful)
- ✓ Patient at risk for vitamin K deficiency (malnutrition, cholestasis, prolonged or new antibiotics)

Consider aPTT if:

- ✓ Unfractionated Heparin therapy
- ✓ Suspected Anti-phospholipid antibody syndrome (Lupus Inhibitor)

Consider both PT/INR and aPTT if:

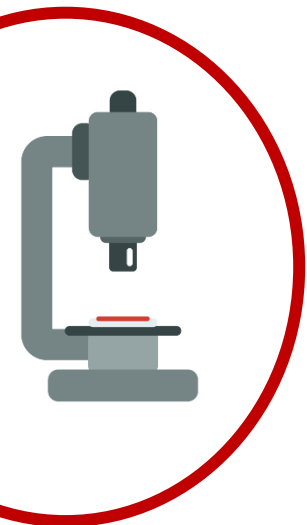
- ✓ Suspected congenital bleeding disorder (von Willerand's Disease, Hemophilia - Factor VIII, IX or XI deficiency)
- ✓ Suspected acquired bleeding disorder (DIC, severe liver failure, acquired hemophilia)
- ✓ Hemorrhaging patient and blood products potentially needed



Always consider severe thrombocytopenia and acquired (e.g. medication) or congenital platelet dysfunction in patients with suspected bleeding disorder or severe hemorrhage

Do not order coagulation testing:

- As routine blood work
- As routine pre-op screening in absence of personal or family bleeding history
- As monitoring of Dabigatran, Rivaroxaban, Apixaban
- As monitoring of Low Molecular Heparin therapy
- As monitoring of thromboprophylaxis (eg. UFH 5000 IU BID)



Coagulation testing for anticoagulation agents	
Warfarin	PT / INR
Unfractionated Heparin	aPTT
Argatroban	aPTT
LMWH	Anti-Xa (drug specific assay)*
Dabigatran	Thrombin Time (TT)
Rivaroxaban	Anti-Xa (drug specific assay)* also an elevated PT/INR may provide a rough indication of the presence of anticoagulation effect
Apixaban	Anti-Xa (drug specific assay)*

*available at RJH Special Hematology Lab through consultation with hematopathologist on-call

Direct Oral Anticoagulant (DOACs) Lab testing

PT/INR and aPTT are not indicated and are not accurate for routine monitoring

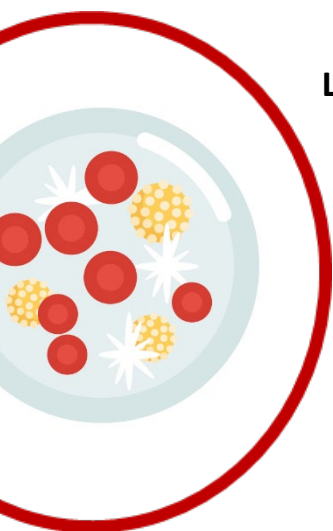
DOAC testing options:

Dabigatran	
Normal Thrombin Time (TT)	Anticoagulant effect is ABSENT
Elevated Thrombin Time (TT)	Anticoagulant effect is PRESENT

Drug specific anti-Xa assay is most accurate

(available through consultation with Hematopathologist on-call)

Apixaban / Rivaroxaban		
PT / INR	Normal	Rivaroxaban → Anticoagulation effect is unlikely
		Apixaban → Does not exclude anticoagulation effect
	Abnormal	Suggests anticoagulation effect for both



Lab testing with DOAC's may be indicated when:

- Urgent or emergent surgical or invasive interventions required
- Significant bleeding complication
- Suspected overdose
- Extreme body weight
- Potential drug interactions
- Renal (Dabigatran) or liver dysfunction (Apixaban/Rivaroxaban) with potential drug accumulation