Direct Oral Anticoagulation (DOAC) Monitoring Checklist for Pharmacists

This is a tool to support ongoing follow-up, monitoring, and adherence support of patients receiving a direct oral anticoagulant (apixaban, dabigatran, edoxaban, rivaroxaban) at the point of referral. This tool is NOT for initial prescriptions.

Place pharmacy label here
- Patient name, DOB, OHIP (province identifier)
- date of assessment
- assessment done by (pharmacist initials)
- date of last refill

PATIENT INFORMATION

INDICATION	Apixaban		Dabigatran		Edoxaban		Rivaroxaban	
❒ Atrial Fibrillation	❒ 5 mg bid	❒ 2.5 mg bid	❒ 150 mg bid	❒ 110 mg bid	❒ 60 mg daily	❒ 30 mg daily	❒ 20 mg daily	❒ 15 mg daily
❒ Venous Thromboembolism	❒ 10 mg bid x 7 days, then 5 mg bid x 3 months minimum, then as per MD		Parenteral treatment x 5 – 10 days, then ❒ 150 mg bid (or ❒ 110 mg bid) x 3 months minimum, then as per MD		Parenteral treatment x 5 – 10 days, then ❒ 60 mg daily (or ❒ 30 mg daily) x 3 months minimum, then as per MD		❒ 15 mg bid x 21 days, then 20 mg daily x 3 months minimum, then as per MD	

Date of original VTE Rx: | If > 3 months ago, confirm intended duration:

HEALTH STATUS SINCE LAST REFILL			Actual or Potential DTP?/Other Comments
Any new medical problems/ED visits/procedures since last refill? *(If yes, describe in margin)*	❒ Y	❒ N	
Any planned medical procedures and/or surgeries? *(If yes, describe in margin)*	❒ Y	❒ N	

ADHERENCE WITH DOAC THERAPY			Actual or Potential DTP?/Other Comments
Is this refill outside of the usual interval?	❒ Y	❒ N	
Is the patient responsible for their own medication administration?	❒ Y	❒ N	
If no, who is responsible?			
Has the patient reported missing 1 or more doses in a week? *(*explore reasons in margin)*	❒ Y	❒ N	
If yes, number of missed doses:			
Patient taking the medication properly? *(i.e. rivaroxaban with food, don't open dabigatran, etc.)*	❒ Y	❒ N	

BLEEDING & RISK FACTORS FOR BLEEDING				Actual or Potential DTP?/Other Comments
Any bleeding episodes since the last refill?		❒ Y	❒ N	
Latest hemoglobin (if available): g/L	Date:			
Has there been a decrease in hemoglobin?	❒ NA	❒ Y	❒ N	
Patient consumes more than 7 alcoholic drinks per week?		❒ Y	❒ N	
Patient has experienced a fall since the last refill? *(*if yes, refer for walking aid assessment)*		❒ Y	❒ N	
Systolic blood pressure uncontrolled (SBP>160mmHg)	❒ NA	❒ Y	❒ N	

CREATININE CLEARANCE/RENAL FUNCTION				Actual or Potential DTP?/Other Comments
Patient aware of any concerns/issues with renal function?		❒ Y	❒ N	
Medication change that may indicate a change in renal function?		❒ Y	❒ N	
Recent dehydrating illness (i.e. vomiting, diarrhea)?		❒ Y	❒ N	
Weight: kg	Nephrologist on file?	❒ Y	❒ N	
Latest eGFR: mL/min ❒ NA	Creatinine: μmol/L	❒ NA		
If eGFR less than 50 mL/min, calculate CrCl			mL/min	
Does the current dose require adjustment for renal function? *(*see dosing chart on back)*		❒ Y	❒ N	

DRUG INTERACTION						Actual or Potential DTP?/Other Comments
Any antiplatelets?					❒ Y	❒ N
❒ ASA	❒ Clopidogrel	❒ Prasugrel	❒ Ticagrelor	❒ Other		
Taking NSAID?					❒ Y	❒ N
Other medications that can affect DOAC levels? *(*If yes, please describe in margin)*					❒ Y	❒ N

EXAMINATION/ASSESSMENT				Actual or Potential DTP?/Other Comments
Blood pressure under control?	❒ NA	❒ Y	❒ N	
Blood pressure today? mmHg	❒ NA			
Any symptomatic hypotension?	❒ NA	❒ Y	❒ N	

FINAL ASSESSMENT						Actual or Potential DTP?/Other Comments
❒ No issues identified						
❒ Actual DTP or potential DTP						
❒ High dose	❒ Low dose	❒ Adherence difficulties	❒ Interactions	❒ Bleeding	❒ Other	

ACTION	OTHER COMMENTS
❒ Patient education ❒ Referral ❒ Treatment recommendations (i.e. Pharmaceutical opinion) ❒ Other *(*please describe in margin)* ❒ I have counselled on the importance of adherence, handling of missed doses, proper administration, avoidance of OTC ASA and NSAIDs, minimizing EtOH and self monitoring.	

NA = information not available

RPh SIGNATURE: _____

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This checklist was developed for pharmacists by Gladstone DJ, Leblanc K, Snow B, Mandlsohn L, Papastergiou J, Semchuk B, Kapoor V, Guirguis L, and is supported in part by Bayer Canada Inc.
Adapted from: Gladstone DJ, Geerts WH, Douketis J, Ivers N, Healey JS, Leblanc K. and is a supplement to *Ann Int Med*. 2015;163:382-386

INDICATION	DOSING OF DIRECT ORAL ANTICOAGULANTS (DOACs)		
	Oral Anticoagulant	**Usual Dose**	**Adjusted Dose**
Atrial Fibrillation	**Apixaban Eliquis®** (Direct Factor Xa Inhibitor)	5 mg BID	2.5 mg BID Recommended in patients with 2 of the following: age ≥ 80 yrs, body weight ≤ 60 kg, or serum creatinine ≥ 133 µmol/L No dose recommendation can be made if CrCL between 15 and 24 mL/min Avoid in patients with CrCl less than 15 mL/min
	Dabigatran Pradaxa® (Direct Thrombin [IIa] inhibitor)	150 mg BID	110 mg BID Recommended in patients age ≥ 80 yrs or those age ≥ 75 yrs with at least one other bleeding risk factor (i.e. CrCl 30-50mL/min, concomitant ASA/NSAID, interacting drug, blood dyscrasia, recent bleed etc.) Avoid in patients with CrCl less than 30 ml/min
	Edoxaban Lixiana® (Direct Factor Xa inhibitor)	60 mg daily	30 mg daily Recommended in patients with 1 or more of the following: CrCl 30 - 50 mL/min, body weight 60 kg or less, or concomitant use of P-gp inhibitors EXCEPT amiodarone and verapamil Avoid in patients with CrCl less than 30 mL/min
	Rivaroxaban Xarelto® (Direct Factor Xa inhibitor)	20 mg daily	15 mg daily Recommended in patients with moderate renal impairment (CrCL 30 - 49 ml/min) Avoid in patients with CrCl less than 30 ml/min
Venous Thromboembolism	**Apixaban Eliquis®** (Direct Factor Xa Inhibitor)	10 mg BID x 7 days, then 5 mg BID x 3 months minimum	No dose adjustment if CrCL 30 mL/min or more; use with caution if CrCL between 15 and 29 mL/min; avoid if CrCL less than 15 mL/min
	Dabigatran Pradaxa® (Direct Thrombin [IIa] inhibitor)	Parenteral treatment x 5-10 days, then 150 mg BID x 3 months minimum	110 mg BID Recommended in patients age ≥ 80 yrs or those age ≥ 75 yrs with at least one other bleeding risk factor. Avoid in patients with CrCl less than 30 ml/min
	Edoxaban Lixiana® (Direct Factor Xa inhibitor)	60 mg daily	30 mg daily Recommended in patients with 1 or more of the following: CrCl 30 - 50 mL/min, body weight 60 kg or less, or concomitant use of P-gp inhibitors EXCEPT amiodarone and verapamil Avoid in patients with CrCl less than 30 mL/min
	Rivaroxaban Xarelto® (Direct Factor Xa inhibitor)	15 mg BID x 21 days, then 20 mg daily x 3 months minimum	No dose adjustment if CrCl 30 mL/min or more; avoid if CrCl less than 30 mL/min

Adapted from the AFIB Innovation Program (www.afibinnovationprogram.com)

ADMINISTRATION INFORMATION	
Apixaban Eliquis®	• May be taken twice daily without regard to meals/food • For NG Administration, may be crushed and suspended in 60 mL water[1]
Dabigatran Pradaxa®	• Must not crush, chew or open capsules (increases exposure by almost double (1.8 times)) • Must be stored in original packaging (foil or bulk bottle) as light, moisture can cause product breakdown
Edoxaban Lixiana®	• May be taken once daily without regard to meals/food
Rivaroxaban Xarelto®	• Doses of 15-20 mg must be taken with food (AUC increases 39%, Cmax increases 75% with food) • For NG Administration, may be crushed and suspended in 50 mL water; follow immediately with food (enteral feeds); ensure NG tube not distal to stomach or decreased absorption can occur[2]

1.Song Y, et al. Clinical Pharmacology and Therapeutics. 2003;93(Suppl 1):S120-1; 2.Moore KT, et al. Clinical Pharmacology in Drug Development. 2004;3(4):321-7

DRUG INTERACTIONS THAT MAY AFFECT DOAC DRUG LEVELS

Potential ↑ in Apixaban		Potential ↓ in Apixaban	Potential ↑ in Dabigatran		Potential ↓ in Dabigatran	
*Diltiazem**	*Naproxen**	*Carbamazepine¥*	*Amiodarone**	*Quinidine*§*	*Antacids§*	*Strong P-glycoprotein inducers‡*
Ketoconazole, itraconazole, voriconazole, posaconazole = azole-antimycotics‡	*Ritonavir (all HIV protease inhibitors)‡*	*Phenobarbital¥*	*Clarithromycin**	*Ritonavir**	*Atorvastatin***	
	Strong inhibitors of both P-glycoprotein and CYP 3A4‡	*Phenytoin¥*	*Cyclosporine**	*Saquinavir**	*Carbamazepine¥*	
		Rifampin¥	*Dronedarone¥*	*Tacrolimus**	*Proton Pump Inhibitors**	
		St. John's Wort¥	*Itraconazole**	*Tipranavir¥*	*Rifampin¥*	
		Strong inducers of both P-glycoprotein and CYP-3A4¥	*Ketoconazole‡*	*Ticagrelor¥*	*St. John's Wort¥*	
			*Nelfinavir**	*Verapamil*§*	*Tenofovir¥*	
			*Posaconazole**	*Strong P-glycoprotein inhibitors‡*		

Potential ↑ in Edoxaban		Potential ↓ in Edoxaban	Potential ↑ in Rivaroxaban		Potential ↓ in Rivaroxaban	
*Amiodarone**	*Ketoconazole£*	*Atorvastatin**	*Clarithromycin**	*Posaconazole‡*	*Carbamazepine¥*	*Strong inducers of both P-glycoprotein and CYP 3A4¥*
Cyclosporine£	*Quinidine£*	*Carbamazepine¥*	*Erythromycin**	*Ritonavir‡*	*Phenobarbital¥*	
*Digoxin**	*Verapamil**	*Esomeprazole**	*Fluconazole**	*Strong inhibitors of both P-glycoprotein and CYP 3A4‡*	*Phenytoin¥*	
Dronedarone£	*Protease Inhibitors¥*	*Phenobarbital¥*	*Ketoconazole‡*		*Rifampin¥*	
Erythromycin£		*Phenytoin¥*	*Itraconazole‡*		*St. John's Wort¥*	
		Rifampicin¥				

Note that drug interaction data with the DOACs is limited and this table reflects currently available data. Consider Pharmacist consult as needed. Dabigatran etexilate and edoxaban are substrates for the P-glycoprotein transporter (P-gp) and as such any strong inhibitors or inducers should be avoided. Rivaroxaban and apixaban are eliminated by both P-gp and cytochrome P-450 3A4 (CYP-450 3A4). As such the concomitant use of strong inhibitors and inducers of both P-gp and 3A4 should be avoided.

**no empiric dosage adjustment required, however use with caution, § recommend to give 2 hours after dabigatran, ‡ contraindicated, ¥ caution advised if co-administering, should be avoided, £ reduce dose of edoxoban to 30mg daily, **no dose adjustment is required*

PRE-OPERATIVE MANAGEMENT OF PATIENTS RECEIVING DIRECT ORAL ANTICOAGULANTS FOR ATRIAL FIBRILLATION

Drug (dose regimen)	Renal Function	Minor Surgery/Procedure (Low Bleeding Risk) 12-15% residual anticoagulant effect at time of surgery acceptable	Major Surgery/Procedure or Spinal Anesthesia (High Bleeding Risk) <10% residual anticoagulant effect at time of surgery acceptable
		For examples of low and high risk bleeding procedures visit: http://thrombosiscanada.ca/?page_id=502&calc=perioperativeAnticoagulantAlgorithm	
Apixaban Eliquis® (twice daily)			
$t_{1/2}$ = 9 hours	Normal renal function or mild impairment (CrCl > 30 mL/min)	Last dose: 2 days before surgery (skip 2 doses)	Last dose: 3 days before surgery (skip 4 doses)
Dabigatran Pradaxa® (twice daily)			
$t_{1/2}$ = 14 hours	Normal renal function or mild impairment (CrCl > 50 mL/min)	Last dose: 2 days before surgery (skip 2 doses)	Last dose: 3 days before surgery (skip 4 doses)
$t_{1/2}$ = 15 – 18 hours	Moderate renal impairment (CrCl 30 – 50 mL/min)	Last dose: 3 days before surgery (skip 4 doses)	Last dose: 4 to 5 days before surgery (skip 6 - 8 doses)
Edoxaban Lixiana® (once daily)			
$t_{1/2}$ = 10-14 hours	Normal renal function or mild impairment (CrCl ≥ 50 mL/min)	Last dose: 2 days before surgery (skip 1 dose)	Last dose: 3 days before surgery (skip 2 doses)
Rivaroxaban Xarelto® (once daily)			
$t_{1/2}$ = 9 hours	Normal renal function or mild impairment (CrCl > 30 mL/min)	Last dose: 2 days before surgery (skip 1 dose)	Last dose: 3 days before surgery (skip 2 doses)

This table provides general guidance and may not be applicable to all patients including those undergoing neuroaxial anaesthesia. Consultation with a specialist is advised for specific patient management, particularly in patients with an active thrombus such as those with VTE.

Adapted from www.thrombosiscanada.ca/wp-content/uploads/2014/05/Peri-operative-Management-of-Patients-who-are-Receiving-a-New-Oral-Anticoagulant-dabigatran-rivaroxaban-apixaban.pdf