

Government of **Western Australia** Department of **Health**

WA Anticoagulation Medication Chart



Overview

This presentation will provide an overview of:

- The layout of the WA Anticoagulation Medication Chart (WA AMC)
- The management of anticoagulants using the chart:
 - Low Molecular Weight Heparins (LMWH)
 - Unfractionated heparin (UFH)
 - Warfarin
 - Direct oral anticoagulants (DOACs)

Anticoagulants – High Risk Medications

- Anticoagulants are consistently identified as causing preventable harm to patients.
- When used in error or omitted, they can cause life-threatening or fatal bleeding or thrombosis.
- Anticoagulants were the fourth most frequent medication class involved in confirmed clinical incidents for 2022/23¹

Medication categories (top 6)	(n)	(%)
Opioid analgesics (opioid based pain relievers)	1,202	12.6
Antibacterials (antibiotics)	926	9.7
Insulins (medications used for diabetes)	687	7.2
Anticoagulants (blood thinning medications)	630	6.6
Antihypertensives (medications for high blood pressure)	417	4.4
Antipsychotics (medications for major psychiatric disorders)	393	4.1

^{1.} Patient Safety Surveillance Unit (2023), Your Safety in Our Hands in Hospital. An Integrated Approach to Patient Safety Surveillance by WA Health Service Providers, Hospitals and the Community: 2022. Delivering Safer Care Series Report Number 12. Department of Health: Perth. Version 1

Anticoagulants

- The most commonly prescribed anticoagulants are:
 - unfractionated heparin (UFH)
 - low-molecular weight heparin (LMWH)
 - enoxaparin sodium (Clexane®)
 - dalteparin sodium (Fragmin®)
 - -warfarin (Marevan®).
- Direct oral anticoagulants (DOACs) are also available and are being prescribed more frequently:
 - apixaban (Eliquis®)
 - dabigatran (Pradaxa®)
 - rivaroxaban (Xarelto®).

Factors that increase the potential for error and harm include:

- Low margin for error
 - over-dose \rightarrow bleeding
 - under-dose or omission \rightarrow thrombosis
- Wide variation in individual patient response
 - multiple indications
 - wide range and complexity of dosage
 - frequent dose adjustment/monitoring
 - interaction with other medicines, herbals, over-the-counter products, food and alcohol.

Benefits of the WA Anticoagulation Medication Chart

- Provides one chart for all anticoagulant prescriptions to reduce the risk of duplicate prescribing.
- Point of care guidelines for initiation, monitoring and reversal of anticoagulants.
- Enables the effective achievement of therapeutic levels.
- Minimise the risk of bleeding events due to supratherapeutic levels.
- To achieve this the chart includes:
 - Optimal dosing guidelines and monitoring requirements
 - Important information required for dosing including test results, weight and renal function

Importance of Cross-Referencing Anticoagulation Chart with WA HMC

 The main WA Hospital medication chart (WA HMC) <u>MUST</u> be annotated (cross-referenced) to identify when the anticoagulation chart is in use to reduce the risk of duplicated orders or dose omissions.

Front of WA HMC	Medication chart number of Additional charts Variable dose Other (Refer to checklist on page 2) IV fluid BGL/insulin Acute pain Palliative care Chemotherapy Anticoagulation	
Inside of WA HMC	Additional Charts – Tick if in use Blood Glucose Level (BGL) monitoring (Subcutaneous Insulin or Intravenous Insulin Infusion) Clozapine Intravenous (IV) Fluid Chemotherapy Agitation & arousal Palliative care Acute Pain Long acting injection Variable dose Other	

Incide of	Venous Thromboembolism (VTE) risk assessment / Anticoagulation	Risk Assessment completed by: (name)	Date/Time	Continue Y / N	
Inside of	VTE risk considered (refer guidelines) Bleeding risk considered				
WA HMC	Pharmacological Prophylaxis: Indicated* Not Indicated Contraindicated				Warfarin/
	*Consider surgical and anaesthetic implications prior to prescribing				Anticoagulant
	Mechanical Prophylaxis: GCS IPC VFP Not Indicated Contraindicated	If risk changes docume requirements on new cl	nt VTE prophyl hart	axis	In use Refer to Anticoagulation Chart for
	Key: GCS – Graduated Compression Stockings; IPC – Intermittent Pneumatic Compression; VFP	– Venous Foot Pumps			administration details

WAAMC - The front page

- Bleeding risk considered -
- Once only and telephone
- Regular dose orders (prophylactic)
- Regular dose orders (therapeutic)

Please refer to Lo				-							-					-				
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WAAMC - The back page

Treatment recommendations do not cover all clinical scenarios and do not replace the need for clinical judgement

RECOMMENDATIONS FOR DIRECT ORAL ANTICOAGULANTS Direct Oral Anticoagulant Agents (DOACs) - Apixaban, Dabigatran, Rivaroxaban (also known as NOACs) Recommendations for Prescribe with care in elderly (> 75 years), underweight (< 50 kg), overweight (> 150 kg) and patients with renal impairment (CrCl < 50 mL/min). Prior to DOAC initiation: Record: FBC, Coagulation status (INR, aPTT and PT), renal and liver function. Check for medicine interactions prior to prescribing. If the patient is on warfarin: Discontinue warfarin and start DOAC when INR is 2 or less Refer to local prescribing guidelines for further information. Apixaban (Eliquist) Dabigatran (Pradaxa[®]) Rivaroxaban (Xarelto[®]) direct oral anticoagulants Idarucizumab is the reversal agent for dabigatran Refer to local hospital guidelines. (Use with caution if CrCL 15 - 29 mL/min) Treatment of DVT/PE: Treatment and Prevention of DVT/PE: CrCl > 25 mL/min: 10 mp twice daily for first CrCl ≥ 15 mL/min: 15 mg twice daily for 3 weeks 7 days, then 5 mg twice daily thereafter then 20 mg once daily Seek specialist advice if CrCl 15 - 29 mL/min Non-Valvular Atrial Fibrillation Non-Valvular Atrial Fibrillation Non-Valvular Atrial Fibrillation (therapeutic dose): 5 mg twice daily (therapeutic dose): (therapeutic dose): CrCl ≥ 50 mL/min: 150 mg twice daily Reduce to 2.5 mg twice daily IF at least 2 of the $CrCl \ge 50$ ml /min: 20 mg once daily following risks: SCr ≥ 133 micromol/L Age ≥ 80 years, Weight ≤ 60 kg CrCl 30 - 49 mL/min or ≥ 75 years: 110 mg twice daily CrCl 30 - 49 mL/min: 15 mg once daily CrCl 15 - 29 mL/min: seek specialist advice VTE prophylaxis: VTE prophylaxis: VTE prophylaxis Total Hip or Knee Replacement Total Hip or Knee Replacement Total Hip or Knee Replacement CrCl > 25 mL/min: 2.5 mg twice daily CrCl > 50 mL/min: 220 mg (2 x 110 mg) once daily CrCl ≥ 15 mL/min: 10 mg once daily CrCl 30 - 50 mL/min: 150 mg (2 x 75 mg) once daily Hip: up to 38 days | Knee: up to 14 days Hip: up to 35 days | Knee: up to 14 days Hip: up to 35 days | Knee: up to 10 days Prevention of cardiovascular events in chronic stable CAD/PVD (in combination with aspirin): CrCl > 15 ml /min: 2.5 mn baice daily Recommendations for RECOMMENDATIONS FOR WARFARIN Warfarin brands are NOT equivalent and cannot be used interchangeably. TARGET INR RANGE 2-3 Therapy for DVT or PE · Preventing DVT: high risk patients e.g. hip or knee surgery warfarin Preventing systemic embolism: AF valvular heart disease, post MI, bioprosthetic heart valves (first 3 months) 2-3 Agric bileaflet mechanical heart valve - if no other risk factors 2.5 - 3.5 Starr-Edwards mechanical heart valves. Mitral bileaflet mechanical heart valve or aortic if risk factors for thromboembolic event including AF, previous thromboembolism, LV dysfunction, hypercoagulable condition. (ADULT) DOSING FOR WARFARIN NAÏVE PATIENTS (TARGET INR 2 - 3) DOSING WITH ONGOING WARFARIN THERAPY Consider if bridging with heparin is indicated. Refer to local warfarin guidelines for further information Patients being re-initiated on warfarin post surgery/ Record baseline FBC, coagulation status (INR, aPTT and PT) and liver function. intervention should be restarted on the dose prescribed Suggested initial dosing of 5 mg daily for first 2 days, modify dosing for day 3 based on day 3 INR. prior to intervention and check INR day 3. For younger patients (< 60 years) consider 7-10 mg on day 1 and day 2. In acutely ill patients with ongoing warfarin therapy: daily Consider smaller starting doses when the patient is elderly, has low body weight or abnormal liver monitoring of INR may be appropriate. function, is at high bleeding risk or has severe chronic renal impairment. Monitor INR more frequently when any change in treatme Consider dose modification in the presence of interacting medicines. involves medicines known to interact with warfarin. Discontinue heparin after a minimum of 5 days therapy and INR is 2 or greate Updated warfarin reversal REVERSING WARFARIN OVER-TREATMENT (bleeding risk increases exponentially from INR 5 to 9. Monitor closely INR ≥ 6) **Clinical Setting** Management INR Bleeding Warfarin Vitamin K Human Prothrombin Comments (seek advice if cardiar Complex⁵ guidelines valve replacement) Greater than Absent Reduce Resume warfarin at reduced dose when INR approaches therapeutic dose or omit sutic range. If INR <10% above therapeutic level, dose reduction may not range but < 4.5 next dose be necessary 4.5 - 10 Absent Stop Measure INR in 24 hours. (Low risk) Resume warfarin at reduced dose when INR approaches the therapeutic range. Absent Consider 1 - 2 mg (oral) Measure INR within 24 hours. Stop Resume warfarin at reduced dose when INR approaches the Or 0.5 - 1 mg IV⁴ (High Risk) therapeutic range. > 10 Absent 3 - 5 mg (oral) Measure INR in 12 - 24 hours. Stop (Low risk) Or IV Resume warfarin at reduced dose when INR approaches the therapeutic range. Absent Stop 3 - 5 mg N³ Prothrombinex VF Measure INR in 12 - 24 hours. (High Risk) Consider 15 - 30 Units/kg³ Resume warfarin at reduced dose when INR approaches the See weight based therapeutic range. Close monitoring over the following week. nomogram Clinically significant bleeding Prothrombinex VF Only add Fresh Frozen Plasma (FFP) if critical organ Stop 5 - 10 mg (IV) where warfarin is a contributing 25 - 50 Units/kg¹⁴ doses bleeding (150 - 300 mL) or if Human Prothrombin Complex is unavailable (FFP 15 mL/kg) may be appropriate as per warfarin reversal e.g. Intracranial or massive If required seek consultation with a haematologist / quidelines. See weight specialist haemorrhage based nomogram Notes 1 undiluted paediatric IV formulation at a rate of 3 mL/min. 500 Units of factor IX in 1 vial of Human Prothrombin Complex ² undikind as skw IV holus over at least 30 second available from transfusion service Prothrombinex VF will be replaced with Beriplex AU mid to late 2024. Please seek specialist advice for Beriplex AU dosing. For reversal prior to a procedure - Refer to hospital guidelines or seek specialist advice. Seek advice with Vitamin K (phytomenadione) in cardiac valve replace Renal Failure
 Alcohol abuse
 Antiplatelet therapy Recent surgery / trauma / bleed *High Bleeding Risk One or more Advanced age Hypertension
 Active GI bleed
 Other relevant co-morbidity

WA AMC - The middle pages (prescribing and administering IV heparin)

- Recommendation for IV unfractionated heparin
- Intravenous
 prescription order
- Initial bolus and infusion rate
- Maintenance infusion rate and bolus dose
- Infusion bag changes

Standa	rd dilution			50 units / mL	: dilute 25	,000 units o	of unfraction	ated hepari	in in 500 ml	L of 0.9% so	dium chlori	de or 5	% glucose		
Target	aPTT			VTE/ACS Target af	TT and do	econds or a se nomogra	s otherwise s ams are HOS	pecified by PITAL SPE	consultant. CIFIC – cor	sult Patholog	y Laborator	y for co	rrect aPTT	ranges	s.
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				 Measure Contact h 	platelets at l aematologia	baseline and t in all sum	d at least twic	e weekly. of Henarin II	nduced Thr	mboodopen	ia (HIT)				
Revers	ing hepari	n treatme	nt	Seek spe	cialist or ser	tior colleagu	e advice. Pro	otamine sulf	ate reversal	should be us	ed for case	s of mai	or bleeding	orwh	ere
				required p	rior to emer	rgency surg	ery. For a hig	h aPTT with	out bleeding	g follow nome	gram (page	3).			
			[As a guio 50 mg) as 	e: Estimate a slow IV p	neparin dos oush (over 1	e received in 0 minutes). N	Initian Indur. A	Commission 1 Fafter bolus	then as requ	ired.	100 un	rs or nepar	in (ma	xm
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WA AMC - The middle pages (dosing recommendations)

- Infusion nomogram for intravenous unfractionated heparin use
- Venous Thromboembolism (VTE) bolus and initial rate
- Acute Coronary Syndromes (ACS) bolus and initial rate
- Nomogram for rate change
- Recommendations for unfractionated subcutaneous heparin
- Recommendations for -LMWH

INIT or A MAI	NFUSIO This nomog Fluid Restr requiring se of this chart TIAL ORDER cute Corons	N NOMOGRA ram (weight-based gu icted Patients: A diut were fluid restrictions.	M FOR IN	ITRAV												
INIT or A MAI	This namog Fluid Restr requiring se of this chart TIAL ORDER cute Coron	ram (weight-based gu icted Patients: A diut vere fluid restrictions.			/EN(ουsι	INFR	CTIO	NATE	D HEP	ARIN	USE				
INIT or A MAI	Fluid Restr requiring se of this chart NAL ORDEP cute Corona	icted Patients: A dilut vere fluid restrictions.	de) is only vali	d when us	sing a	n unfracti	onated he	parin con	centration	of 25,000	units in	500 mL a	and STAN	IDARD aF	TT targe	ts.
INIT or A • MAI cont	of this chart		on of 25,000 u Please contact	vour pha	macio	nated hep st for advi	ice. If requ	ired, strik	im chiorid ie out nor	e 0.9% inf tooram be	low and	n associat attach Flu	ed nomog id Restrict	ram is avi ted Nomo	stable for pram over	r papent
INIT or A • • • •	Cute Coron															
• MAI cont	cute Coron	R : Prescriber should o	omplete order	(initial bol	lus an	d initial in	fusion rat	e) on page	e 2. See l	elow for r	ecommer	nded dose	for Veno	us Throm	oembolis	m (VTI
MAI	It is importa	nt that a bolus dose of	unfractionated	l heparin i	is pres	cribed ar	d adminis	stered on	initiating a	an unfracti	onated h	eparin infu	ision to er	nsure that	the therap	peutic
cont	range is rea	ched within the first 2	hours of thera	spy.												
	INTENANCI tacted follow	E : Prescriber to indica ving each aPTT test.	te on page 2 w	hether nu	urse st	hould mai	ntain intu	sion rate t	ased on	nomogran	as indic	ated OR v	whether th	e prescrib	er is to b	8
	п	IS RECOMMENDED	THAT ALL BO	LUS DOS	ES BI	E DRAWI	UP FRO	M SEPA	RATE AN	POULES	INTO A S	YRINGE	FOR AD	AINISTRA	TION.	
		Ven	ous Thron	nboem	boli	sm (D)	T/PE)	Bolus	and In	itial Ra	te Rec	uirem	ents			
								Weight	Based	Suide For	Initial De	ose				
			Weig	ht ≤4	40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95
	Boli	us Dose 80 unit	s/kg Unit	s 3.	200	3600	4000	4400	4800	5200	5600	6000	6400	6800	7200	720
	Initi	al Rate 18 units/kg/	nour Rate		14	16	18	20	22	23	25	27	29	31	32	32
			Acute Co	oronary	v Sv	ndrom	e Bolu	s and I	nitial I	Rate Re	auirer	nents				-
-								Weight	Based (Suide For	Initial D	ose				_
			Weig	ht ≤4	10 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95
	Boli	us Dose 60 unit	s/kg Unit	s 24	400	2800	3000	3300	3600	4000	4000	4000	4000	4000	4000	400
	Initi	al Rate 12 units/kgl	nour Rate		10	11	12	13	14	15	17	19	20	20	20	20
	Nomo	gram for modifi	(mL/ho	our)	nint	ration	for Vor		bromb	oombo	liem a	nd Acu	to Con	00000	hundro	-
MAI	INTENANC	E ORDER	rate o	aum	msu	auon	IOI VEI	Neight B:	ased Rat	For Mai	itenance	Dose	te con	onary	synuro	me
			Weig	ht ≤4	40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95
	aPTT	Dose Adjustment			Rate 0	Change (I	nL/hour)	This r	ate equa	s recomm	ended ch	ange in u	nits/hour f	or a 50 ur	it/mL dilut	ion.
		Use weight column of and row for aPTT rate	n nomogram	.				Reme	asure aP	TT within	6 hours o	of each rat	e change			
		conversion of unit/kg	hour													
	≤Kk	Bolus dose as per i	above)		.2	+3	+3	+3	-4	+4	+4	+5	+5	+5	+5	+ 6
w		Then increase 3 uni	ts/kg/hour													
ANC	LI - Mm	Increase 2 units/kgl	our		+2	+2	+2	+2	+2	+3	+ 3	+3	+3	+3	+4	+4
Ē		For VIE consider 40	unitsing bolus o	JOSE				_								<u> </u>
MAIN	Nn - Pp	No Change						Reme	asure aP	l I within a	4 hours	(or next m	oming)			_
	uid - ist.	Reduce 1 unit kg/ho	ur	- 1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	- 2	-2
	Ss - Tt	Hold 30 minutes Theo reduce 2 units	kabour		- 2	- 2	-2	- 2	-2	-3	- 3	-3	-3	-3	-4	-4
	>72	Contact doctor		- 10	-		<u> </u>	-	<u> </u>		<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	-
		 Hold 60 minutes 			-2	- 3	-3	- 3	-4	-4	- 4	-5	-5	-5	- 5	-6
		Then reduce 3 un	its/kg/hour													
	oright var	PECOMME	NDATION	IS FO		IRCU	TANE	alory re	INED A	ISEG. PIE	ase ch	ECK with	A DINL	(IIEW)	Laborat	ory.
		Insing	VTF prophyle	avis: 500	(unite	thd (080)	1.8 1800	High Pi	tk Three	hoembol	sm: 500) units tele	(0600 12	00 1800		
1	Withholdin	g subcutaneous	Withhold h	eparin a r	minim	um of 6 to	8 hours o	prior to int	ervention			- Jima (05	10000,12			
	Unfractio	nated Heparin	 Intervention 	nal (surgi	cal) pr	ocedure:	may com	mence pri	ophylactic	doses 2	nours after	er procedu	re.			
	Mo	nitoring	Full blood of	count: Me	asure	platelets	at baselir	e and at l	east twic	e weekly. I	ledical n	eview if pl	atelets les	is than 50	x 109L.	_
		RECOM	IMENDAT	TIONS	FO	R LOV	V MOL	ECUL	AR W	EIGH	HEP	ARIN (LMWI	H)		
		Preferred adminis	tration times fo	or twice da	aily do	sing are (0600 and	1800 hr. D	aily thron	nboprophy	daxis sho	uld be giv	en in the	evening.		
		Enoxaparin	osage an	d Freq	ueno	cy (Se	ek spec	ialist ad	vice in p	patients	weighin	g < 40 k	g and >	120 kg)		
IND	CATION	ie				No	rmal rena 40 ma con	a function	n		-	20 mov	renal fun	ction (Cr	ul < 30 ml	Limin)
DVI	T/PE treatm	ent			1.5 n	ng/kg ond	e daily O	R 1 mg/kc	twice da	ily	+	1 mg/kg	once dail	y or consi	ter alterna	ative
Acu	ite Coronar	y Syndrome/Cardiac	Valves			1	mg/kg tw	ice daily		-		1 mg/kg	once dail	y or consi	ier alterna	ative
Dalt	teparin is o	ommonly used for VTE	treatment in c	ancer pati	ients:	dose 200	Units/kg	daily subo	utaneous	ly for 30 d	ays, ther	150 Unit	sikg daily	for 5 mon	hs. Total (daily
Mos	e should ho hitoring	Baseline full h	ood count and	U&Es M	lasun	or renal il e platelet	npairmen s at basel	ine and st	least twi	erila. 586 te weekly	Medical	ng guideli review if n	nes. Iatelets le	es than 5	1 x 1040	
-		 Seek specialis 	t advice for mo	nitoring a	nti-Xa	, dose m	dification	or alterna	tive then	peutic op	tions.					
		Consider anti-	Xa levels for pa	atients on	high d	doses, an	d in obesi	e, pregnar	nt, renal in	npairment	and frail	elderly pa	tients.		I have been	
Ove	ersing ertreatment	 Seek specialist within the last 1 	advice as prota 2 hours.	mine sufa	ste only	y partially	neutralises	s row mole	cular weig	nt neparin	Uniy con	sider prota	mine sufa	në it LMW	n nas beer	1 given
		Check hospital Solution	guidelines for r	more deta	nied ad	tvice on p	rotamine	sulfate us	e. As a gu	ide: Give 1	mg prot	amine sulf	ate per 1 r	ng enoxa;	arin (maxi	imum
		ou mg as a sin	yic cose).													

Prescribing anticoagulant agents

When prescribing anticoagulant agents, it is important to first check for:

- co-existing conditions,
- past history of anticoagulant related adverse events and
- concomitant therapy
- These may influence the decision to prescribe a particular anticoagulant or indicate a need for closer monitoring and/or dose adjustment.
- The "Bleeding Risk considered before prescribing anticoagulants" prompt is on the front of the WA AMC.

Bleeding Risk considered before prescribing anticoagulants Completed by (prescriber) _____ Date:____ Please refer to Local Venous Thromboembolism Guidelines for Bleeding Risk Assessment. Caution should be considered for patients on Dual Antiplatelet Therapy (DAPT)

- The prescriber MUST complete this section.
- Please refer to local Venous Thromboembolism (VTE) guidelines for bleeding risk assessment.

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Regular dose orders



This section is used for regular dose orders for anticoagulants including:

- Subcutaneous unfractionated heparin
- Subcutaneous enoxaparin or dalteparin dosing based on indication and the patient's renal function and weight.
- Direct oral anticoagulant (eg apixaban, dabigatran and rivaroxaban are to be prescribed in this section of the chart depending on indication).

Example of Correct Use of Regular Dose Order Section

If the anticoagulant is the same and there is no change in indication, you can <u>continue</u> the prescription order on the consecutive line as shown below:

REGULA (Subcutane	R DOSE ORI	DERS - PRO	PHYLACTIC DOSES ular weight heparins and dire	Checl ct oral anticoa	k plat agular	tele	ts a DOA	nd (Cs)	coa	gula	tior	n pro	ofile	be	fore	cor	mmer	ncin	ng
YEAR 20_2	22		DAY AND MC	NTH 🗲	4/8	5/8	6/8	7/8	8/8	9/8	10/8	11/8	12/8	13/8	14/8	15/8			
Date 4/8	Medicine (Print gener Enoxat		1800													VES/NO		oty:	
CrCl mL/min	n Route Dose AND Frequency NOW enter times → 20mg daily		1800	AU	CT	<i>C</i> 7	<i>C1</i>	PL.	PL.	PL.	AD	PL.	ZA	CT	LA	sharge:	ON/S	days.	
Indication: VT	SUBCUT	Pharmacy A R 4/5	Creatinine	122				-			132	-				ue at Disc	ISE YES	in:	
Prescriber Sign	A.Medic	Print Name A.Med	Contact No. ic pager 1234	Platelets	213							206					Contin	Disper	Duratic
YEAR 20_2	22	B-03200020000045	DAY AND MC	NTH 🗲	16/8	17/8	18/8	1918	20/8	22/8	22/8	23/8	24/8	25/8	26/8	27/8			1
Date 16/8	Medicine (Print gener Enoxat	^{ic name)} Darin															'ES /NO		oty:
CrCl mL/min	Route	y NOW enter times 🗲	1800	ŻA	AD	ZA	AD	<i>C</i> 7	KF	KF	KF	KF	AD	MN	MN	harge:)	ON/	days. (
28	subcut	20mg a	ally														Disc	YES	
Indication: VT	E Prophylaxis	Pharmacy A.B 16/8	8 Creatinine			98										nue at	anse	tion:	
Prescriber Sign	A. Medic	Print Name A.Med	tic pager 1234	Platelets			224	ł									Conti	Dispe	Dura

Example of Correct Use of Regular Dose Order Section

When changing the anticoagulant agent or the indication, the day and month must be carried in the <u>corresponding</u> column across the order as

shown below:

REGULA (Subcutaneo	R DOSE ORI	DERS - PRC	PHYLACTIC	DOSES	Checl t oral antico	k plat			nd c	oag	jula	ition	pro	file	bef	ore	cor	nme	enci	ng
YEAR 202	2		DAY	AND MO	NTH ->	418	5/8	618	118)										1
Date 4/8	Medicine (Print gener	_{ic name)} arin			0600	ZA	ZA	ZA	ZA				/					ON/S		
0.01-11-5	Thep		NOW		1800	MN	MN	MN	MN		/							e: YES	0	S. Ct)
68	subcut	5000 L	units BD							/	1	Cee	ase	d	7/8	3/2	2)ischarg	ES / NC	day
Indication: VT	E Prophylaxis		Pharmacy	A.B 4/8	Creatinine													nue at [nse Y	ion:
Prescriber Sign	A Medic	Print Name A.Med	dic pager :	1234	Platelets													Conti	Dispe	Durat
YEAR 202	2		DAY	AND MO	NTH 🗲					818	918	2018	118	$\mathbf{)}$						
Date 8/8	Medicine (Print gener Enoxa	_{io rame)} aparin												1	/		S/NO		th:	
CrCl mL/min 66	Route SUbcut	Dose AND Frequence 40mg	oy NOW enter times → daily	•	1800	X	X	X	X	77V	<i>TT</i>	77	TN	/	/	_		ischarge: Y	ES/NO	days. C
Indication: VT	E Prophylaxis		Pharmacy	A.B 8/8	Creatinine						0	lea	sec	11	1/8	122	2	ue at D	nse Y	:uo
Prescriber Sign	A.Medic	Print Name A.Me	dic Pager	1234	Platelets													Contir	Dispe	Durat
REGULA (Subcutaneo	R DOSE ORI	DERS - THE weight heparin	RAPEUTIC D	OSES anticoagulant	Checl s - DOACs)	< plat	elet	s a	nd c	oag	jula	ition	pro	file	bef	ore	cor	nme	enci	ng
YEAR 20_2	2	3	DAY	AND MO	NTH ->	T							d	12/8	13/8	22/8	1518	5		
Date	Medicine (Print gene	no name) Itarin			0600	X	x	x	x	x	x	x	x	ĸМ	KM	KM	KM	ON/S		
CrCl mL/min	Route	Dose AND Frequen	•	1800	X	X	x	X	x	х	X	X	ST	57	57	<i>S</i> 7	e: YES	0	S. Q)	
66	subcut	80mg	BD															ischarg	ES / N	day
Indication:	VT Thera	peutic	Pharmacy	A.B 12/8	Creatinine													tue at D	nse Y	:uo
Prescriber Sign	A. Medic	Print Name A.Med	Contact No. ic pager 12	34	Platelets													Contir	Dispe	Durat

Recommendations for Low Molecular Weight Heparin (LMWH)

- Dosing of LMWH (enoxaparin and dalteparin) is based on the indication, risk of bleeding risk and modifying factors (e.g. renal function and patient weight).
- Dose modification of these drugs is required when the creatinine clearance (CrCl or GFR) is less than 30mL/min.

	RECOMMEN	IDATIO	NS FOR SUBCUTANEOUS UNFRACTION	IATED HEPARIN (UFH)								
Dosi	ng V	VTE prophy	laxis: 5000 units bd (0600 & 1800) High Risk Thromboemboli	sm: 5000 units tds (0600,1200,1800)								
Withholding su Unfractionate	ibcutaneous • ed Heparin •	Withhold	heparin a minimum of 6 to 8 hours prior to intervention. onal (surgical) procedure: may commence prophylactic doses 2 h	ours after procedure.								
Monito	Monitoring • Full blood count: Measure platelets at baseline and at least twice weekly. Medical review if platelets less than 50 x 10 ⁹ /L.											
	RECOMMENDATIONS FOR LOW MOLECULAR WEIGHT HEPARIN (LMWH)											
	Preferred administra	ation times	or twice daily dosing are 0600 and 1800 hr. Daily thromboprophy	laxis should be given in the evening.								
I	Enoxaparin Do	osage ai	d Frequency (Seek specialist advice in patients v	veighing < 40 kg and > 120 kg)								
INDICATION			Normal renal function	Impaired renal function (CrCl < 30 mL/min)								
VTE prophylaxis			40 mg once daily	20 mg once daily or consider alternative								
DVT/PE treatment			1.5 mg/kg once daily OR 1 mg/kg twice daily	1 mg/kg once daily or consider alternative								
Acute Coronary S	yndrome/Cardiac V	/alves	1 mg/kg twice daily	1 mg/kg once daily or consider alternative								
Dalteparin is comm dose should not exc	nonly used for VTE tr ceed 18,000 Units. D	reatment in Dose adjustr	cancer patients: dose 200 Units/kg daily subcutaneously for 30 d nent is required for renal impairment and thrombocytopenia. See	ays, then 150 Units/kg daily for 5 months. Total daily prescribing guidelines.								
Monitoring	 Baseline full bloc Seek specialist a Consider anti-Xa 	od count an advice for m a levels for p	d U&Es. Measure platelets at baseline and at least twice weekly. onitoring anti-Xa, dose modification or alternative therapeutic opt atients on high doses, and in obese, pregnant, renal impairment	Medical review if platelets less than 50 x 10º/L. ions. and frail elderly patients.								
Reversing Overtreatment	 Seek specialist ac within the last 12 Check hospital g 50 mg as a single Administer initial Reassess the pa 	dvice as prof hours. guidelines for le dose). dose (up to atient and the	amine sulfate only partially neutralises low molecular weight heparin. more detailed advice on protamine sulfate use. As a guide: Give 1 50 mg) by slow IV push (over 10 minutes) and remaining dose by aPTT in 2-4 hours and consider a repeat dose if the patient is still	Only consider protamine sulfate if LMWH has been given mg protamine sulfate per 1 mg enoxaparin (maximum ntravenous infusion (maximum infusion rate 5 mg/minute). bleeding or the aPTT remains prolonged.								

Recommendations for LMWH

- Routine monitoring of residual anti-Xa activity as a measure of LMWH therapy is not required.
- However, in the case of patients at high risk of bleeding, obese patients, patients on high doses, pregnant, renal impairment and frail elderly patients, anti-factor Xa monitoring may be appropriate.
- While the risk of heparin induced thrombocytopenia (HIT) is lower with LMWH than unfractionated heparin, screening for HIT with a platelet count at day 5 of therapy is recommended.

Prescribing Intravenous Unfractionated Heparin (UFH)

- Initial order prescriber should complete order (initial bolus and initial infusion rate) on page 2 of chart.
- Maintenance prescriber to indicate whether nurse should maintain infusion rate based on nomogram as indicated OR whether prescriber is to be contacted
- It is important, especially for serious pulmonary embolism (PE), that a bolus dose of UFH is prescribed and administered on initiating UFH infusion to ensure that the therapeutic range is reached within the first 24 hours of therapy

Heparin Infusion Nomogram



aPTT ranges in above nomogram are an EXAMPLE ONLY to illustrate use of chart in following slides. Please check with your Pathology Laboratory for aPTT ranges for your hospital

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Intravenous Infusions

e.g. for patient with Venous Thromboembolism (VTE)

INTR Prescri	AVENOUS F	PRESCRIPTION ew prescription is require	ORDER ed if the order (total dose, fluid or vo	lume) is c	hanged)							
Targe	etaPTT: -95	Indication: 🗤	TE Acute Coronary	Syndro	ome (ACS)	□ Other (sp	ecify)	Weig	ht: 4 kg			
Date	Drug	Total dose (units)	Fluid		Volume (mL) Signature	Print Name	Conta	act			
31/8	HEPARIN	25,000 units 0.9% SODIUM CHLORIDE 500 mL a. Doctor A.Doctor										
INITI	AL BOLUS [DOSE AND INITI	AL INFUSION RATE	Prescrit	per to complete	ORDER						
Date	Baseline	Date/Time of dose	Initial Bolus	Initial I	nfusion Rate	Pres	criber	Nu	irse			
	aPTT		(units)	(mL/ho	our)	Signature	Print Name	Time	N1/N2			
31/8	42	31/8/22 0200	6000 units	27	mL/hr	a. Doctor	A.Doctor	1430	SR/ Da			
MAI	TENANCE	NFUSION RATE	ECHANG <mark>ES AND BOL</mark>	US D	OSES							
Presc	riber to comple	te order 🛛 Prescrib 🛛 Nursing	er to be contacted followin staff to adjust dose based	g each on non	aPTT test nogram usin	g <u>75</u> kgc	olumn					
Date 31/8/2	Prescriber sigr	ature A. Doctor	Print Name	octor	C	Contact 4025	Pharmacy P.Har	ma	víst			

Heparin Infusion Nomogram use for VTE

		Venous	Thrombo	emboli	sm (D\	/T/PE)	Bolus	and In	itial Ra	te Req	uireme	ents			
							Weight	Based G	Guide For	Initial Do	ose				
			Weight	≤ 40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95 kg
	Bolu	Is Dose 80 units/kg	Units	3200	3600	4000	4400	4800	5200	5600	6000	6400	6800	7200	7200
	Initia	al Rate 18 units/kg/hour	Rate (mL/hour)	14	16	18	20	22	23	25	27	29	31	32	32
		Ac	ute Coror	nary Sy	ndrom	e Bolu	s and I	nitial F	Rate Re	quirer	nents				
							Weight	Based G	uide For	Initial Do	ose				
			Weight	≤ 40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95 kg
	Bolu	IS Dose 60 units/kg	Units	2400	2800	3000	3300	3600	4000	4000	4000	4000	4000	4000	4000
	Initia	al Rate 12 units/kg/hour	Rate (mL/hour)	10	11	12	13	14	15	17	19	20	20	20	20
	Nomo	gram for modifying	rate of ac	lminist	ration 1	for Ven	ious Th	nromb	oembo	lism a	nd Acu	te Cord	onary S	Syndro	me
MA	NTENANCE	EORDER				V	Veight Ba	sed Rate	For Mair	ntenance	Dose				
			Weight	≤ 40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95 kg
	aPTT	Dose Adjustment Use weight column on nor and row for aPTT range for conversion of unit/kg/hour	mogram or mL/hour	Rate C	Change (n	nL/hour)	This r Reme	ate equal asure aP	s recomm TT within	ended ch 6 hours o	ange in u f each rate	its/hour fo change.	or a 50 un	it/mL dilut	tion.
u.	≤ 50	Bolus dose as per indicat (VTE OR ACS listed abov Then increase 3 units/kg/	tion e) hour	+ 2	+ 3	+ 3	+ 3	+ 4	+ 4	+ 4	+ 5	+ 5	+ 5	+ 5	+ 6
ENANC	51-69	Increase 2 units/kg/hour For VTE consider 40 units/	kg bolus dose	+ 2	+ 2	+ 2	+ 2	+ 2	+ 3	+ 3	+ 3	+ 3	+ 3	+ 4	+ 4
ANT	70-95	No Change					Reme	asure aP	FT within 2	24 hours	or next m	oning)			
M	96-110	Reduce 1 unit/kg/hour		- 1	- 1	- 1	- 1	- 1	- 1	- 1	- 2	-2	- 2	- 2	-2
	111-120	Hold 30 minutes Then reduce 2 units/kg/ho	ur	-2	- 2	-2	-2	- 2	- 3	- 3	- 3	- 3	- 3	- 4	- 4
	>120	Contact doctor Hold 60 minutes Then reduce 3 units/k	g/hour	-2	- 3	- 3	- 3	- 4	- 4	- 4	- 5	- 5	- 5	- 5	- 6

aPTT ranges in above nomogram are an EXAMPLE ONLY to illustrate use of chart in following slides. Please check with your Pathology Laboratory for aPTT ranges for your hospital

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Maintaining the infusion regimen using the weightbased nomogram and weight-based guide

8	PTT te	st				Bolus a	nd infusi	on rate	admini	stration				
Date	Time	aPTT	Time	IV bolus	Bolus (Sign)	Hold (minutes)	Time	Hold (Sign)	Time	New Rate	I	Rate (Sign)	Prescriber Sign	
31/8	Taken		0800	6000		(minutes)	stopped	(oign)	0800	27				
31/8	1400	90							1430	27		E-MG		27 + 3
1/9	1400	62	1430	3000	DA SW				1430	30	D	A SW	-	_
1/9	2000	85							2030	30	K	w SU		-
2/9	2000	109							2030	28	S	PMR	+	
3/9	0400	125				60 minutes	0430		0530	23	9	P MR		30 - 2
														00 2
												\sim		
														28 - 5
											_			
											_			_
					/						_			
INFUS	ION CEA	SED:	Date		Time	Prescriber signa	ture		Print Nar	ne	(Contact	Pharmacy	
INFU	JSION	BAG	CHAN	GES N	lursing staff	to documen <u>t ea</u>	ch new bao	. Infusio	on should	only be inter	rupte	d when ir	ndicated by aPT	Г
Date	Time		Checked	Given	Time	Volume	Date	Time	0	hecked Gin	/en	Time	Volume	-
Cato	Comme	enced	CHOCKEG	Given	Completed	Infused	Date	Commer	nced	inconicial City	i cin	Complet	ted Infused	
1				tor										

- 2. Withhold infusion for 60 minutes
- 3. Reduce rate by 3 units/kg/hour, which is 5mL/hour as per nomogram= 23mL/hour

Maintenance regimen IV Heparin Continuous infusion

- Should only be stopped when indicated by nomogram or as directed by the prescriber.
- aPTT should be checked
 - within 6 hours of every rate change

OR

- within 24 hours (next morning) when aPTT within target range
- There should be a prompt dose adjustment to each aPTT measurement
- The infusion should be <u>continuous</u> only stop when indicated by aPTT (nomogram)
- Prescriber should always be contacted for EXTREME aPTT levels
- In all cases the prescriber should <u>frequently check the aPTT result and</u> <u>subsequent infusion rate changes</u>
- It is recommended that bolus doses be drawn up (as prescribed) from a separate ampoule into a syringe for administration.

Fluid Restricted Patients

- Renal failure and heart failure
- 25,000 units in <u>50mL</u> nomogram available
- Watch rate changes
- 10x difference to normal nomograms
- Print and attach to WA Anticoagulation Chart (WA AMC)

Heparin Infusions

- Important to make sure correct dilution used
- Standard dilution 25,000 units in 500mL on WA AMC
- Fluid Restricted Patients 25,000 units in <u>50mL</u>
 - Not all sites will require a fluid restricted nomogram
- Different nomograms required 10x rate errors
- Monitoring and rate adjustment important for safe management

Treatment recommendations do NOT cover all clinical scenarios and do not replace the need for clinical judgement. Infusion Nomogram for Intravenous Unfractionated Heparin For FLUID RESTRICTED PATIENTS 25,000 units in 50 mL

Patients requiring fluid restrictions (e.g. patient with heart failure or severe renal impairment) may require a more concentrated dilution of unfractionated heparin than the standard dilution used in the WA Anticoagulation Medication Chart -25,000 units in 500 mL of sodium chloride 0.9% (50 units/mL).

Print a copy of the FLUID RESTRICTED nomogram and ATTACH to Anticoagulation Chart over existing page 3 – put a line through the original nomogram on the WA Anticoagulation Medication Chart.

This nomogram (weight-based guides) is ONLY valid when using an unfractionated heparin concentration of 25,000 units in 50 mL and STANDARD aPTT targets.

INITIAL ORDER : Prescriber should complete order (initial bolus and initial infusion rate) on page 2. See below for recommended dose for Venous Thromboembolism (VTE) or Acute Coronary Syndrome (ACS).

 It is important that a bolus dose of unfractionated heparin is prescribed and administered on initiating an unfractionated heparin infusion to ensure that the therapeutic range is reached within the first 24 hours of therapy.
 MAINTENANCE : Prescriber to indicate on page 2 of Anticoagulation Chart whether nurse should maintain infusion rate based on nomogram as indicated OR whether the prescriber is to be contacted following each aPTT test.
 IT IS RECOMMENDED FOR SAFETY THAT

All bolus doses be drawn up from separate ampoules into a syringe for administration.
A syringe driver is used to administer the infusion due to the very low infusion rates required

Venous Thromboembolism (DVT/PE) Bolus and Initial Rate Requirements

				· ·	· · · ·									
					<u>ا</u>	Veight	Based	Guide	for Ini	ial Do	se			
Bo	lus Dose 80 units/kg	Weight	≤40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95 kg
БО	ius Dose oo unitsikg	Units	3200	3600	4000	4400	4800	5200	5600	6000	6400	6800	7200	7200
Ini	tial Rate 18 units/kg/hour	Rate mL/hour)	1.4	1.6	1.8	2	2.2	2.3	2.5	2.7	2.9	3.1	3.2	3.2
	Acute Co	oronary	Synd	drome	Bolu	is and	Initia	I Rate	e Req	uirem	ents			
		Weight Based Guide for Initial Dose												
		Weight	≤ 40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95 kg
В	olus Dose 60 units/kg	Units	2400	2800	3000	3300	3600	4000	4000	4000	4000	4000	4000	4000
Ir	nitial Rate 12 units/kg/hour	Rate mL/hour)	1	1.1	1.2	1.3	1.4	1.5	1.7	1.9	2	2	2	2
Nomog	gram for modifying rate	ofadm	inistra	ation f	or Ver	ious T	hromt	ooemb	olism	and A	cute (Corona	ary Sy	ndrome
MAINTENANCE ORDER						Weight	Based R	ate for N	laintena	nce Dos	e			
and row for aPTT range for			≤ 40 kg	45 kg	50 kg	55 kg	60 kg	65 kg	70 kg	75 kg	80 kg	85 kg	90 kg	≥ 95 kg
aPTT	Dose Adjustment		Rate C	hange (r	nL/hour)	This ra Reme	te equals asure aP	recomm TT within	ended ch n 6 hours	ange in u of each	nits/hour rate cha	for a 50 u nge	unit/mL di	lution.
≤Kk	Bolus dose as per indication (VTE OR ACS listed above) Then increase 3 units/kg/hou	r	+0.2	+ 0.3	+0.3	+0.3	+0.4	+ 0.4	+ 0.4	+ 0.5	+ 0.5	+0.5	+ 0.5	+ 0.6
LI-Mm	Increase 2 units/kg/hour For VTE consider 40 units/kg b	olus dose	+ 0.2	+ 0.2	+ 0.2	+ 0.2	+ 0.2	+ 0.3	+ 0.3	+ 0.3	+ 0.3	+ 0.3	+ 0.4	+ 0.4
Nn-Pp	No Change				F	Remeas	ure aPT	T within	24 hou	rs (or ne	ext morr	ning)		
Qq-Rr	Reduce 1 unit/kg/hour		- 0.1	- 0.1	- 0.1	- 0.1	- 0.1	- 0.1	- 0.1	- 0.2	- 0.2	- 0.2	- 0.2	- 0.2
Ss-Tt	Hold for 30 minutes Then reduce 2 units/kg/hour		- 0.2	- 0.2	- 0.2	- 0.2	- 0.2	- 0.3	- 0.3	- 0.3	- 0.3	- 0.3	- 0.4	- 0.4
>Zz	Contact doctor Hold for 60 minutes Then reduce 3 units/kg/hou	r	- 0.2	- 0.3	- 0.3	- 0.3	- 0.4	-0.4	- 0.4	-0.5	- 0.5	- 0.5	- 0.5	- 0.6
Slight v	ariances of aPTT ranges ma	y occur d	ue to ch	nanges	in labor	atory re	agents	used. P	lease c	heck wi	th your	Patholo	gy Lab	oratory.
Please	note: Each hospital is requ	ired to c	heck w	ith thei	Patho	logy lat	oratory	should	d deten	nine its	own t	herape	utic targ	jet range

Anticoagulation Chart from another hospital as ranges will change from hospital to hospital.

Version 6 February 2024

Reported Heparin Infusion Issues

- Wrong rate due to using the incorrect nomogram
- Be aware that ICU may have a different dilution they use for renal perfusion, if this is the case then a new prescription on the WA AMC must be initiated and a new infusion solution must be used.
- Accidentally pushing through a large volume when not required (often occurs when 'pushing' through volume of infusion bag rather than drawing up into a syringe for a push).
- Not monitoring aPTT and changing rate in accordance with aPTT results has led to sub-therapeutic and supratherapeutic heparin management
- Not administering a bolus dose when required by nomogram for low aPTT values resulting in sub-therapeutic heparin management

Warfarin

- The following is to be documented:
 - INR results
 - daily warfarin dose & prescriber's initials prior to 1600hrs according to the most recent INR
 - indication & target INR range
 - brand of warfarin to be used
 - initials of administering and checking nurses/midwives

WARFARIN OR DOAC MEDICINE INTERACTION Details: Ciprofloxacin increasing I	NS (Pharmacy	y: Indicate me	edicine	e and	expe	cted in	teract	tion)						Sign Date 13/9/17
Year 20_23 DA	IRIS IY AND MO	NTH→	12/9											Ą
Dose at admission: Dosemg													0 / 1 1 1 1 1 1 1	
Date Medication 12/9/23 WARFARIN	Dose	DOSE	5 mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	e YES /N ted Date 3mg qty
Indication AF Route ORAL	Time 16:00 hr	Prescriber	AP											Scharg Direc S /NO ety
Target INR 2-3 Pharmacy 77		Telephone order N1/N2												ue at D Ke as Ise YE an 5mg
Prescriber sign A. Prescriber Print name A. Prescriber	Contact No. 4152	Given by	sw											Contir LT al Disper Marev oR

Recommendations for Warfarin

Page 4 of the WA AMC has recommendations for warfarin

	RECOMMENDATIONS FOR WARFARIN									
	Warfarin brands are NOT equivalent and cannot be used interchangeably.									
	TARGET INR RANGE									
2-3	Therapy for DVT or PE Preventing DVT: high risk patients e.g. hip or knee surgery Preventing systemic embolism: AF valvular heart disease, post MI, bioprosthetic heart valves (first 3 months)									
2-3	 Aortic bileaflet mechanical heart valve – if no other risk factors 									
2.5 - 3.5	 5-3.5 • Starr-Edwards mechanical heart valves. Mitral bileaflet mechanical heart valve or aortic if risk factors for thromboembolic event including AF, previous thromboembolism, LV dysfunction, hypercoagulable condition. 									
(ADULT) D	OOSING FOR WARFARIN NAÏVE PATIENTS (TARGET INR 2 - 3)	DOSING WITH ONGOING WARFARIN THERAPY								
Consider if bri Record baseli • Suggested • For younge • Consider s function, is • Consider d • Discontinue	idging with heparin is indicated. Refer to local warfarin guidelines for further information. ne FBC, coagulation status (INR, aPTT and PT) and liver function. initial dosing of 5 mg daily for first 2 days, modify dosing for day 3 based on day 3 INR. ar patients (< 60 years) consider 7-10 mg on day 1 and day 2. maller starting doses when the patient is elderly, has low body weight or abnormal liver at high bleeding risk or has severe chronic renal impairment. ose modification in the presence of interacting medicines. e heparin after a minimum of 5 days therapy and INR is 2 or greater.	 Patients being re-initiated on warfarin post surgery/ intervention should be restarted on the dose prescribed prior to intervention and check INR day 3. In acutely ill patients with ongoing warfarin therapy: daily monitoring of INR may be appropriate. Monitor INR more frequently when any change in treatment involves medicines known to interact with warfarin. 								

Best practice when initiating warfarin

- Consider if the benefits of anticoagulation outweigh the risks for each patient
- Measure baseline INR prior to starting therapy.
- For the majority of patients > 60 years a starting dose of <u>5mg for</u> <u>day 1 and day 2</u> is recommended, with dose modification tailored to INR on Day 3.
- For younger patients (< 60 years) consider 7-10mg on day 1 and day 2
- Consider <u>smaller starting doses for high risk patients</u> (elderly, low body weight, abnormal liver function or is at high bleeding risk)
- Consider dose modification in the presence of interacting drugs
- Warfarin doses should be modified based on the INR result.

Bridging with heparin

- <u>Bridging with heparin</u> is recommended for patients at high risk of thrombotic events.
- Acute treatment of venous thromboembolism (DVT or PE) should be treated with heparin (unfractionated or low molecular weight) for at least of 5 days and INR is > 2
- No heparin cover is required for patients at low risk of thrombosis

Ongoing warfarin therapy:

- Brand substitution is <u>not allowed.</u>
- Marevan[®] is the preferred brand for initiation.
- In acutely ill patients, daily monitoring of INR may be appropriate.
- Monitor INR more frequently when any change in treatment involves drugs known to interact with warfarin.
- Patients being re-initiated on warfarin post surgery/ procedure should be restarted on the dose prescribed prior to the intervention and check INR on day 3

Warfarin discharge planning

If a patient is being discharged on warfarin, this section will need to be completed by prescriber. This section of the **Discharge Treatment Plan** under the warfarin order section is specific for warfarin discharge

WARFAR	RIN VARIAB	LE DOSE	ORDE	RS																							
Year 20	Y AND MO	NTH→												≥	Ę	Nam											
Dose at admission: Dosemg □ Not applicable				INR Result												-1mg4	1mg	Print									
Brand: 🛛 Marevan [®] or 🗋 Coumadin [®]															γ Ί,	≩											
Date Medication Dose				Dose	DOSE	mq	mg	mq	mq	mq	mq	mq	mq	mq	mo	mg	e YES // ted 	2mg c	5								
Indication			Route ORAL	Time 16:00 hr	Prescriber												Directarg S /NO	g qt/	riber Sig								
Target INR		Pharmacy			Telephone order N1/N2										/		ueatD <eas nse YE an 5mg</eas 	adin 5m	Presec								
Prescriber s	sign	Print name	C	Contact No.	Civen by												ontin Tal- isper arev	, iii									
Warfarin Dis	Varfarin Discharge Plan Dosemg Target INR Duration next INR due _/_/_ Prescriber																										
ANTICOAG	SULANT DISC	HARGE PL	ANNING	L	Patient has	; bool	det		L	l Pati	ent eo	lucati	on co	mplet	ed												
U Warfarin	DOAC			WH D	Patient give	en tre	atmei	nt pla	n 🛛	Dura	tion_		_		P infe	ormed	EIGP faxed	l cha	Warfarin DOAC DAWH Patient given treatment plan Duration Dependence of the planet of the pl								

Patient Information Warfarin

- Engage the patient and family in selfmanagement of warfarin
 - highlight the importance of identifying & reporting signs of bleeding
 - provide verbal counselling and education booklets
 - highlight the importance of:
 - regular INR monitoring
 - Medicines and food/alcohol that interfere with the way warfarin works.

Medication safety resources DOH Website https://www.health.wa.gov.au/~/media/Corp/Documents/Healthfor/WATAG/Living-with-warfarin.pdf



Direct Oral Anticoagulants

- Direct Oral Anticoagulants (DOACs) are to be prescribed on the WA AMC.
- Prescribe in the Regular Dose Order section (either prophylaxis or treatment depending on indication)
- Prescribe with care in patients with poor renal function and elderly, underweight (< 50kg) or overweight (>150kg) patients.
- Idarucizumab is the reversal agent for dabigatran

- Refer to local hospital guidelines

 Andexanet alpha is provisionally approved by the TGA as a reversal agent for apixaban and rivaroxaban. It is not listed on the Statewide Medicines Formulary and only available through local Drug/Medicine and Therapeutic Committee Individual Patient Approval for acute life-threatening bleeding.

Recommendations for DOACs

 Page 4 of the WA AMC has recommendations for DOACs

Treatment recommendations do not cover all clinical scenarios and do not replace the need for clinical judgement RECOMMENDATIONS FOR DIRECT ORAL ANTICOAGULANTS

Direct Oral Anticoagulant Agents (DOACs) - Apixaban, Dabigatran, Rivaroxaban (also known as NOACs)

- Prescribe with care in elderly (> 75 years), underweight (< 50 kg), overweight (> 150 kg) and patients with renal impairment (CrCl < 50 mL/min).
- Prior to DOAC initiation: Record: FBC, Coagulation status (INR, aPTT and PT), renal and liver function. Check for medicine interactions prior to prescribing.
- · If the patient is on warfarin: Discontinue warfarin and start DOAC when INR is 2 or less
- · Refer to local prescribing guidelines for further information.

		·
Apixaban (Eliquis®)	Dabigatran (Pradaxa®)	Rivaroxaban (Xarelto®)
	Refer to local hospital guidelines.	(Use with caution if CrCL 15 - 29 mL/min)
 Treatment of DVT/PE: CrCl > 25 mL/min: 10 mg twice daily for first 7 days, then 5 mg twice daily thereafter 		 Treatment and Prevention of DVT/PE: CrCl ≥ 15 mL/min: 15 mg twice daily for 3 weeks, then 20 mg once daily Seek specialist advice if CrCl 15 - 29 mL/min
Non-Valvular Atrial Fibrillation (therapeutic dose): 5 mg twice daily Reduce to 2.5 mg twice daily IF at least 2 of the following risks: SCr ≥ 133 micromol/L Age ≥ 80 years, Weight ≤ 60 kg	Non-Valvular Atrial Fibrillation (therapeutic dose): • CrCl ≥ 50 mL/min: 150 mg twice daily • CrCl 30 - 49 mL/min or ≥ 75 years: 110 mg twice daily	Non-Valvular Atrial Fibrillation (therapeutic dose): • CrCl ≥ 50 mL/min: 20 mg once daily • CrCl 30 - 49 mL/min: 15 mg once daily • CrCl 15 - 29 mL/min: seek specialist advice
VTE prophylaxis: Total Hip or Knee Replacement • CrCl > 25 mL/min: 2.5 mg twice daily Hip: up to 38 days Knee: up to 14 days	VTE prophylaxis: Total Hip or Knee Replacement • CrCl > 50 mL/min: 220 mg (2 x 110 mg) once daily • CrCl 30 - 50 mL/min: 150 mg (2 x 75 mg) once daily Hip: up to 35 days Knee: up to 10 days	VTE prophylaxis: Total Hip or Knee Replacement • CrCl ≥ 15 mL/min: 10 mg once daily Hip: up to 35 days Knee: up to 14 days
		Prevention of cardiovascular events in chronic stable CAD/PVD (in combination with aspirin): • CrCl ≥ 15 mL/min: 2.5 mg twice daily

Patient Information Direct Oral Anticoagulant Agents (DOACs)

- Engage the patient and family in self-management of DOACs
 - Including
 - Dabigatran
 - Apixaban
 - Rivaroxaban
 - highlight the importance of identifying & reporting signs of bleeding
 - provide verbal counselling and education booklets

Medication safety resources DOH Website

https://www.health.wa.gov.au/~/media/Corp/Documents/Healthfor/WATAG/Living-with-a-doac.pdf



Anticoagulant discharge planning

- This section should be completed for any patient that is being discharged on an anticoagulant.
- This should be used as a prompt to ensure all aspects of discharge planning are completed and handed over to the patient's GP

WARFARIN VARIABLE	E DOSE ORDERS																
YEAR 20	NTH 🗲													8			
Dose at admission: Dose Brand: Marevan® or Co		INR Result													NO Se YES 1 m	1 mg	
Date Medicine	WARFARIN		DOSE	ma	ma	ma	ma	mg	ma	ma	ma	ma	ma	ma	ma	a YES/ Disper 3 mg	2 mG
Indication	Route ORAL	Dose Time 16:00 hr	Prescriber													ischarge irected 5 mg	5 mg
Target INR	Pharmacy		Telephone order N1/N2	\square	\square	\square	\square	\square	\square	\square	\square	\square	И	\square	\square	n Oth:	din Qi
Prescriber Sign	Print Name Cont	act No.	Given by													Contin Tak Mareve	Couma
Warfarin Discharge Plan	Dose mg Target INR		Duration			Nex	INR	due	_				Pres	cribe	r		
ANTICOAGULANT DISC Warfarin DOAC Signature:	HARGE PLANNING	Patient has bo Patient given t	oklet reatment plan Date:] Pa] Du	tient iratio	educ n	atio	n co	mple	ted GP ir	nforr	ned	C] GP	faxed c	hart

Minimising Risks with Anticoagulants

- Careful prescribing
 - Use Standardised abbreviations write "Units"



- Brand specification for warfarin
 - Marevan[®] preferred unless patient previously stabilised on Coumadin [®]
 - If not available on ward, ensure staff are familiar with ordering medications to ensure correct brand is supplied for patient

Minimising Risks with Anticoagulants

- Choosing the correct product for administration
 - Correct brand and strength of warfarin chosen



- Multiple strengths of heparin available



Confusion with other medications



health.wa.gov.au

Adverse Effects of Anticoagulants

- The major side effect of anticoagulants is bleeding
- All symptoms must be followed up and appropriate action implemented according to the severity of the bleed
- Bleeds may be:
 - minor
 - major
 - critical

Adverse Effects of Anticoagulants

• Minor bleeds:

- bleeding from gums after brushing teeth
- bruising easily
- nose bleeds
- prolonged bleeding from cuts/wounds
- excessive menstrual or vaginal bleeding

Major bleeds:

- blood in stools (melaena):
 - bright red blood-stained stools
 - black tarry stools
 - rectal bleeding
- vomiting blood (haematemesis)
 - may have a "coffee ground" appearance
- Passing blood in urine (haematuria)
 - bright red urine
 - dark brown, rusty coloured urine
- Coughing up blood (haemoptysis)
 - pink or blood-streaked sputum
- Painful, swollen, hot joints
- Patient feeling tired and looking pale (anaemia)

Intracranial Haemorrhage

- An intracerebral bleed is a clinically critical bleed
- Symptoms may include:
 - sudden, severe headache
 - change in vision, speech
 - difficulty in walking, dizziness
 - confusion
 - weakness or numbness in one arm/leg or side of face.

Warfarin Reversal (Over-treatment)

REVERSING V	VARFARIN O	/ER-TREAT	MENT (bleeding ris	k increases exponen	tially from INR 5 to 9. Monitor closely INR \geq 6)	
Clinical	Setting			Manager	nent	
INR	Bleeding	Warfarin	Vitamin K (seek advice if cardiac valve replacement)	Human Prothrombin Complex⁵	Comments	
Greater than therapeutic range but < 4.5	Absent	Reduce dose or omit next dose			Resume warfarin at reduced dose when INR approaches therapeutic range. If INR <10% above therapeutic level, dose reduction may not be necessary.	
4.5 - 10	Absent (Low risk)	Stop			Measure INR in 24 hours. Resume warfarin at reduced dose when INR approaches the therapeutic range.	
	Absent (High Risk)*	Stop	Consider 1 - 2 mg (oral) ¹ Or 0.5 - 1 mg IV ²		Measure INR within 24 hours. Resume warfarin at reduced dose when INR approaches the therapeutic range.	
> 10	Absent (Low risk)	Stop	3 - 5 mg (oral) ¹ Or IV ²		Measure INR in 12 - 24 hours. Resume warfarin at reduced dose when INR approaches the therapeutic range.	
	Absent (High Risk)*	Stop	3 - 5 mg IV ²	Prothrombinex VF Consider 15 - 30 Units/kg ^{3,4} See weight based nomogram	Measure INR in 12 - 24 hours. Resume warfarin at reduced dose when INR approaches the therapeutic range. Close monitoring over the following week.	
Clinically significa where warfarin is a factor. e.g. Intracranial or haemorrhage	nt bleeding a contributing massive	Stop	5 - 10 mg (IV) ²	Prothrombinex VF 25 - 50 Units/kg ^{3,4} doses may be appropriate as per warfarin reversal guidelines, See weight based nomogram	Only add Fresh Frozen Plasma (FFP) if critical organ bleeding (150 - 300 mL) or if Human Prothrombin Complex is unavailable (FFP 15 mL/kg). If required seek consultation with a haematologist / specialist.	
Notes ¹ undilute ² undilute For rever	d paediatric IV formi d as slow IV bolus o sal prior to a proce	ulation ver at least 30 s dure – Refer to	³ at a rate of 3 i econds ⁴ available from ⁵ Prothrombine Beriplex AU (hospital guidelines or seek	mL/min. 500 Units of factor IX i transfusion service x VF will be replaced with Beri dosing. specialist advice. Seek advic	in 1 vial of Human Prothrombin Complex⁵ plex AU mid to late 2024. Please seek specialist advice for re with Vitamin K (phytomenadione) in cardiac valve replacement.	
*High Bleeding Risk One or more ⇒ •Recent surgery / trauma / bleed •Advanced age •Renal Failure •Hypertension •Hypertension •Alcohol abuse •Active GI bleed •Other relevant co-morbidity						

Information found on page 4 of chart

Reversal of Heparin Over-treatment

Unfractionated heparin

Reversing heparin treatment	Seek specialist or senior colleague advice. Protamine sulfate reversal should be used for cases of major bleeding or where	
	required prior to emergency surgery. For a high aPTT without bleeding follow nomogram (page 3).	-
	50 mg) as a slow IV push (over 10 minutes). Monitor aPTT after bolus then as required.	m

Information found on page 2 of chart

Low molecular weight heparins (e.g. enoxaparin and dalteparin)

Reversing Overtreatment	•	Seek specialist advice as protamine sulfate only partially neutralises low molecular weight heparin. Only consider protamine sulfate if LMWH has been given within the last 12 hours.
	•	Check hospital guidelines for more detailed advice on protamine sulfate use. As a guide: Give 1 mg protamine sulfate per 1 mg enoxaparin (maximum 50 mg as a single dose). Administer initial dose (up to 50 mg) by slow IV push (over 10 minutes) and remaining dose by intravenous infusion (maximum infusion rate 5 mg/minute).
		Reassess the patient and the aPTT in 2-4 hours and consider a repeat dose if the patient is still bleeding or the aPTT remains prolonged.

Information found on page 3 of chart

Safe management of anticoagulants Pre and Post Invasive Procedures



- A protocol for withholding or resuming anticoagulants pre and post invasive procedures should be readily accessible to staff.
- Consideration should be made based on anticoagulant halflife, surgery type, patient's bleeding risk and thrombotic risk
- For more information refer to local guidelines

Summary

- Anticoagulants are high risk medications
- Anticoagulants
 - have complex dosing regimens
 - require monitoring for safe management
- The WA Anticoagulation Medication Chart (WA AMC) is designed to enable safe and appropriate dose selection and monitoring.