
Managing anticoagulant drugs in WA hospitals

This presentation will provide an overview of:

- The layout WA Anticoagulation Medication Chart (WAAMC)
- The management of anticoagulants using the chart
 - Subcutaneous enoxaparin
 - Oral warfarin
 - IV heparin

Aim of the WAAMC

Enable the effective achievement of therapeutic levels

- Minimise the risk of a thromboembolic event due to sub-therapeutic levels
- Minimise the risk of bleeding events due to supra-therapeutic levels

To achieve this the chart includes:

- recommended dosing and monitoring regimen
- important information required for dosing including test results, weight and renal function

Caution

The main medication chart **MUST** be annotated to identify when an anticoagulation chart is in use

MEDICATION Chart No.of

ADDITIONAL CHARTS

- | | | | |
|--|---------------------------------------|--|--------------------------------|
| <input type="checkbox"/> IV Fluid | <input type="checkbox"/> BGL/Insulin | <input type="checkbox"/> Acute Pain | <input type="checkbox"/> Other |
| <input type="checkbox"/> Palliative Care | <input type="checkbox"/> Chemotherapy | <input type="checkbox"/> Anticoagulation | |

WARFARIN

Warfarin in use

**REFER TO ANTICOAGULATION CHART
FOR ADMINISTRATION DETAILS**

The front page

AFFIX PATIENT IDENTIFICATION LABEL HERE & OVERLEAF

Facility logo

Facility/Service:
 Ward/Unit:
 Consultant:
 Anticoagulation Chart No: of

Attach ADR Sticker

1st Prescriber to Print Patient Name and Check Label Correct: Patient Weight (kg)
 Height (cm)

PRE-PRESCRIPTION SCREEN (First prescriber to complete and sign)

Co-existing conditions relevant to anticoagulants

Pregnancy Renal dysfunction Recent trauma Hepatic impairment Hypoaebutriaemia Recent surgery
 Thyroid disorder High Vitamin K intake Recent bleeding Congestive Heart Failure Thrombocytopenia Active peptic ulcer

Anticoagulant history Allergy to warfarin Bleeding with anticoagulants Heparin induced Thrombocytopenia

Concomitant therapy Antiplatelet therapy Other with thrombolytic agent (specify)

Other prescription (Specify)

Nil known Sign and print name: Date:

ONCE ONLY AND TELEPHONE (Prescriber to sign within 24 hours of order)

Date prescribed	Medication (print generic name)	Route	Dose	Date/Time of dose	N1	N2	Sign	Print name	Given by	Time given

REGULAR DOSE ORDERS

YEAR 20..... DAY AND MONTH ->

Date	Medication (print generic name)	Route	Dose	Frequency NOW enter times ->	Sign	Date

Indication: PROFYLAXIS TREATMENT Pharmacy:

Prescriber Sign: Print name: Contact: Create date:
 Tablets:

VARIABLE DOSE ORDERS

WARFARIN DRUG INTERACTIONS (PHARMACIST indicate drug, type of change (if any) and expected interaction)

Details	Sign	Date

YEAR 20..... DAY AND MONTH ->

Dose at admission: Not Applicable
 Dose: Brand: Mervac® Coumadin® INR Result:

Date	Medication (print generic name) (WARFARIN)	Route	Dose	Time 1000 (Apr)	DOSE	Sign	Date

Indication: Pharmacy:
 Target INR:
 Prescriber sign: Print name: Contact:
 Telephone order N/ING:
 Given by:

Warfarin discharge plan: Dose: Target INR: Duration: next INR due: / /

DISCHARGE PROCESS

Mandatory activity	Signature	Print name	Mandatory activity	Signature	Print name
<input type="checkbox"/> Patient has warfarin booked			<input type="checkbox"/> Patient given treatment plan		
<input type="checkbox"/> Patient education completed			<input type="checkbox"/> GP informed		

Fax or copy this page to GP

MR

ANTICOAGULATION MEDICATION CHART

Pre-prescription screen

Once only and telephone

Regular dose orders

Variable dose orders

The back page

Recommendations for LMWH (enoxaparin)

Recommendations for warfarin

RECOMMENDATIONS FOR LMWH		
Preferred administration times for twice daily dosing are 08:00 and 18:00. Daily therapeutic levels should be given in the morning.		
ENOXAPARIN (Clexane®) DOSE/AGE		
INDICATION	DOSE AND FREQUENCY (Class or weight/150 kg. Seek specialist advice)	
	Normal renal function	Impaired renal function (CrCl <30 mL/min)
VTE prophylaxis	40 mg once daily	20 mg once daily
DVT treatment	1.0 mg/kg once daily or 1 mg/kg twice daily	1 mg/kg once daily
Acute Coronary Syndromes		
VTE treatment	1 mg/kg twice daily	1 mg/kg once daily
High bleeding risk	<ul style="list-style-type: none"> Seek specialist advice for monitoring anti-factor Xa, dose modification or alternative therapeutic options. Interventional (surgical) procedures: may commence treatment 4-6 hours after procedure. Spinal/epidural anaesthetics: do not initiate anaesthetics or remove catheter within 12 hours of a dose of LMWH. Treatment may be commenced 2 hours after catheter removal. Consider longer occlusion periods in the presence of complications or high risk of bleeding. 	
LMWH prophylaxis and invasive procedures	<ul style="list-style-type: none"> Interventional (surgical) procedures: withhold treatment 12-24 hours before and after procedure. Spinal/epidural anaesthetics: do not initiate anaesthetics or remove catheter within 24 hours of a dose of LMWH. Treatment may be commenced 2 hours after catheter removal. Consider longer occlusion periods in the presence of complications or high risk of bleeding. 	
LMWH treatment and invasive procedures	<ul style="list-style-type: none"> Seek specialist or senior advice. As a guide: Give (mg) prophylaxis \times 1.5 (mg) enoxaparin/100 units of heparin. Give half the prophylaxis dose as slow IV push (10 minutes) and the remainder as an infusion (2% places or 0.5% saline) over 8-10 hours. 	
Reversing over-treatment	<ul style="list-style-type: none"> Seek specialist or senior advice. As a guide: Give (mg) prophylaxis \times 1.5 (mg) enoxaparin/100 units of heparin. Give half the prophylaxis dose as slow IV push (10 minutes) and the remainder as an infusion (2% places or 0.5% saline) over 8-10 hours. 	
RECOMMENDATIONS FOR WARFARIN		
Warfarin brands are not equivalent and cannot be used interchangeably.		
TARGET INR RANGE		
3.3-5.0	<ul style="list-style-type: none"> Preventing DVT: high risk patients eg hip or knee surgery Thrombolytic therapy for DVT or PE Preventing systemic embolisation: AF, valvular heart disease, post MI, degenerative heart valves 	
3.3-3.6	<ul style="list-style-type: none"> Mechanical mitral heart valves (bicuspid) 	
3.3-4.5	<ul style="list-style-type: none"> Mechanical prosthetic valve (Aortic) 	
(ADULT) INITIATION DOSING TARGET INR 3.3 - FOR GUIDANCE ONLY		
Day	INR	Suggested dose
1	1.0-1.4	3 mg
2	No INR	3 mg
3	<1.0	3 mg
	21.0	1 mg
4-5	>1.5	7 mg
	1.5-1.9	5mg
	2.0-2.5	4mg
	2.6-3.5	3mg
	3.6-4.0	2mg
	4.1-4.5	1mg
	>4.5	see treatment reversal
6 onwards	Measure on alternate days until stable (daily if drug interaction or high bleeding risk)	as for days 4-5 or per clinical judgement
<ul style="list-style-type: none"> This dosing regimen takes about 6 days to achieve therapeutic INR, longer in those under 65 years. For younger patients consider 7-10mg on day 1 and day 2. Consider smaller starting doses when the patient is elderly, has low body weight or abnormal liver function, or is at high bleeding risk. Consider dose modification in the presence of interacting drugs. INR testing is recommended at morning blood record. Discontinue heparin after a minimum of 5 days therapy and when INR is therapeutic ($\times 2$) for two consecutive days. 		
DOSING WITH ONGOING WARFARIN THERAPY		
<ul style="list-style-type: none"> In stability if patients with ongoing warfarin therapy daily monitoring of INR may be appropriate. Monitor INR more frequently when any change in treatment includes drugs known to interact with warfarin. 		
REVERSING WARFARIN OVERTREATMENT (bleeding risk increases exponentially from INR 5 to 8. Monitor closely INR24)		
High bleeding risk	<ul style="list-style-type: none"> Recent major/traumatised Recent falls Alcohol abuse Antiplaquet therapy Advanced age Hypertension Active GI disease Other relevant comorbidity 	
Clinical setting	Action	
INR <5; no bleeding	<ul style="list-style-type: none"> Lower the dose or omit the next dose. Resume therapy at reduced dose when INR approaches therapeutic range. If INR is only minimally above therapeutic range (up to 10%), dose reductions may not be necessary. 	
INR 5-8; no bleeding	<ul style="list-style-type: none"> Pause warfarin; consider reasons for elevated INR and patient-specific factors. If high bleeding risk, give vitamin K (1-2 mg orally) or 0.5-1 mg IV Measure INR within 24 hours. Resume warfarin at reduced dose once INR is in therapeutic range. 	
INR >8; no bleeding	<ul style="list-style-type: none"> If low bleeding risk, pause warfarin, give vitamin K either (2-5 mg orally) or 1 mg IV. Measure INR in 4-12 hours. Resume warfarin at reduced dose once INR <5. If high bleeding risk, pause warfarin, give vitamin K 1 mg IV. Consider Prothrombinase VF (25-50 units factor 100g/L) and 300 ml of fresh frozen plasma. Measure INR in 6-12 hours. Monitor patient, resume warfarin at reduced dose when INR <5. 	
Warfarin-related clinically significant bleeding	<ul style="list-style-type: none"> Pause warfarin, give 5-10 mg vitamin K IV, as well as Prothrombinase VF (25-50 units of factor 100g/L) and fresh frozen plasma* (300ml), assess patient continuously until INR < 5.0, and bleeding stops. CR If fresh frozen plasma is unavailable, pause warfarin, give 5-10 mg vitamin K IV, and Prothrombinase VF (25-50 units of factor 100g/L), assess patient continuously until INR < 5.0, and bleeding stops. CR 	
Seek senior advice	<ul style="list-style-type: none"> If Prothrombinase VF is unavailable, pause warfarin therapy, give 5-10 mg vitamin K IV, and 10-15mL/kg of fresh frozen plasma*, assess patient continuously until INR < 5.0, and bleeding stops. 	
NOTES	<ul style="list-style-type: none"> * indicate paediatric IV formulation * at a rate of 3mL/min. 500 units of factor 10 in 1 vial of Prothrombinase VF * available from transfusion service 	

The middle pages -dosing recommendations

RECOMMENDATIONS FOR INTRAVENOUS UNFRACTIONATED HEPARIN	
Standard dilution	■ 50 units/mL: dilute 25,000 units of unfractionated heparin in 500 mL of 0.9% sodium chloride or 5% glucose
Target aPTT	■ VTE: seconds and A/C: seconds, or as otherwise specified by consultant. ■ Target aPTT and dose nomograms are hospital specific. ■ Measure baseline aPTT prior to commencing treatment, then within 6 hours of every rate change, otherwise daily.
Other monitoring	■ Measure platelets of baseline and at least twice weekly. ■ Contact haematologist in all suspected cases of Heparin Induced Thrombocytopenia (HIT).
Reversing heparin treatment	■ Protamine reversal should be reserved for cases of major bleeding or where required prior to emergency surgery. For a high aPTT without bleeding apply relevant nomogram. ■ Seek senior advice. As a guide, Estimate heparin dose received in last hour. Administer 1mg protamine sulphate per 100 units of heparin (max 50mg) as a slow IV push (over 10 minutes). Monitor aPTT after bolus then as required.

Recommendations for intravenous unfractionated heparin

INFUSION NOMOGRAMS FOR INTRAVENOUS UNFRACTIONATED HEPARIN USE	
The nomograms (weight-based guides) are only valid when using an unfractionated heparin concentration of 50 units/mL, and STANDARD aPTT targets.	
INITIAL ORDER: Prescriber should complete order (initial bolus and initial infusion rate) on page 2. See below for recommended doses.	
MAINTENANCE: Prescriber to indicate on Page 2 whether nurse should maintain infusion rate based on nomogram as indicated OR whether the prescriber is to be contacted following each aPTT test. The PRESCRIBER SHOULD ALWAYS BE CONTACTED FOR EXTREME aPTT levels.	

Infusion nomograms for intravenous unfractionated heparin

VENOUS THROMBOEMBOLISM (Target aPTT)														
INITIAL	INITIAL ORDER:	WEIGHT BASED GUIDE FOR INITIAL DOSE												
		Weight kg	<40	45	50	55	60	65	70	75	80	85	90	≥95
	Bolus dose 80 units/kg	units	3263	3906	4000	4400	4833	5200	5600	6030	6403	6900	7200	7200
	Infusion 18 units/kg/hr	mL/hr	14	16	18	20	22	23	25	27	29	31	32	32
MAINTENANCE	MAINTENANCE ORDER:	WEIGHT BASED RATE FOR MAINTENANCE DOSE												
		Weight kg	<40	45	50	55	60	65	70	75	80	85	90	≥95
	aPTT	Dose adjustment	Rate change (mL/hour) Reassess aPTT within 6 hours of each rate change											
		80 units/kg bolus (as per initial bolus) then increase 4 units/kg/hr	+2	+4	+4	+4	+5	+5	+6	+5	+5	+7	+7	+8
		40 units/kg bolus (as initial bolus) then increase 2 units/kg/hr	+2	+2	+2	+2	+2	+3	+3	+3	+3	+3	+4	+4
		No change	Reassess aPTT within 24 hours (or next morning)											
	Reduce 2 units/kg/hr	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-4	-4	
	Contact doctor, hold 60 minutes then reduce 3 units/kg/hr	-2	-3	-3	-3	-4	-4	-4	-5	-5	-5	-5	-6	

VenousThromboEmbolic nomogram

ACUTE CORONARY SYNDROMES (Target aPTT)														
INITIAL	INITIAL ORDER:	WEIGHT BASED GUIDE FOR INITIAL DOSE												
		Weight kg	<40	45	50	55	60	65	70	75	80	85	90	≥95
	Bolus dose 80 units/kg	units	3453	3900	3300	3300	3653	4000	4300	4603	4900	4300	4300	4300
	Infusion 12 units/kg/hr	mL/hr	10	11	12	13	14	15	17	18	19	20	20	20
MAINTENANCE	MAINTENANCE ORDER:	WEIGHT BASED RATE FOR MAINTENANCE DOSE												
		Weight kg	<40	45	50	55	60	65	70	75	80	85	90	≥95
	aPTT	Dose adjustment	Rate change (mL/hour) Reassess aPTT within 6 hours of each rate change											
		80 units/kg bolus (as per initial bolus) then increase 3 units/kg/hr	+2	+3	+3	+3	+4	+4	+4	+5	+5	+5	+5	+5
		Increase 2 units/kg/hr	+2	+2	+2	+2	+2	+3	+3	+3	+3	+3	+4	+4
		No change	Reassess aPTT within 24 hours (or next morning)											
	Reduce 1 units/kg/hr	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	
	Hold 30 minutes then reduce 2 units/kg/hr	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-4	-4	
	Contact doctor, hold 60 minutes then reduce 3 units/kg/hr	-2	-3	-3	-3	-4	-4	-4	-5	-5	-5	-5	-6	

Acute Coronary Syndromes nomogram

Patient details - Page 1

Record all ADRs, including those related to anticoagulants on the NIMC.

If any ADRs recorded affix a RED ADR ALERT sticker here.

Facility logo

Facility/Service:
Ward/Unit:
Consultant:
Anticoagulation Chart No: of

Attach ADR Sticker

AFFIX PATIENT IDENTIFICATION LABEL HERE & OVERLEAF

UR No:

Family Name:
Given Names:

Address:

DOB

NOT A VALID
PRESCRIPTION UNLESS
IDENTIFIERS PRESENT

Sex M F

1st Prescriber to Print Patient
Name and Check Label Correct:

Patient Weight (kg)

..... Height (cm)

PRE-PRESCRIPTION SCREEN (First prescriber to complete and sign)

Co-existing conditions relevant to anticoagulants

- Pregnancy Renal dysfunction Recent trauma Hepatic impairment Hypoalbuminaemia Recent surgery
 Thyroid disorder High Vitamin K intake Recent bleeding Congestive Heart Failure Thrombocytopaenia Active peptic ulcer

Anticoagulants history Allergy to warfarin Bleeding with anticoagulants Heparin Induced Thrombocytopaenia

Concomitant therapy Antiplatelet therapy Other antithrombotic agent (specify)

Other precaution (Specify)

Nil known

Sign and print name

Date

Patient details: pre-prescription screen

Check for co-existing conditions, past history of anticoagulant related adverse events and concomitant therapy before prescribing any anticoagulant medication.

These may influence the decision to prescribe a particular anticoagulant or indicate a need for closer monitoring and/or dose adjustment.

PRE -PRESCRIPTION SCREEN (First prescriber to complete and sign)					
Co-existing conditions relevant to anticoagulants					
<input type="checkbox"/> Pregnancy	<input type="checkbox"/> Renal dysfunction	<input type="checkbox"/> Recent trauma	<input type="checkbox"/> Hepatic impairment	<input type="checkbox"/> Hypoalbuminaemia	<input type="checkbox"/> Recent surgery
<input type="checkbox"/> Thyroid disorder	<input type="checkbox"/> High Vitamin K intake	<input type="checkbox"/> Recent bleeding	<input type="checkbox"/> Congestive Heart Failure	<input type="checkbox"/> Thrombocytopaenia	<input type="checkbox"/> Active peptic ulcer
Anticoagulants history					
<input type="checkbox"/> Allergy to warfarin	<input type="checkbox"/> Bleeding with anticoagulants	<input type="checkbox"/> Heparin Induced Thrombocytopaenia			
Concomitant therapy					
<input type="checkbox"/> Antiplatelet therapy	<input type="checkbox"/> Other antithrombotic agent (specify)				
<input type="checkbox"/> Other precaution (Specify)					
<input type="checkbox"/> Nil known	Sign and print name				Date

At least one box SHOULD be ticked. If there are no coexisting conditions, no history of anticoagulant related adverse events and no antiplatelet or antithrombotic therapy tick the "Nil Known" box.

First prescriber should complete this section then sign and print and name.

Once only and telephone

ONCE ONLY AND TELEPHONE (Prescriber to sign within 24 hours of order)										
Date prescribed	Medication (print generic name)	Route	Dose	Date/Time of dose	Nurse initials		Sign	Prescriber Print name	Given by	Time given
					N1	N2				

Check the route

- Low molecular weight heparin (enoxaparin)
 - Initial subcutaneous dose
 - Intravenous starting bolus
- Unfractionated heparin
 - Initial subcutaneous dose
- Initiating oral anticoagulant therapy

Regular dose orders

Check the route

YEAR 20		DAY AND MONTH →																	
Date	Medication (Print generic name)																		
CrCl mL/min	Route	Dose	Frequency NOW enter times →																
Indication <input type="checkbox"/> PROPHYLAXIS <input type="checkbox"/> TREATMENT			Pharmacy																
Prescriber Sign	Print name	Contact	Creatinine																
			Platelets																

Calculate and record CrCl

Record baseline creatinine (and platelets)

- Subcutaneous heparin
- Subcutaneous enoxaparin dosing based on
- Oral anticoagulant (rivaroxaban)

Recommendations for low molecular weight heparin

- Dosing of LMWH is a function of the indication, perception of bleeding risk and modifying factors (eg renal failure).

INDICATION	DOSE AND FREQUENCY	
	Normal renal function	Impaired renal function (GFR <30 mL/min)
Venous Thromboembolism (VTE) prophylaxis	40 mg once daily	20 mg once daily
DVT treatment	1.5 mg/kg once daily or 1 mg/kg twice daily	1 mg/kg once daily
Acute Coronary Syndromes (ACS)/VTE treatment	1 mg/kg twice daily	1 mg/kg once daily

- Dose modification of these drugs is required when the creatinine clearance (GFR) is less than 30 ml/min.
- 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, 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.

Variable dose orders

VARIABLE DOSE ORDERS														
WARFARIN DRUG INTERACTIONS (PHARMACIST: Indicate drug, type of change (if any) and expected interaction)														
Details												Sign	Date	
Check the route														
YEAR 20 _____ DAY AND MONTH →														
<input type="checkbox"/> Dose at admission <input type="checkbox"/> Not Applicable Dose _____ Brand: <input type="checkbox"/> Marevan® <input type="checkbox"/> Coumadin®			INR Result		Dr to complete prior to discharge									
Date	Medication (Print generic name) WARFARIN pre printed		Dose	DOSE	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg
Indication	Route		Dose Time 1600 (4pm)	Prescriber										
Target INR	Pharmacy		Telephone order N1/N2											
Prescriber sign	Print name	Contact	Given by											
Warfarin discharge plan: Dose <u>3 mg</u> Target INR <u>2-3</u> Duration <u>3 months</u> next INR due <u>21/ 5.08</u>														
DISCHARGE PROCESS Complete prior to discharge														
Mandatory activity	Signature		Print name		Mandatory activity	Signature		Print name						
<input type="checkbox"/> Patient has warfarin booklet					<input type="checkbox"/> Patient given treatment plan									
<input type="checkbox"/> Patient education completed					<input type="checkbox"/> GP informed									
Fax or copy this page to GP Don't forget														

Take as directed
 Continue on discharge YES / NO
 Dispense YES / NO
 Marevan: 5mg qty _____ / 3mg qty _____ / 1mg qty _____

Best practice when initiating warfarin

- Measure baseline INR prior to starting therapy
- Warfarin should be dose modified based on the INR result
- In the case of acute VTE treatment, heparin (unfractionated or low molecular weight) should be given for at least of 5 days and until the INR is greater than 2 for two consecutive days

On going warfarin therapy

- Brand substitution not allowed
- 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.

Intravenous infusions

1

INTRAVENOUS PRESCRIPTION ORDER Prescriber to complete. A new prescription is required if the order (total dose, fluid or volume) is changed.								
Target aPTT:		Indication: <input type="checkbox"/> VTE <input type="checkbox"/> ACS <input type="checkbox"/> Other(specify)					Weight:	
Date	Drug	Total dose (units)	Fluid	Volume (mL)	Signature	Print name	Contact	
	HEPARIN	25,000	0.9% SODIUM CHLORIDE	500				

2

INITIAL BOLUS AND INFUSION RATE Prescriber to complete ORDER.								
Date	Baseline aPTT	Date/time of dose	Bolus (units)	Infusion (mL/hr)	Prescriber		Nurse	
					Signature	Print name	Time	N1/N2

3

MAINTENANCE INFUSION RATE CHANGES AND BOLUS DOSES				
Prescriber to complete order <input type="checkbox"/> Prescriber to be contacted following each aPTT test <input type="checkbox"/> Nursing staff to adjust dose based on nomogram for <input type="checkbox"/> VTE <input type="checkbox"/> ACS using _____kg column				
Date	Prescriber signature	Print name	Contact	Pharmacy

4

aPTT test			Bolus and infusion rate administration									
Date	Time taken	aPTT	Time	IV bolus (units)	Bolus Sign	Hold (mins)	Time stopped	Hold Sign	Time started	New Rate (mL/hr)	Rate Sign	Prescriber Sign
INFUSION CEASED:	Date/Time	Prescriber signature	Print name	Contact	Pharmacy							

5

INFUSION BAG CHANGES Nursing staff to document each new bag. Infusion should only be interrupted when indicated by aPTT.											
Date	Time commenced	Checked	Given	Time completed	Volume infused	Date	Time commenced	Checked	Given	Time completed	Volume infused

Best practice in the use of IV heparin

- Main indications are Venous thromboembolism (VTE) and Acute coronary syndromes (ACS)
- Less intensive initial and maintenance dosing ACS than VTE
- Initial bolus and infusion rates are weight based
- Maintenance dose modification based on
 - weight
 - the activated partial thromboplastin time (aPTT)
- Monitor aPTT
 - within 6 hours of every rate change or
 - within 24 hours (next morning) - when aPTT within target range
- Each laboratory should determine its own therapeutic target range

Weight based nomograms valid for standard target aPTT

Venous ThrombEmbolism

Initiation regimen

Bolus dose 80 units/kg

Infusion 18 units/kg/hr

VENOUS THROMB		
INITIAL	INITIAL ORDER	
	Weight kg	
	Bolus dose 80 units/kg units	
MAINTENANCE	MAINTENANCE ORDER	
	Weight kg	
	aPTT	Dose adjustment
	<55	80 units/kg bolus (as per initial bolus) then increase 4 units/kg/hr
	55-<70	40 units/kg bolus (half initial bolus) then increase 2 units/kg/hr
	70-105	No change
	>105-120	Reduce 2 units/kg/hr
>120	Contact doctor, hold 60 minutes then reduce 3 units/kg/hr	

Maintenance regimen

80 units/kg bolus (as per initial bolus) then increase 4 units/kg/hr

40 units/kg bolus (half initial bolus) then increase 2 units/kg/hr

No change

Reduce 2 units/kg/hr

Contact doctor, hold 60 minutes then reduce 3 units/kg/hr

Acute Coronary Syndromes

Initiation regimen

Bolus dose 60 units/kg

Infusion 12 units/kg/hr

ACUTE CORONAR		
INITIAL	INITIAL ORDER	
	Weight kg	
	Bolus dose 60 units/kg units	
MAINTENANCE	MAINTENANCE ORDER	
	Weight kg	
	aPTT	Dose adjustment
	<55	60 units/kg bolus (as per initial bolus) then increase 3 units/kg/hr
	55-<70	Increase 2 units/kg/hr
	70-90	No change
	>90-105	Reduce 1 unit/kg/hr
>105-120	Hold 30 minutes then reduce 2 units/kg/hr	
>120	Contact doctor, hold 60 minutes then reduce 3 units/kg/hr	

Maintenance regimen

60 units/kg bolus (as per initial bolus) then increase 3 units/kg/hr

Increase 2 units/kg/hr

No change

Reduce 1 unit/kg/hr

Hold 30 minutes then reduce 2 units/kg/hr

Contact doctor, hold 60 minutes then reduce 3 units/kg/hr

Weight based guides -valid for standard solution 50 units/mL

Venous ThromboEmbolism

Initiation regimen

Maintenance regimen

Acute Coronary Syndromes

Initiation regimen

Maintenance regimen

Weight based guides

VENOUS THROMBOEMBOLISM (Target aPTT)		WEIGHT BASED GUIDE FOR INITIAL DOSE											
Weight kg		<40	45	50	55	60	65	70	75	80	85	90	≥95
units		3200	3600	4000	4400	4800	5200	5600	6000	6400	6800	7200	7200
mL/hr	Infusion 18 units/kg/hr	14	16	18	20	22	23	25	27	29	31	32	32
MAINTENANCE ORDER		WEIGHT BASED RATE FOR MAINTENANCE DOSE											
Weight kg		<40	45	50	55	60	65	70	75	80	85	90	≥95
Rate change (mL/hour)		Remeasure aPTT within 6 hours of each rate change											
initial bolus)		+3	+4	+4	+4	+5	+5	+5	+6	+6	+7	+7	+8
55-<70	40 units/kg bolus (half initial bolus) then increase 2 units/kg/hr	+2	+2	+2	+2	+2	+3	+3	+3	+3	+3	+4	+4
70-105	No change	Remeasure aPTT within 24 hours (or next morning)											
>105-120	Reduce 2 units/kg/hr	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-4	-4
>120	Hold 60 minutes	-2	-3	-3	-3	-4	-4	-4	-5	-5	-5	-5	-6
ACUTE CORONARY SYNDROMES (Target aPTT)		WEIGHT BASED GUIDE FOR INITIAL DOSE											
Weight kg		<40	45	50	55	60	65	70	75	80	85	90	≥95
units		2400	2800	3000	3300	3600	4000	4000	4000	4000	4000	4000	4000
mL/hr		10	11	12	13	14	15	17	18	19	20	20	20
MAINTENANCE ORDER		WEIGHT BASED RATE FOR MAINTENANCE DOSE											
Weight kg		<40	45	50	55	60	65	70	75	80	85	90	≥95
Rate change (mL/hour)		Remeasure aPTT within 6 hours of each rate change											
60 units/kg bolus (as per initial bolus)		+2	+3	+3	+3	+4	+4	+4	+5	+5	+5	+5	+5
70-90	No change	Remeasure aPTT within 24 hours (or next morning)											
>90-105	Reduce 1 units/kg/hr	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2
>105-120	Hold 30 minutes then reduce 2 units/kg/hr	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-4	-4
>120	Hold 60 minutes then reduce 3 units/kg/hr	-2	-3	-3	-3	-4	-4	-4	-5	-5	-5	-5	-6

When should chart NOMOGRAMS NOT be used?

Nomograms only apply
for STANDARD aPTT
TARGETS

Prescription order

Document target aPTT
Weight based nomograms only applicable with STANDARD aPTT therapeutic ranges

Document indication

Document actual patient weight

INTRAVENOUS PRESCRIPTION ORDER Prescriber to complete. A new prescription is required if the order (total dose, fluid or volume) is changed.

Target aPTT: 70-105	Indication: <input checked="" type="checkbox"/> VTE <input type="checkbox"/> ACS <input type="checkbox"/> Other(specify)	Weight: 74 kg					
Date	Drug	Total dose (units)	Fluid	Volume (mL)	Signature	Print name	Contact
	HEPARIN	25,000	0.9% SODIUM CHLORIDE	500			

Standard solution - may be pre-printed
If not applicable cross out and document as appropriate

Weight based guides are only applicable when the standard solution is used

Initial bolus dose and infusion rate

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Document as soon as available

INITIAL BOLUS AND INFUSION RATE Prescriber to complete ORDER.								
Date	Baseline aPTT	Date/time of dose	Bolus (units)	Infusion (mL/hr)	Prescriber		Nurse	
					Signature	Print name	Time	N1/N2
14/5	45	14/5 0200	6000	27				

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VENOUS THROMBOEMBOLISM (Target aPTT 70-105)														
INITIAL	INITIAL ORDER	WEIGHT BASED GUIDE FOR INITIAL DOSE												
		Weight kg	<40	45	50	55	60	65	70	75	80	85	90	≥95
	Bolus dose 80 units/kg	units	3200	3600	4000	4400	4800	5200	5600	6000	6400	6800	7200	7200
	Infusion 18 units/kg/hr	mL/hr	14	16	18	20	22	23	25	27	29	31	32	32

The aPTT must be checked within 6 hours of initial dose

Prescribing a maintenance infusion regimen using the weight based nomogram

MAINTENANCE INFUSION RATE CHANGES AND BOLUS DOSES				
<input type="checkbox"/> Prescriber to complete order		<input type="checkbox"/> Prescriber to be contacted following each aPTT test		
<input checked="" type="checkbox"/> Nursing staff to adjust dose based on nomogram for		<input checked="" type="checkbox"/> VTE	<input type="checkbox"/> ACS using	75 kg column
Date	Prescriber signature	Print name	Contact	Pharmacy

Prescriber to write date, sign and print name.

- If section not completed
 - the doctor must be contacted following each aPTT test
- Prescriber to be contacted following each aPTT test
 - the doctor must prescribe all dose adjustments
- Nursing staff to adjust dose based on nomogram then two nurses should
 - check the aPTT result
 - determine whether
 - IV bolus required or infusion needs to be “held”
 - Infusion rate change required

Maintenance regimen

continuous infusion - should only be stopped when indicated by nomogram

MAINTENANCE INFUSION RATE CHANGES AND BOLUS DOSES

aPTT test			Initial bolus and infusion rate - order and administration									
Date	Time taken	aPTT	Time	IV bolus (units)	Bolus Sign	Hold (mins)	Time stopped	Hold Sign	Time started	New Rate (mL/hr)	Rate Sign	Prescriber Sign
					/			/			/	
					/			/			/	

- 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 timely dose adjustment to each aPTT measurement
- The infusion should be continuous - only stop when indicated by aPTT
- The prescriber should always be contacted for EXTREME aPTT levels
- In all cases the prescriber should check the aPTT result and subsequent infusion rate changes in a timely manner

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

aPTT test			Bolus and infusion rate administration									
Date	Time taken	aPTT	Time	IV bolus (units)	Bolus Sign	Hold (mins)	Time stopped	Hold Sign	Time started	New Rate (mL/hr)	Rate Sign	Prescriber Sign
14/5	0800	62	0830	3000	MV/ GH				0830	30	MV GH	27 + 3
14/5	1400	110							1430	27	KJ MN	30 - 3
14/5	2000	85							2030	27	PO MG	

MAINTENANCE ORDER		WEIGHT BASED RATE FOR MAINTENANCE DOSE												
		Weight kg	<40	45	50	55	60	65	70	75	80	85	90	≥95
aPTT	Dose adjustment	Rate change (mL/hour) Remeasure aPTT within 6 hours of each rate change												
<55	80 units/kg bolus (as per initial bolus) then increase 4 units/kg/hr	+3	+4	+4	+4	+5	+5	+6	+6	+6	+7	+7	+8	
55-<70	40 units/kg bolus (half initial bolus) then increase 2 units/kg/hr	+2	+2	+2	+2	+2	+3	+3	+3	+3	+3	+4	+4	
70-105	No change	Remeasure aPTT within 24 hours (or next morning)												
>105-120	Reduce 2 units/kg/hr	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-4	-4	
>120	Hold 60 minutes then reduce 3 units/kg/hr	-2	-3	-3	-3	-4	-4	-4	-5	-5	-5	-5	-6	

CAUTIONS

- Appropriate monitoring of the aPTT with timely dose adjustments
- Contact prescriber when aPTT is within the highest range
- Continuous infusion unless indicated by the aPTT. That means NOT
 - allowing the infusion bag run out
 - stopping the infusion for the patient to shower or go to xray ect

Infusion bag changes

Document the time the bag was changed/stopped.

Document volume infused. (Total volume minus volume remaining)

INFUSION BAG CHANGES Nursing staff to document each new bag. Infusion should only be interrupted when indicated by aPTT.

Date	Time commenced	Checked	Given	Time completed	Volume infused	Date	Time commenced	Checked	Given	Time completed	Volume infused
14/5	0200			1800	480 ml						
14/5	1800										

This extra information will assist monitoring actual doses delivered

Summary

- Anticoagulants are high risk drugs
 - Complex dosing regimen
 - Monitoring required
- WAAMC designed to enable appropriate dose selection and monitoring
- BUT it is only a piece of paper - practice has to change

wamsg@health.wa.gov.au
www.watag.org.au/wamsg