

# Anticoagulation Stewardship (ACS) Program

Simone Taylor/Nadishani Ratnayake – Lead Anticoagulation Stewardship Pharmacist  
Tass Nalpantidis - Lead Anticoagulation Stewardship Haematologist



# Mission statement of the Anticoagulation Stewardship (ACS) program?

*‘The Anticoagulation Stewardship program aims to promote and optimise the safe use of anticoagulants for patients of Monash Health. The primary focus of the program is to improve patient outcomes by reducing anticoagulant-related adverse events and preventing hospital-complications through optimising the use of anticoagulants.’*



# Who is part of the ACS team?

Collaborative multidisciplinary approach between:

- Pharmacy
  - 1.0 Grade 3
  - 1.0 Grade 2
- Haematology
  - 0.8 Consultant Haematologist
    - 0.3 Lead
    - 0.1 x 5 others

Servicing 6 hospitals (+HITH)

- ~1600 beds



# Which patients do the ACS team review?

- **Any** adult patient being prescribed anticoagulation
- Particularly, patients in **complex scenarios** including:
  - Extremes of body weight (<40 kg or >130 kg)
  - Impaired renal function (CrCl<30 mL/min)
  - Intravenous anticoagulation (eg. heparin infusion, bivalirudin infusion)
  - Low platelets ( $\leq 50 \times 10^9/L$ )
  - Supra- or sub-therapeutic INRs with warfarin
  - Warfarin initiation/re-initiation
- Referrals regarding choice, dose, adjustment, or monitoring of anticoagulants; periprocedural management of anticoagulants
- Routine review of patients flagged to be at **increased risk of harm due to anticoagulant** therapy
- All patients referred to HITH for anticoagulation (enoxaparin/warfarin)



# Intervention Examples

- 93F prescribed and administered  **$\geq 2$  anticoagulants** (apixaban 10 mg BD for a deep vein thrombosis (DVT) and enoxaparin 40 mg subcut daily) concurrently
  - Enoxaparin ceased
- 63F **recommenced on warfarin** for mechanical heart valve at 10.5 mg, 9 mg, 9 mg post-fistuloplasty, usual maintenance dose was 3 mg
  - Dose decreased to 3 mg
- 68M experiencing chemotherapy-related **thrombocytopenia** ( $25 \times 10^9/L$ ), prescribed and administered enoxaparin 40 mg subcut daily and aspirin 100mg daily
  - Enoxaparin and aspirin suspended, platelets monitored daily



# Intervention Examples

## Anticoagulation Stewardship (ACS) Virtual Review

ACS Pharmacist: Simone Taylor

ACS Haematologist: Emma Leitingner

Thank you for contacting the ACS team RE: warfarin dosing plan

Patient chart reviewed by ACS team:

- 37M with confirmed DVT and presumed large volume PE with RH dysfunction/pulmonary hypertension
- Patient weight 250kg, eGFR>90 mL/min
- On enoxaparin 200mg subcut bd. Anti-Xa level = 0.59 at 4hrs post dose – within target 0.5-1.0
- Commenced on warfarin (Coumadin) on 3/3/23, received 1 dose of 9 mg, then dose increased to 10.5mg, pt has received 2 doses of 10.5 mg and INR yesterday = 1.6
- Target INR range = 2-3

### Relevant medication(s):

- Enoxaparin 200mg subcut twice daily
- Warfarin (Coumadin) 10.5 mg oral daily

### ACS recommendation(s):

- Suggest increasing warfarin dose to 11 mg daily and continuing this dose for 2 days before considering any further dose increases (unless clinically appropriate to decrease dose ie. INR rising rapidly)
- Suggest continuing bridging enoxaparin 200 mg subcut BD with warfarin until two consecutive INRs above 2 are achieved, then cease enoxaparin

Above information discussed with HMO [REDACTED]. If you require further information, please contact the ACS pharmacist on 0429 357 512.



# What activities do the ACS team perform?

- Daily rounds targeting high-risk anticoagulant scenarios
- Provide anticoagulant related advice
- Education
  - Medical, nursing, pharmacy
- Review anticoagulant-related documents
- Monitor anticoagulant usage, trends and incidents
- Continuous quality improvement activities
- Research



# Daily rounds 'dashboard'

## Anticoagulation Stewardship Dashboard

Last Updated: 01 Oct 23 16:02

Campus / Ward	Medical Specialty	UR Number	Anticoagulant	Dose	Order Status
All	All	All	All	All	All

High Risk	Age	Weight	eGFR (ml/min)	INR	APTT (sec)	Platelets (x10 <sup>9</sup> L)	Anti-Xa level (units/mL)
All	18 102	0.0 294.0	0 91	0.00 5.50	0.00 66.30	0.00 805.00	0.19 1.01

Total Inpatients	Anticoag Inpatients
1,604	989

Patient Name	UR Number	Age	Latest Weight	Height	iPM Specialty	Ward Code	No of Anticoagulants	No of Antiplatelets	eGFR Result	INR Result	APTT Result	Platelets Result	High Risk Factors	Creatinine Clearance
		74	81.9		VHH - ACS	VHH7B	4	1	9	1.1	25.6	181	2	13
		80	106.5	170	Vascular Surgery	CW33	3	0	12	1.3	25.4	170	2	22
		83	71.1		D General Medicine B	DSW4	3	0	88	1.3	Comment	252	2	92
		81	85.5	178	Cardiac Surgery	VHH7B	3	1	8	1.0	25.6	248	1	12
		74	87.4	186	Respiratory Medicine	CW32	3	0	89	1.3	29.0	566	0	104
		88	92.0		Orthopaedic Surgery	DSW3	3	0	15	1.3	31.3	291	1	20
		80	72.9	172	Geriatric Medicine	BDDSA	2	1	24			261	0	25
		80	71.2		MonashHeart	BCCU	2	1	26	1.4	30.6	216	1	28
		67	84.7	167	Oncology	CICU	2	1	10	1.2	56.4	180	2	16
		76	70.4	165	C Haematology Red	CW44	2	0	75	1.2	26.0	102	0	69

Inpatient Medications						
Medication	Order Status	OrderDateTime	Dose	Unit	Route	Frequency
Home Medications						
Medication	Order Status	OrderDateTime	Dose	Unit	Route	Frequency

Flagged Pathology Results - last 5 days		
Service Date	Test	Result

All Pathology Results - last 30 days		
Service Date	Test	Result





# Daily rounds 'dashboard'

## Anticoagulation Stewardship Dashboard

Last Updated: 01 Oct 23 16:02

Campus / Ward	Medical Specialty	UR Number	Anticoagulant	Dose	Order Status
All	All	All	All	All	All

High Risk	Age	Weight	eGFR (ml/min)	INR	APTT (sec)	Platelets (x10 <sup>9</sup> L)	Anti-Xa level (units/mL)
All	18102	0.0294.0	091	0.005.50	0.0066.30	0.00805.00	0.191.01

Total Inpatients	Anticoag Inpatients
1,604	989

Patient Name	UR Number	Age	Latest Weight	Height	iPM Specialty	Ward Code	No of Anticoagulants	No of Antiplatelets	eGFR Result	INR Result	APTT Result	Platelets Result	High Risk Factors	Creatinine Clearance
	73	78.0	184		B General Medicine 6	BTW5	2	0	44			230	0	48
	72	76.1	155		Neurology	CW54	2	0	50	1.1	31.2	312	0	56
	52	157.0			General Medicine HITH	BHIIH	2	0	82	1.4	29.1	234	4	184
	86	72.9			C Gen Med Delta Team	CW42	2	0	77	1.5	50.7	243	0	60
	53	294.0			Urology	BA	2	0	49	1.4	50.2	199	1	226
	81	95.4	172		B General Medicine 5	BTW5	2	1	76			266	0	83
	87	63.3	62.70		Geriatric Medicine	KS1	2	0	71	2.4		220	0	49
	83	62.0			Orthopaedic Surgery	DHIIH	2	0	80	1.3	22.8	341	0	57
	94	0.1			Monash at Home - ARC	KGAH	2	0	12	2.6	32.5	299	2	
	86	66.0			Geriatric Medicine	KRS6	2	0	61	1.1	21.9	449	0	49
	64	91.9			MonashHeart	BCCU	2	0	34	2.9	40.2	291	1	48

Inpatient Medications						
Medication	Order Status	OrderDateTime	Dose	Unit	Route	Frequency
enoxaparin	Ordered	20/09/2023 4:00:00 PM	20.00	mg	SUBCUT	Evening
enoxaparin	Suspended	18/09/2023 4:00:00 PM	40.00	mg	SUBCUT	Evening

Home Medications						
Medication	Order Status	OrderDateTime	Dose	Unit	Route	Frequency

### Flagged Pathology Results - last 5 days

Service Date	Test	Result
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### All Pathology Results - last 30 days

Service Date	Test	Result
18/09/2023 4:40 PM	ALT/1	24
30/09/2023 9:30 AM	ALT/1	20
10/09/2023 8:26 AM	APTT	21.9
18/09/2023 4:40 PM	BILI	9.0
30/09/2023 9:30 AM	BILI	7.0
12/09/2023 7:27 AM	eGFR	41
18/09/2023 4:40 PM	eGFR	69
30/09/2023 9:30 AM	eGFR	61



# Daily rounds 'dashboard'

## Anticoagulation Stewardship Dashboard

Last Updated: 01 Oct 23 16:02

Campus / Ward All		Medical Specialty All		UR Number All		Anticoagulant All		Dose All		Order Status All				
High Risk All	Age 18	102	Weight 0.0	294.0	eGFR (ml/min) 0	91	INR 0.00	5.50	APTT (sec) 0.00	66.30	Platelets (x10^9/L) 0.00	805.00	Anti-Xa level (units/mL) 0.19	1.01

Total Inpatients	Anticoag Inpatients
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	86	65.6			Geriatric Medicine	BDDSA	1	2	29	1.1	96.9	372	0	24
	80	71.0			VHH - ACS	VHH7B	1	3	43	1.2	66.3	204	1	40
	64	95.0			CC Cardiac	VHHJM6 A	1	1	69	1.0	62.2	192	1	90
	73	79.8	165		C Gen Med Echo Team	CW42	1	0	48	1.3	62.2	144	0	52
	79	51.7			VHH - ACS	VHH7A	1	2	85	1.6	58.7	237	0	58
	81	0.1			C Gen Med Bravo Team	CW41	1	2	61	1.2	57.3	192	0	
	67	84.7	167		Oncology	CICU	2	1	10	1.2	56.4	180	2	16
	91	80.2	170		Stroke B	CW54	1	0	51	Comment	54.0	211	0	44
	86	72.9			C Gen Med Delta Team	CW42	2	0	77	1.5	50.7	243	0	60
	67	53.3	170		Oncology	CW44	2	1	85	1.1	50.1	162	2	58

Inpatient Medications						
Medication	Order Status	OrderDateTime	Dose	Unit	Route	Frequency
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Home Medications						
Medication	Order Status	OrderDateTime	Dose	Unit	Route	Frequency

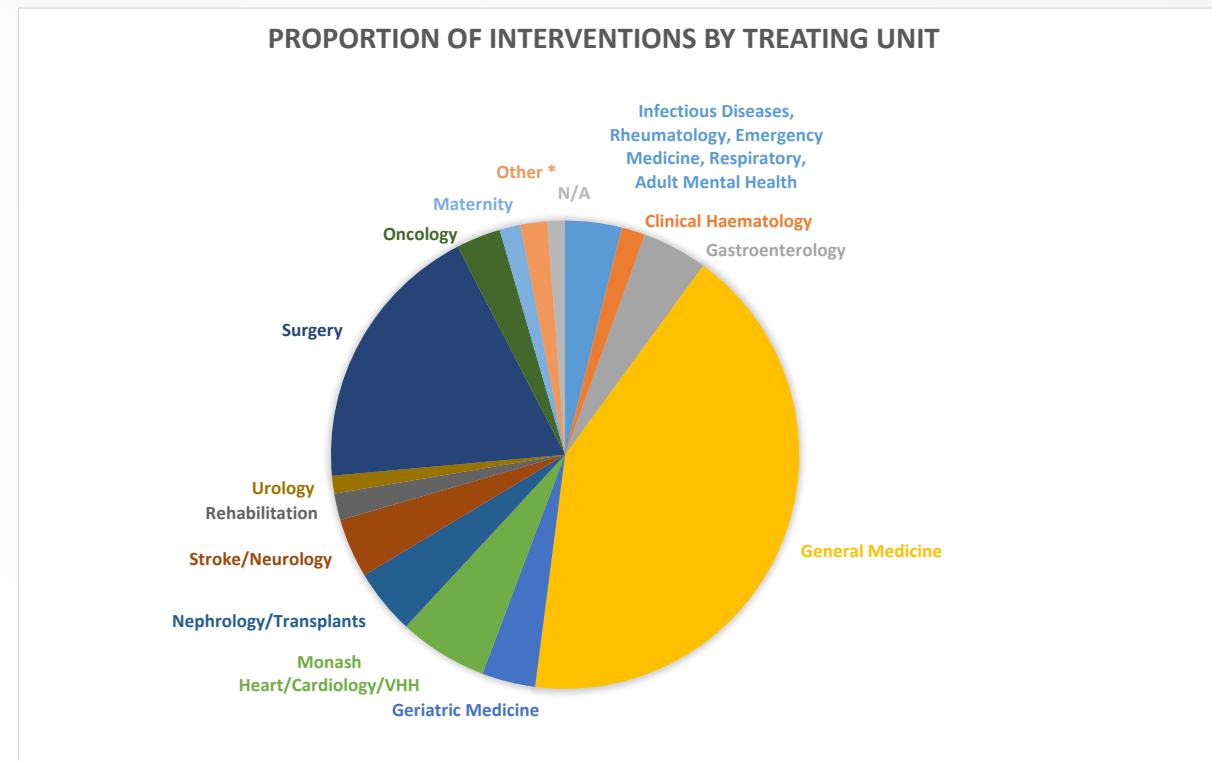
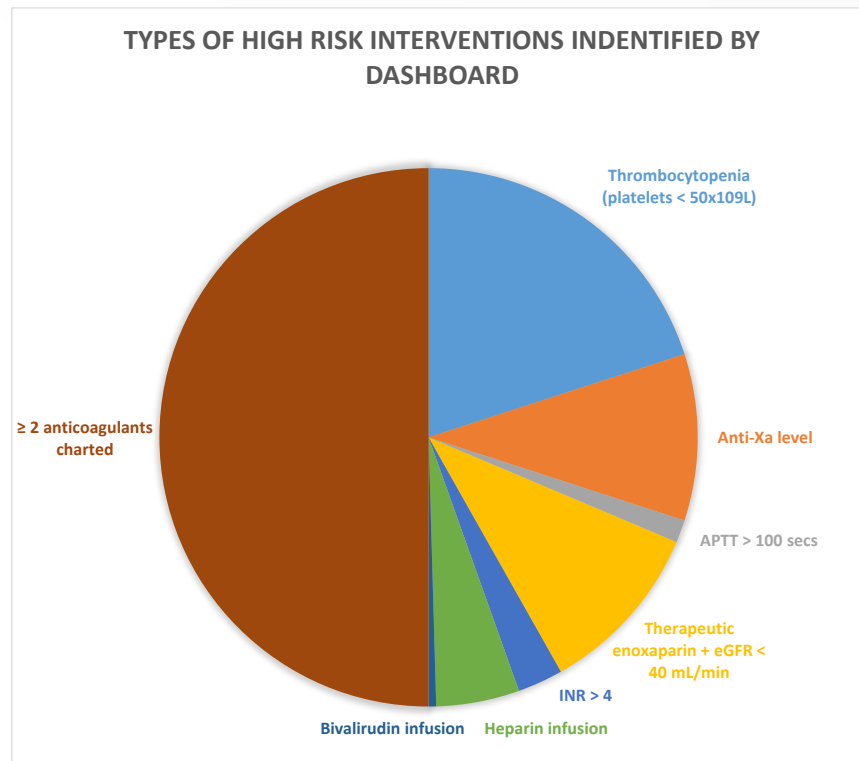
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30/09/2023 9:30 AM	ALT/1	20
10/09/2023 8:26 AM	APTT	21.9
18/09/2023 4:40 PM	BILI	9.0
30/09/2023 9:30 AM	BILI	7.0
12/09/2023 7:27 AM	eGFR	41
18/09/2023 4:40 PM	eGFR	69
30/09/2023 9:30 AM	eGFR	61



# ACS team stats - Dashboard

- No. of interventions made via dashboard **total** = 490 (~2/day)



# ACS team stats - Dashboard

- No. of high-risk interventions identified via the dashboard = 220
  - 110 patients charted  $\geq 2$  anticoagulant concurrently on the MAR
  - 44 thrombocytopenic patients on an anticoagulant
  - 23 therapeutic enoxaparin + eGFR  $<40\text{mL/min}$
  - 22 anti-Xa level
  - Smaller numbers: INR  $>4$ /APTT  $>100$ ; heparin/bivalirudin infusions
- Approximately 60-80 patients/day reviewed via dashboard
  - Of those approximately 10 requiring going into EMR



# ACS team stats – Referrals

- ‘Non Dashboard’ activity (via phone, Teams, email) = 1295 (~5/day)
  - Anticoagulant:
    - Choice
    - Bridging
    - Dosing
    - Monitoring
  - Consults:
    - New diagnosis simple VTE



# What activities are being planned for the future?

- Daily rounds targeting patients not prescribed VTE prophylaxis
- Expand in-person rounds in high-risk areas
  - Orthopaedics, general medicine, other ICUs
- Oversight of patients anticoagulated after valve surgery
- Early follow-up of high-risk patients discharged on a new anticoagulant



# Contacting the ACS program

- Email: [Anticoagulation.Stewardship@monashhealth.org](mailto:Anticoagulation.Stewardship@monashhealth.org)

