Anaesthetic Services, Pre-Operative Assessment and Investigations Guideline

Effective: 2 October 2019

1. Guiding Principles

This guideline is intended for use by the pre-assessment nurse, surgical team and anaesthetists as a reference for booking emergency cases for theatre, pre-operative assessment and investigations. Additional queries are to be directed to the responsible anaesthetists

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2. Guideline

2.1 Provision of Emergency Anaesthetic Services

The anaesthetic department is staffed by a mixture of non-specialist and specialist anaesthetists. There are 2-3 elective all day lists and two (2) endoscopy lists Monday-Friday. There is some provision for day time emergency theatre. Urgent or life/limb cases should be done as soon as possible. If there is no day time emergency theatre, elective list can be interrupted to accommodate for urgent cases.
It will be the best practice to do all the major and high risk emergency cases during day time. After hours, only life/ limb cases and emergency LUSCS should be done.

Booking of emergency/ urgent theatre cases

The surgeon or one of their team is to book all emergency cases via the theatre co-ordinator.
A booking slip with all patient details, surgery, co-morbidities, urgency and fasting time are to be filled in.
The on call anaesthetist is to be contacted by the surgical team. This should be a doctor to doctor communication. Handover details of patient co-morbidities, any optimisation, abnormal investigation results and fasting time are expected.
The theatre co-ordinator will liaise with the team and the time scheduled for the emergency cases is to be communicated to the surgeon, anaesthetist and the theatre team.
The on call anaesthetist is responsible for covering all emergencies from 8.00-8.00. If the on call anaesthetist cannot cover emergency cases during the day, he/ she are responsible to source alternative anaesthetic cover. This information should be communicated to the theatre co-ordinator and switch board. This is to ensure that there is robust anaesthetic cover for emergencies 24 hours a day.

WA Emergency Surgery Urgency Categories

Category	Time	Description	Example procedures
EC1	<15 mins	Immediate life, limb or organ-saving intervention. Resuscitation simultaneous with surgical intervention. Normally within minutes of decision to operate	Ruptured aortic aneurysm Laparotomy/ thoracotomy for control of major haemorrhage (life, limb/ organ threatening) Craniotomy for life-threatening high ICP Clot retrieval for strokes
EC2	<2 hours	Serious condition requiring imminent treatment. Resuscitation simultaneous with surgical treatment. The patient has life, limb or organ-threatening condition but is responding to resuscitative measures	Major trauma Leaking aortic aneurysm Laparotomy for perforation Gastrointestinal bleeding Sepsis with impending organ failure Testicular torsion Fasciotomy

EC3	<6 hours	Operation not required immediately but must take place as soon as possible. The patient is physiologically stable but problem may undergo significant deterioration if left untreated	Intra-abdominal sepsis Debridement plus fixation of open/ complex fractures Acute ischaemic limb Dental abscess/ deep neck infection
EC4	24 hours	Operation as soon as possible after resuscitation. The patient is physiologically stable, but some risk of deterioration if left overnight	Irreducible hernia Intestinal obstruction Major fractures
EC5	<48 hours	Time critical surgery. The patient's condition is stable	Required to maximise functional recovery

Life, limb or organ saving emergencies

These should be done as soon as possible regardless of the time of the day. Help from a second anaesthetist should be considered if it is a high risk case or major haemorrhage is expected.

Day time urgent cases when emergency theatre is not available

Urgent cases should be slotted into elective list which will be interrupted. The anaesthetist doing the list should be given all the relevant patient information with appropriate time allowed for pre-assessment. This may result in unavoidable cancellation of some elective cases. If urgent cases are added to existing elective list in the morning, patients should be booked with the anaesthetist as soon as possible to allow time for pre-assessment and informed consent. This may mean a delayed start time or interruption during the list. The anaesthetic group is happy to be informed of these cases and take clinical handover up to 19.00 hours the evening before. Alternatively, the on call anaesthetist should be contacted to assess complex patients.

Evening urgent cases

Urgent cases should be started as soon as elective lists are finished and there is adequate staffing to proceed.
High risk urgent but stable patients should be postponed and scheduled for the next day.
It is expected that everyone should use common sense to ensure urgent/ emergency cases are done as soon as time and safety allows. It should be a team decision.

Request for epidurals or LUSCS

The same standard of handover as above is expected from GPO to anaesthetist when epidurals or LUSCS are requested.

LUSCS urgency categories

Category	Suggested decision to delivery time	Description	Example procedures
1	Within 30 minutes	Immediate threat to the life of a woman or fetus	Placental abruption Fetal distress
2	Within 60 minutes	Maternal or fetal compromise but not immediately life threatening	Failure to progress
3	Within next 24 hours	Without current fetal or maternal compromise. Needing earlier than planned delivery	

Decision to delivery time for LUSCS should be made on clinical decision on each individual case.

Elective Surgery

There are 3 clinical categories for classifying patients for elective surgery. Patients with the most urgent medical need (Category 1- urgent) will be scheduled for surgery first.

Category	Clinical description	Desirable waiting time
1-Urgent	Has the potential to deteriorate quickly to the point where it may become an emergency	Admission within 30 days
2- Semi-urgent	Causes pain, dysfunction or disability Unlikely to deteriorate quickly Unlikely to become an emergency	Admission within 90 days
3- Non-urgent	Causes pain, dysfunction or disability Unlikely to deteriorate quickly	Admission within 365 days

Please refer to DOH policy on elective surgery access and wait list management

2.2 Fasting Instructions For Elective Surgery

All Elective Surgical patients requiring GA and plastic Surgery patients under LA and sedation

Objective: to minimise the risk of aspiration during general anaesthesia or decreased level of consciousness

Adults

	Recommended fasting time
Light meal	6 hours
Cow's milk	6 hours
Clear fluids eg water, clear fruit juices, carbonated drinks, tea/ coffee without milk	2 hours

Note: patient may take a small amount of water less than 2 hours pre-procedure to swallow medication

Children/ Infants

	Infants ≤12 months and	Patients >12 months
Food/ Cow's milk	6 hours	6 hours
Formula	4 hours	6 hours
Breast milk	3 hours	6 hours
Clear Fluids	1 hour	

Clear fluids: when held to the light is transparent. They include water, glucose based drinks, dilute cordials, clear juices.
Jelly, chewing gum and hard lollies are NOT clear fluids

Eye patients scheduled for LA+/- light sedation
This group of patient do **not** need to be fasted
GA/LA/LAWS should be decided by the ophthalmic surgeons when booking form for wait-listing (MR20) is submitted. LA and LAWS **cannot** be converted to GA on the day of surgery
If in doubt about suitability for LA/sedation, patient should be booked as GA and fasted according to GA guideline above.

2.3 Perioperative Medication Instructions

Medication	Action	Recommendation
Antiplatelets/ anticoagulants	Patient specific	See guideline in later section +/- consultation with the anaesthetist +/- cardiologist
Warfarin	Depends on type of surgery and risk of thromboembolism vs bleeding	See guideline in later section
Enoxaparin	Withhold	Cease 12 hours prior to surgery

Heparin	Withhold	Cease 6 hours prior to surgery
DOAC	See later section	See later section
Cardiovascular agents		
ACE inhibitors Angiotensin II receptor antagonists	Varies	Anaesthetist preference May cause labile BP after induction if not omitted on day of surgery
Beta blockers	Continue	
Calcium channel blockers	Continue	
Diuretics	Continue	Consider withholding K+ sparing diuretic on day of surgery
Digoxin	Continue	Measure levels, especially in renal impairment
Statins	Continue	

2.4 Perioperative Management of Diabetes

Diabetic patients are at greater risk of perioperative mortality and morbidity after major surgery. Good glycaemic control in the perioperative period results in a lower incidence of perioperative and post-operative complications. Elective surgery should be postponed if glycaemic control is poor (HbA1c ≥ 9%)

Guideline

Diabetic patients should be placed first on the operating list where possible. Inform Anaesthetist if BGL <4 or >12 mmol/l within 24 hours of surgery. Aim for BGL of 5 to 10 mmol/l in the perioperative period.

Regime for insulin requiring and poorly controlled Type 2 Diabetes Mellitus

Major Surgery

- Night before: give patients **normal** insulin dose. Long acting (basal) insulin eg Lantus, Levemir should be continued. Consider reducing long- acting insulin dose by 20% in prolonged fasting or in patients with recent fasting BGL consistently <5.0mmol/l.
- Prior to theatre, normal fasting rules apply

For an AM case:

- Withhold morning insulin
- BGL on admission and hourly from admission on day of surgery
- Insulin and dextrose infusions to commence as per MR157A

For a PM case:

- Light breakfast at 6am with half usual insulin dose
- First on PM list where possible

BGL on admission and hourly after that

- Insulin and dextrose infusions to start at 1100 as per MR157A
  Note that patients who may experience hypoglycaemic episodes on the morning of surgery may be advised to take or may be given clear apple juice OR commenced on a glucose infusion. This may delay surgery by 2 hours but is unlikely to result in cancellation

Minor Surgery

- Night before: give patients NORMAL insulin dose
- Normal fasting rules apply
- **AM cases only**: This regime is only suitable for patients whose random blood sugar level is <10mmol/l on admission, will only miss one meal preoperatively and are first on the list for very minor surgery eg cystoscopy
- No breakfast, no insulin, place first on list
- Blood glucose: 1 hour pre-op and at least once during operation. Hourly if operation >1 hour. Post-operatively every 2 hours until eating, then 4 hourly
- Restart normal s/c insulin regime with first meal

Regime for Type 2 Diabetes Mellitus

No oral medication:

- Normal fasting rules apply for both am and pm operation
- BGL on admission to ward

Oral medication e.g. metformin:

- Continue medication the night before (unless precautions required such as renal impairment or IV contrast)
- Normal fasting rules apply
- Omit AM diabetic medication
- BGL on admission and 2 hourly from 0800 day of surgery
- Institute guidelines for Insulin-requiring DM if BGL >12mmol/l
- Resume normal oral medication once eating and drinking post-operatively

Oral Medication and Insulin:

- Continue night before NORMAL diabetic medication (applying caution to metformin as above)
- Normal fasting rules apply

***For AM case*:**

- Withhold morning insulin and oral diabetic medication
- BGL on admission and hourly
- Institute guidelines for insulin requiring DM if BGL >12mmol/l

***For PM case*:**

- Light breakfast at 6-7am with half usual insulin dose.
- No oral hypoglycaemic to be given
- BGL on admission and hourly from 1000
- Institute guidelines for insulin requiring DM if BGL >12mmol/l

Post-operative guidelines for Management of Insulin-requiring Diabetics

- For the patient who will be nil by mouth post-operatively e.g. bowel surgery, and whose BGL is likely to be elevated as part of the stress response to surgery and lack of insulin, an insulin infusion should be commenced. Glucose will need to be provided as a substrate to protect from inadvertent hypoglycaemia. Note that in general 1-2 hourly monitoring of BGL is required and that patients on insulin infusions require prior and ongoing monitoring of their K+ and creatinine.

Resumption of normal medications

- Once the patient is eating they may be converted back to their normal insulin requirement. The insulin/dextrose infusions should be ceased **ONE HOUR** after their subcutaneous dose of insulin has been given. If they are on oral hypoglycaemias in addition, these may also be resumed.
- Caution should be exercised with the resumption of metformin with regards to ensuring adequate hydration, particularly if vomiting has been present.

Summary of peri-operative protocol for patients on the morning list

Pre-operative
- Pre-operative assessment and optimisation of BGL (target BGL 5-10, HbA1c < 7.0%)
- Usual dose of insulin and oral AHG on the day prior to surgery
- Fast from midnight
- Patients should not drive themselves to hospital
- Should be the first case on the morning list

Major Surgery

Insulin-Requiring *
- Omit morning dose of insulin (as well as all oral AHG) and cease insulin pump
- Commence I/G infusion before induction of anaesthetics (before 10am)
- Patients on insulin pump will stop the pump when I/G infusion is started

Non-insulin requiring
- Omit all oral AHG on day of surgery
- Monitor BGL hourly in pre-operative ward and during surgery: IV glucose if BGL< 4.0
- Low threshold to start I/G infusion if BGL erratic during peri-operative period

Post operative
- Continue I/G infusion and monitor BGL hourly
- Restart s/c insulin / oral AHG / insulin pump when patients are able to tolerate solids
- Restart Metformin after 24 hrs if haemodynamically stable and serum

Insulin regimen
- AHG and night time Glargine/ Detemir/ Isophane only
- Meal-time bolus insulin and night-time Isophane / Detemir
- Meal-time bolus and morning Glargine / Detemir/ Isophane

Minor Surgery

- Omit all oral AHG on morning of surgery
- Modify insulin dose as suggested **in table below** (If procedure is completed and patient can eat **by 10am**, can delay usual morning dose of insulin/AHG and have late breakfast)
- Monitor BGL hourly in pre-operative ward and IV glucose if BGL <4.0
- Consider I/G infusion if BGL erratic during peri- operative period

Post operative
- Monitor BGL hourly in the post-operative ward
- For day-only surgery, consider admitting patients if their BGL very erratic or their oral intake inadequate post-procedure
- Restart usual s/c insulin / oral AHG including Metformin with next meal

Suggested modification for minor surgery
- Stop AHG and give usual dose of insulin night before. May reduce dose by 10-20% if recent fasting BGL consistently <5.0mmol/l
- ½ combined morning and lunch time bolus insulin dose but given as intermediate-acting insulin in the morning
- Omit bolus insulin in the morning and give usual morning dose of intermediate- or long-acting insulin

* Includes patients with type 1 diabetes as well as insulin-requiring type 2 diabetes
Abbreviations: **I/G**: Insulin-glucose infusion **AHG**: Anti-hyperglycaemic agents **BGL**: Blood glucose level

Summary of perioperative protocol for patients on the afternoon list

Pre-operative

- Afternoon list not ideal for patients with diabetes: more disruptive to their control
- Pre-operative assessment and optimisation of BGL (target BGL 5-10, HbA1c < 7.0%)
- Usual dose of insulin and oral AHG on the day prior to surgery
- Patients should not drive themselves to hospital

On the day of surgery

- Stop all AHG on morning of surgery
- Modify insulin doses as suggested in table below
- Light breakfast and fast from 6am
- Should present to pre-operative ward early (eg 9am)
- Monitor BGL hourly: IV glucose if BGL<4.0mmol/l

Major Surgery

Insulin-Requiring *

- Start I/G infusion before induction of anaesthesia
- Insulin pump to be stopped when I/G is commenced
- Monitor BGL hourly during surgery

Non-insulin requiring

- Omit AHG on day of surgery
- Monitor BGL hourly during surgeryLow threshold to start I/G infusion if BGL

Minor Surgery

- Can continue insulin pump at basal rate
- Monitor BGL hourly during surgery
- Consider I/G infusion if BGL erratic during surgery

Post operative

- Monitor BGL hourly in the post-operative ward
- Restart s/c insulin / AHG when patients able to tolerate solids
- For day-only procedures, consider admitting patients if their BGL become erratic post-procedure or if their oral intake remains inadequate
- For patient who had abnormal renal function or had undergone major surgery, restart Metformin after 24 hrs only if haemo-dynamically stable and serum creatinine level normal post-procedure. For patients who had minor surgery, Metformin can be restarted with the next meal.

Insulin regimen

- AHG and night time Glargine/ Detemir/ Isophane only
- Meal-time bolus insulin and night-time Isophane / Detemir
- Meal-time bolus and morning Glargine / Detemir/ Isophane
- Meal-time bolus and night-time Glargine
- Pre-mixed Insulin

Suggested modification for minor surgery

- Stop AHG and give usual dose of insulin night before. May reduce dose by 10-20% if recent fasting BGL consistently <5.0mmol/l
- ½ combined morning and lunch time bolus insulin dose but given as intermediate-acting insulin in the morning
- Omit bolus insulin in the morning and give usual morning dose of intermediate- or long-acting insulin
- ½ morning bolus insulin dose before light breakfast; and give usual dose of Glargine the night before
- ½ usual morning dose of insulin

Bowel preparation for patients with diabetes: while patients are on clear fluids

- Omit all AHG
- If patients are on insulin, modify insulin regimen as below:

Insulin Regimen	
Short-acting insulin (with meals) and Glargine	Omit short acting insulin and continue Glargine
Short-acting insulin (with meals) and Detemir/ Isophane twice daily	Omit short-acting insulin and continue Detemir /Isophane twice daily
Short-acting insulin (with meals) and Detemir/ Isophane at night only	½ sum of all meal time short-acting insulin and administer as Detemir/ Isophane in the morning
Pre-mixed insulin	½ the Pre-mixed insulin doses
Insulin pump	Continue at the basal infusion rate

- More frequent BGL monitoring (every 2 hours)
- May consume glucose-containing fluid or jelly
- Add extra glucose in fluid if BGL <5.0mmol/l
- Avoid diet drinks or diet jelly unless BGL > 10mmol/l
- Consider admitting patients with unstable glycaemic control to hospital during the period of clear fluid
- Patients must have access to their diabetes physician for advice

There are reports of severe euglycaemic ketoacidosis with the use of SGLT2 (sodium glucose co-transporter-2) inhibitors in the perioperative period. ANZCA has recommended stopping this group of drugs for 3 days pre-operatively (2 days prior and on day of surgery)
SGLT2 inhibitors include:

- **Dapagliflozin (Forxiga)**
- **Empagliflozin (Jardiance)**
- **Combination with Metformin (Xigduo or Jardiamet)**

2.5 Perioperative Anti-Coagulant Management

The question of whether antithrombotic therapy should be suspended in an elective surgical patient depends on balancing the risk of perioperative surgical bleeding against the thromboembolic risk with suspension of treatment and the use of bridging anticoagulant therapy.

Summary of indications for anticoagulation and associated level of risk of thromboembolism

Reason for anticoagulation	High risk (>10%)	Moderate risk (5-10%)	Low risk (<5%)
Mechanical heart valve	Any prosthetic mitral valve Caged-ball or tilting AV prosthesis Recent (<6 months) CVA/TIA	Bi-leaflet aortic valve with one or more of the followings risk factors: AF, previous CVA/TIA Hypertension Diabetes CCF Age>75	Bi-leaflet aortic valve without AF and risk factors for CVA
Chronic atrial fibrillation CHADS2 score: CHF 1point Hypertension 1 point Diabetes 1 point Age>75 1 point Prev CVA/TIA 2 points	CHAD2 score 5-6 CVA/TIA within 3 months Rheumatic valvular heart disease Prosthetic heart valve LV ejection fraction<35%	CHADS2 score 3-4	CHADS2 score 0-2 (assuming no prior CVA/TIA)
Venous Thromboembolism	VTE within 3 months Severe thrombophilia eg deficiency of protein C/S/ antithrombin, antiphospholipid antibodies, multiple abnormalities Recurrent VTE on warfarin	VTE 3-12 months ago Recurrent VTE Active cancer treated within 6 months or palliative Non severe thrombophilia eg heterozygous factor V Leiden or prothrombin gene mutation	Single VTE>12 months ago and no other risk factors
Other causes	Intracardiac thrombosis ACS Coronary stent after MI		Dilated cardiomyopathy or LV aneurysm

Risk stratification: bleeding
The risk of bleeding is best assessed by the surgeon. Advice regarding perioperative anticoagulant should be documented on the wait-list booking form (MR20)

Examples of high bleeding risk procedure in patients on warfarin:

- Any major operation of duration >45 minutes
- Cardiothoracic surgery: all
- Cardiovascular: diagnostic coronary angiography, cardiac implantable electronic devices, transcatheter valve therapies
- Dental: reconstructive procedure, tooth extraction
- ENT: Any sinus surgery, nasal polypectomy, parotidectomy, septoplasty, cautery of turbinates
- Gastroenterology: large polypectomy (>1cm), variceal treatment, biliary sphincterectomy, pneumatic dilatation, endoscopically guided fine needle aspiration
- General surgery: Major tissue injury, vascular organs (spleen, liver, kidney), bowel resection, thyroidectomy
- Gynaecology: Hysterectomy and oophorectomy, laparotomy, oncology surgery
- Ophthalmology: all except cataract extraction
- Orthopaedic surgery: joint replacement including foot/ hand/ shoulder surgery, hip and knee replacement, laminectomy
- Plastic surgery: reconstructive/ cosmetic surgery, hand surgery, breast implant
- Neurosurgical, head and neck, abdominal and breast cancer surgery
- Urology: TURP, TURBT, nephrectomy, kidney biopsy
- Vascular surgery

Warfarin

In general, a patient taking warfarin are at increased risk of bleeding if it is continued pre-operatively and at increased risk of thrombo-embolic complications if it is withheld. The pre-operative management of these patients depends on the original indication for anticoagulation, the time since the last thrombotic event, and the extent/ type of surgery planned.

All patients

- Identify patient risk group for cessation of warfarin (see table)
- Check INR
- Consider risk of surgery with residual anticoagulation
- INR less than 1.5 is acceptable for most surgery
- The risks associated with modifying anticoagulation in the perioperative patient should be included in the general discussion of perioperative risks as part of informed consent

Warfarin bridging

There has been a shift away from routinely bridging patients. Mounting evidence suggests that bridging confers an increase in both major bleeding and major cardiovascular events, but without an appreciable decrease in thromboembolic events. Currently the following key points are recommended:

- Warfarin should not be interrupted for procedures of low bleeding risk
- Patients at low VTE should not be bridged

- In patients at highest risk of VTE, but not excessive bleeding risk, bridging should be considered
- Intermediate risk cases should be considered on an individual patient basis, with the risk of bleeding vs risk of VTE assessed.

Warfarin bridging protocol

- The last warfarin dose should be 5 days pre-procedure
- A rest day should follow with no anticoagulant to allow the effects of warfarin to diminished and INR< 2 before heparin is initiated (about 3 days before surgery)
- LMWH (enoxaparin) have superseded unfractionated heparin as the bridging agent of choice (more predictable pharmacokinetic profile, less frequent dosing without requirement of monitoring essays, reduced cost and can be used in out-patient setting)
- Use Enoxaparin sc 1.5mg/kg once a day or 1mg/kg twice a day.
- The 1mg/kg bd regime is more efficacious and should therefore be used for high risk VTE patients and high risk bleeding patients, as peak concentrations are reduced should bleeding occur.
- The 1.5mg/kg once a day regime can be used for lower risk patients
- There must be a 24 hours mandate period between the last dose of heparin and surgery, to make certain the residual anticoagulant effect has ceased sufficiently.
- If prescribing the once daily schedule, the last 1.5mg/kg dose should be halved to 0.75mg/kg to allow adequate time for anticoagulant effects to subside
- Postoperatively, warfarin should be recommenced when patient has resumed oral fluids and when surgical bleeding risk is low.
- For low risk patient, prophylactic enoxaparin 40mg OD should be started once surgical bleeding risk is low (check with surgeons)
- For moderate and high risk VTE patients, enoxaparin 1mg/kg BD should be started once surgical bleeding risk is low. Discontinue enoxaparin when the INR is in the therapeutic range (4-5 days later)

Exception/Issues

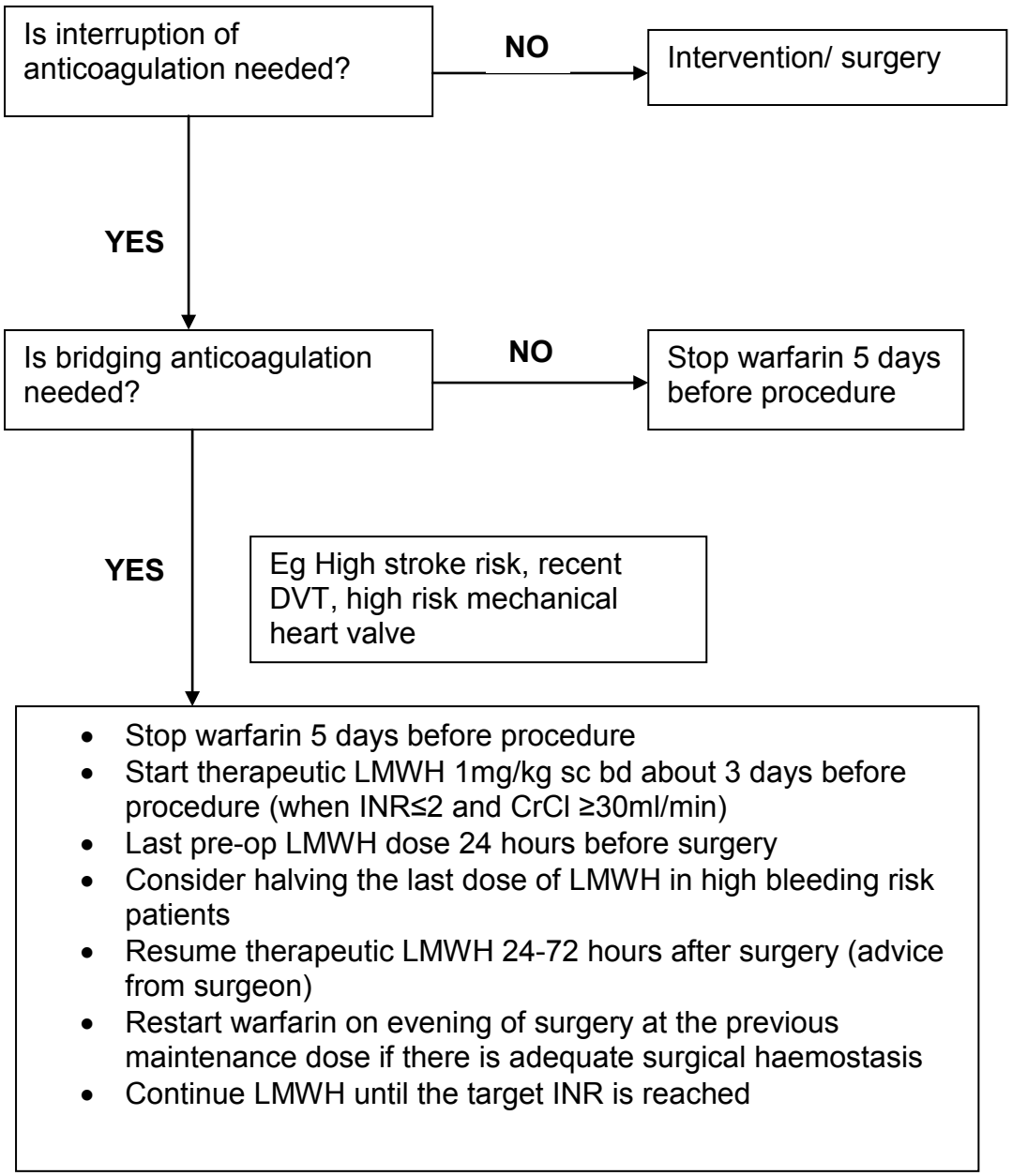
Patients with chronic renal failure (calculated CrCl 30ml/min) should not receive Enoxaparin/ Clexane. Use sc sodium heparin or Dalteparin/ Fragmin instead

Dalteparin dose for high risk patients: 100IU/kg BD or iv unfractionated heparin to attain APTT 1,5-2X the control (therapeutic dosing)

Elective surgery should be avoided in the three months after an acute episode of venous thromboembolism or systemic arterial embolism when anticoagulation should be continued. If this is not possible follow high risk protocol.

Inferior vena cava filter may be indicated if pulmonary thromboembolism or proximal deep vein thrombosis has occurred within the previous 4 weeks and an urgent procedure is required. In such cases, filters can prevent pulmonary embolic events and allow temporary discontinuation of anticoagulant therapy

Summary of perioperative bridging protocol for patients on warfarin



Direct oral anticoagulants DOAC (eg dabigatran, rivaroxaban, apixaban)

Bridging is not usually recommended because the duration necessary for the drug to be withheld before surgery is short and the restoration of clinical effect upon re-initiation is rapid, without a procoagulant effect. Bridging may be contemplated in a patient with high thrombotic risk and requires prolonged preoperative cessation of anticoagulant.

For **EMERGENCY** surgery in patients on a DOAC:

- Anticipate increased risk of bleeding
- Avoid neuraxial anaesthesia
- Consider consultation with specialist haematologist

For **URGENT** surgery in patient on a DOAC:

- Delay surgery for 24-36 hours (longer if significant renal impairment)
- Consider consultation with specialist haematologist

For **MINOR** bleeding risk procedures:

- DOAC may be continued without interruption (anticipated effect is similar to performing procedure while on warfarin or LMWH)

For **ALL OTHER PROCEDURES**:

- Management is dependent on the patient's renal function and procedure related bleeding risk.

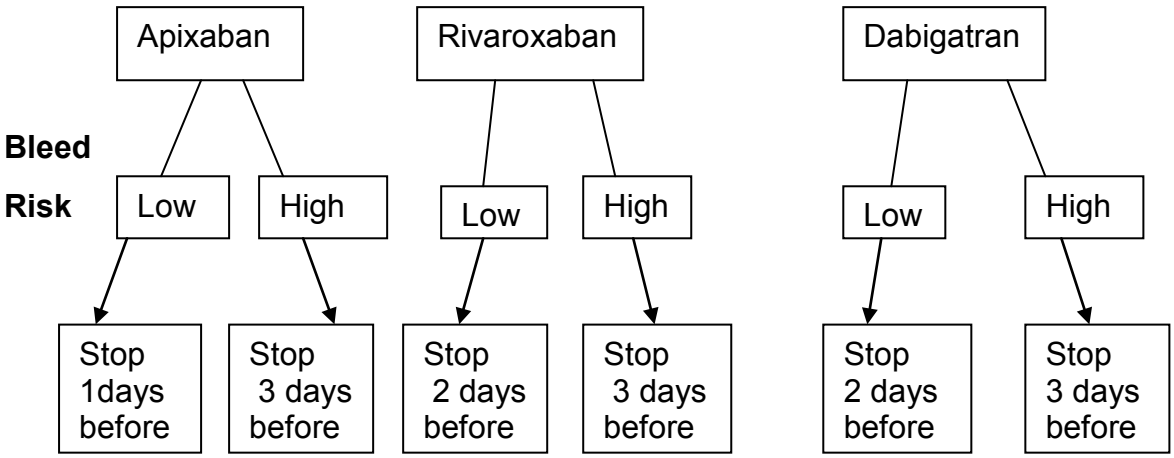
Pre-procedure:	**Half-life (Range) Hours**	**Low bleeding risk procedures (2-3 drug half-lives between last dose and surgery)**	**Moderate to high bleeding risk procedures (4-5 drug half-lives between last dose and surgery)**
DABIGATRAN: (Pradaxa) 150mg BD			
CrCl>50 ml/min	12-18 hours	Last dose: 2 days before surgery	Last dose 3 days before surgery
CrCl 30-50 ml/min	13-23 hours	Last dose: 3 days before surgery	Last dose 4 days before surgery
RIVAROXABAN: (Xarelto) 20mg OD			
CrCl>50 ml/min	7-10 hours	Last dose: 2 days before surgery	Last dose: 3 days before surgery
Cr Cl 30-50 ml/min	9-13 hours	Last dose: 2 days before surgery	Last dose: 3 days before surgery

APIXABAN: (Eliquis) 5mg BD CrCl>50 ml/min	7-8 hours	Last dose: 1 day before surgery	Last dose: 3 days before surgery
Cr Cl 30-50 ml/min	9-13 hours	Last dose 2 days before surgery	Last dose: 4 days before surgery

Post-procedure:

- Delay re-initiation until haemostasis is certain (24-72 hours)
- Low bleeding risk: resume on day after procedure (24 hours post-op)
- High bleeding risk: resume 2-3 days after procedure (48-72 hours post-op)

Suggested DOAC interruption scheme for patients with <u>CrCl>50ml/min</u>



Perioperative management of antiplatelet agents

The following is only a guideline. Clinical judgement must be exercised based on the patient's risk of cardiovascular event vs surgical bleeding. Specialist advice from the surgeon and specialist managing the antiplatelet agents should be sought.

- Patients at increased risk of thromboembolism undergoing low bleeding risk surgery, treatment can be continued
- Patients at low risk of thromboembolism undergoing high bleeding risk surgery, treatment can potentially be suspended
- Patients with a low risk of thromboembolism and a low risk of procedural bleeding, aspirin can be continued.

Dual antiplatelet therapy (DAPT): prescribed for post- acute coronary syndrome (ACS) +/- coronary stents. Stent thrombosis causing MI has a high mortality rate >50%. Elective surgery should be delayed and DAPT continued for the recommended period of DAPT:

- 12 months for drug eluting stents (DES)
- 4-6 weeks for bare metal stent (BMS)
- 12 months after ACS irrespective of type of stent

The risk of in-stent thrombosis is highest for BMS in the first 6 weeks after insertion and for DES within the first 6 months. Postpone surgery for this period if possible. If it is not possible, DAPT can potentially be continued in low bleeding risk surgery. **At least aspirin should be continued** and other antiplatelet agent should be stopped for as brief a period as possible. Surgery should take place in a centre that offer 24 hours interventional cardiology

Recommended time interval between discontinuation of antiplatelet agents prior to procedure (**if required**)

Antiplatelet agent	When to cease antiplatelet therapy (if required)
Aspirin	At least 5 days prior
Clopidogrel	At least 7 days prior
Prasugrel	At least 7 days prior
Ticagrelor	At least 5 days prior
Ticlopidine	At least 14 days prior

Aspirin

If there is no medical indication, patient should avoid using aspirin for 7-10 days prior to surgery. Paracetamol can be used as a simple analgesic.
If medically indicated, low dose aspirin (75-150mg/day) should be continued prior to surgery unless operation is in a high bleeding risk group. Withdrawal for 10 days is required to totally eliminate the effect of aspirin. In moderate bleeding risk group, the risk of cessation of antiplatelet therapy should be considered carefully.
Low dose aspirin is **not** a contraindication to spinal or epidural procedures.
When medically indicated aspirin has been ceased pre-operatively for surgical reasons, it should be given post-operatively as soon as there is no risk of surgical bleeding.
Early post-operative aspirin +/- other antiplatelet agent should be given when surgically appropriate. **If in doubt** specialist advice should be sought from the prescribing physician.

For advice on reversal of anticoagulant therapy in emergency surgery, please contact the haematologist on call at SCGH. Phone: 9346 3333

NSAIDs

Non-selective cyclo-oxygenase (COX) inhibitors produce a reversible inhibition of enzymes, which normalises if the drug is stopped for 3 days. Selective COX-2 inhibitors do not cause significant platelet dysfunction. In general for **regular** user of NSAID, withhold on day of surgery.
Stop NSAIDs for 7 days before major surgery.

Dipyridamole

Dypyridamole acts on vascular smooth muscle and reversibly on platelet activity but does not have clinically significant haemorrhagic complications. Withhold on day of surgery

Anticoagulation and neuraxial anaesthesia

Anticoagulant	Epidural/Spinal insertion and catheter removal
SC heparin (unfractionated) 5000iu (usually given 08.00 and 20.00)	A minimum of 6 hours after last dose Wait at least 2 hours before giving next dose
LMWH (Clexane) prophylactic dose (usually given 20.00)	A minimum of 12 hours after last dose Wait at least 2 hours before giving next dose
LMWH (Clexane) therapeutic dose (1.5mg/kg)	A minimum of 24 hours after last dose Wait at least 4 hours before giving next dose
Warfarin	Stop for 5 days Ensure INR<1.5 If>1.5 might need FFP cover Do not administer warfarin until 4 hours after catheter removal. May require alternative anticoagulant
iv unfractionated heparin infusion	Cease infusion for 6 hours, check APTT and ensure normal 2 hours after catheter removal, bolus heparin and recommence infusion

Cessation of DOAC before neuraxial anaesthesia

There is limited data on neuraxial procedures and DOAC.
Spinal or epidural anaesthesia is contraindicated in patients receiving therapeutic dose of DOAC. If DOAC has been ceased for sufficient time to predict absence of anticoagulant effect, then epidural or spinal anaesthesia can be sited. If in doubt, avoid neuraxial block unless laboratory test is available to confirm the absence of anticoagulant effect

Effect of DOAC on routinely performed coagulation assays

Effect	Dabigatran	Rivaroxaban	Apixaban
Significant anticoagulant effect unlikely	APTT and TT normal	PT normal	Normal PT **DOES NOT** exclude presence of therapeutic apixaban
Anticoagulant effect present	TT prolonged APTT prolonged	PT prolonged	PT prolonged or normal
Specific essays to quantify drug presence	Diluted thrombin clotting time	Modified anti Xa assay specific for rivaroxaban	Modified anti Xa assay specific for Apixaban

2.6 Cardiac Problems Requiring Referral to Cardiologists Pre-Op

Patients with uncontrolled heart failure, unstable angina and new symptoms of dyspnoea on minimal exertion should be deferred to the cardiologist/ consultant physician for opinion and optimisation therapy. Wait list clerk should be informed and communication passed onto the surgical team.

2.7 Hypertension

Traditionally patients with "uncontrolled" hypertension have been deferred. However there is little evidence as to when to treat, what agent to treat with and for how long. There is currently **NO** evidence that a systolic BP<180mmHg or a diastolic of <110mmHg has any untoward effects perioperatively. Obviously long term health may be affected, but surgery should not be delayed.

Even in patients with systolic>180 or diastolic>110mmHg, there is no evidence of direct harm. However there is increased risk of intraoperative haemodynamic instability, which has itself been linked to complications. Therefore a prudent approach is to defer all patients having non-essential surgery until BP is **<180/110**. If patient is having urgent surgery (eg malignancy), it is reasonable to proceed with therapy pre-operatively (probably a beta-blocker), using invasive monitoring intraoperatively and continuing this in the postoperative period on HDU.

Letters should be send/fax to GPs if there are concerns about BP:

1. BP>140/90 but less than 180/110- this is a general health issue. GPs are to be informed about the elevated reading, which they may like to repeat and observe/ treat
2. BP>180 systolic or diastolic>110 and having non-essential surgery- this is to defer patients until GP has obtained a satisfactory reading (<180/110)
3. BP>180 systolic or diastolic>110 and having urgent surgery (eg suspected malignancy)- this again is just to inform the GP

Please remember to obtain at least 3 readings if the BP is elevated at the clinic, and accept the lowest one. White coat hypertension is extremely common. A satisfactory value must have a systolic <180mmHg **and** a diastolic <110mmHg (eg 182/78 fails, 160/112 fails, 178/108 passes)

There is some evidence in animals that cerebral autoregulation can take around 6 weeks to stabilise after the initiation of antihypertensive treatment. Therefore if a patient's BP is high but not requiring deferment, initiation of treatment should be delayed until after surgery.

2.8 Indications of Echocardiography

This can be a very useful tool prior to surgery, particularly in major cases in which large fluid shifts may be predicted (eg vascular surgery, colonic resections, TURPs)

Indications for referral for echocardiography include:

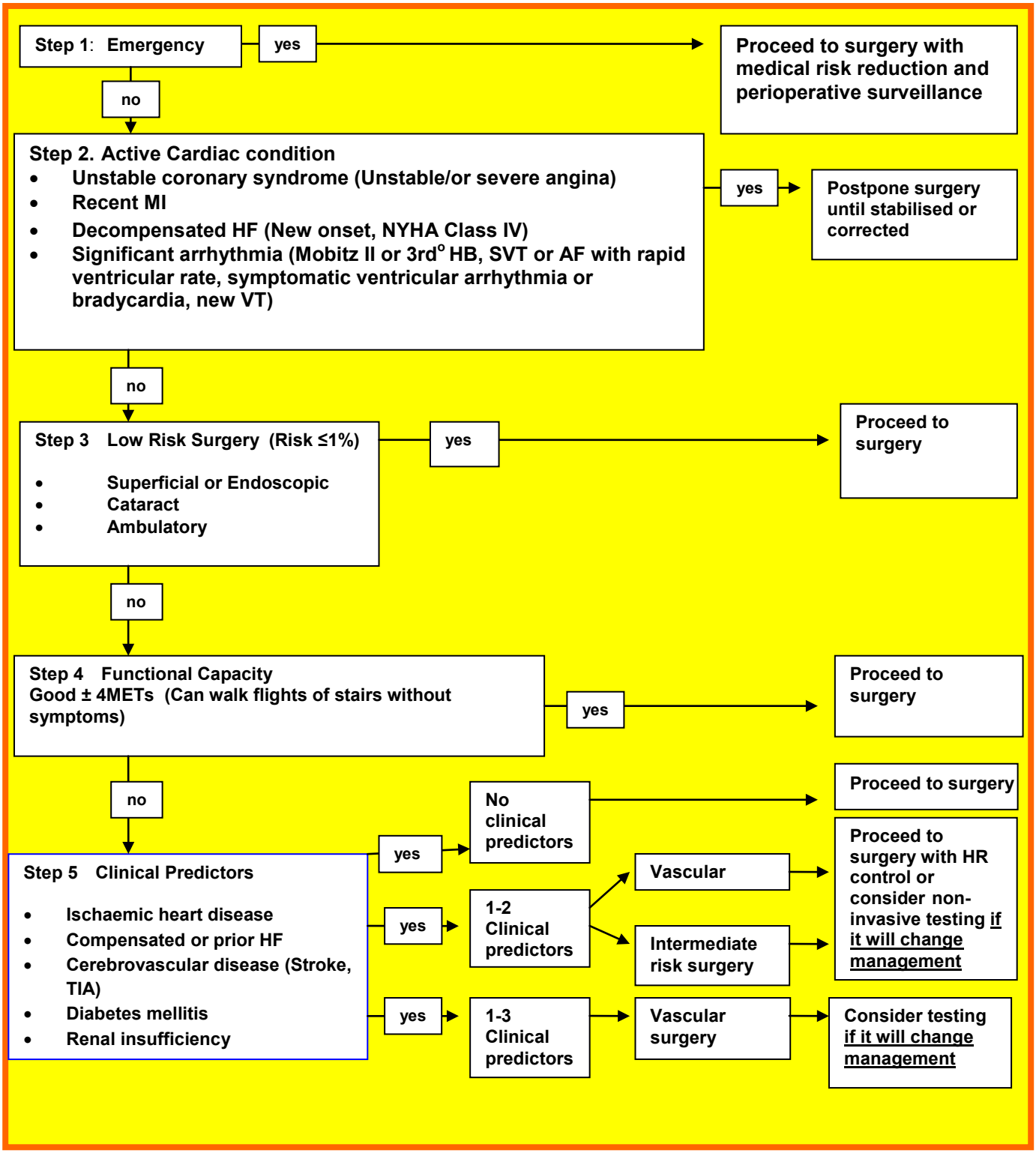
- All patients with an undiagnosed systolic murmur should have an echocardiogram to exclude aortic stenosis
- Patients with unexplained shortness of breath or poor exercise tolerance
- Patients having major surgery with a past diagnosis or clinical suspicion of impaired ventricular function or heart failure
- Significant arrhythmias
- Severe valvular heart disease

When considering referral for an echocardiogram, remember that the decision must be based on a combination of clinical symptoms/ signs and the proposed surgery. For example, a patient who can walk 3km a day is unlikely to require an echo, even if they had a previous MI. A patient who can only walk 200m before becoming exhausted may not require an echo for minor surgery.

How to organise an echocardiogram?

An urgent echo can be requested by contacting the echo technician in the specialist rooms at Albany Health Campus. A provisional report can be obtained immediately after the procedure. Please ensure that the formal report is reviewed and forwarded to the responsible surgeon and anaesthetist. Non-urgent Echocardiogram can be organised by faxing a request form to Access cardiology.

2.9 Simplified Cardiac Evaluation for Non-Cardiac Surgery



2.10 Respiratory Disease

Patient with severe asthma and COPD with limited exercise tolerance may require respiratory function tests. They should be referred to the technician at respiratory testing services (T: 0893155699 or F: 93372284) Respiratory function tests are performed every Tuesday and Thursday am at Amity Health

2.11 Obstructive Sleep Apnoea (OSA)

Obstructive sleep apnoea (OSA) is a common condition that remains undiagnosed in many subjects (60-92% with severe and moderate OSA) and is associated with increased perioperative airway, respiratory and cardiovascular complications.
The STOP-BANG questionnaire is a simple eight point patient-administered screening tool that is useful in detecting those at risk of OSA. A score of ≥5 indicates a high probability of moderate or severe OSA.
Day case surgery may be reasonable, depending upon severity, the presence of co-morbid conditions, and the nature of proposed procedure.
Consideration should be given to managing patients at risk with a local or regional technique.
Moderate and severe OSA patients with multiple co-morbid conditions undergoing high impact surgery will require HDU monitoring post-op.

Pre-anaesthesia evaluation of baseline risk:

Any combination of the following factors may warrant HDU admission post-op:

1. Severity of OSA
   - High probability of moderate-severe OSA if STOP-BANG score ≥ 5
   - Confirmed moderate-severe OSA by sleep study pre-op
2. Severity of comorbid disease
   - Morbid obesity
   - Respiratory failure
   - Heart failure
   - IHD
   - Significant dysrhythmia
   - Refractory systemic hypertension
   - Pulmonary hypertension
   - CVA or TIA
   - (Pregnancy)
3. Impact of surgery and anaesthesia
   - Surgery: airway or major (eg intracavity or spinal surgery) > peripheral or superficial surgery
   - Anaesthesia: GA> sedation> no sedation
4. Postoperative opioid requirement
   - High risk: more than low dose oral opioid, parenteral and neuraxial opioid
   - Lower risk: low dose PO opioid ≤ codeine 30-60mg PO 4 hourly, or equivalent

STOP-Bang Questionnaire

Snoring? Do you **Snore Loudly** (loud enough to be heard through closed doors or your partner elbows you for snoring at night)?	Yes/No
Tired? Do you often feel **tired, Fatigued, or Sleepy** during daytime (eg falling asleep when driving	Yes/No
Observed? Has anyone **observed** you **stop breathing** or **Choking/Gasping** during your sleep?	Yes/No
Pressure? Do you have, or are being treated for, **High Blood Pressure**?	Yes/No
Body Mass Index more than 35kg/m2?	Yes/No
Age: older than 50 year old?	Yes/No
Neck circumference greater than 40 cm (16 inches) measured around Adam's apple?	Yes/No
Gender = Male?	Yes/No

Scoring criteria for general population:

Low risk of OSA: yes to 0-2 questions

Intermediate risk of OSA: Yes to 3-4 questions

High risk of OSA: Yes to 5-8 questions

Or Yes to 2 or more of 4 STOP questions + male gender

Or Yes to 2 or more of 4 STOP questions + BMI > 35 kg/m2

Or Yes to 2 or more of 4 STOP questions + neck circumference > 40 cm

2.12 Perioperative Management Of Anaemia And Iron Deficiency

Pre-operative anaemia is an independent risk factor for increased morbidity, mortality, ICU admission and hospital length of stay. Identifying, evaluating and managing preoperative anaemia is required to optimise red blood cell mass, especially in surgery where major blood loss is anticipated.

The key steps in optimisation include:

1. **Identify**

   Early identification of patients undergoing procedure where moderate to high blood loss is anticipated (>500 mls)

2. **Screen**

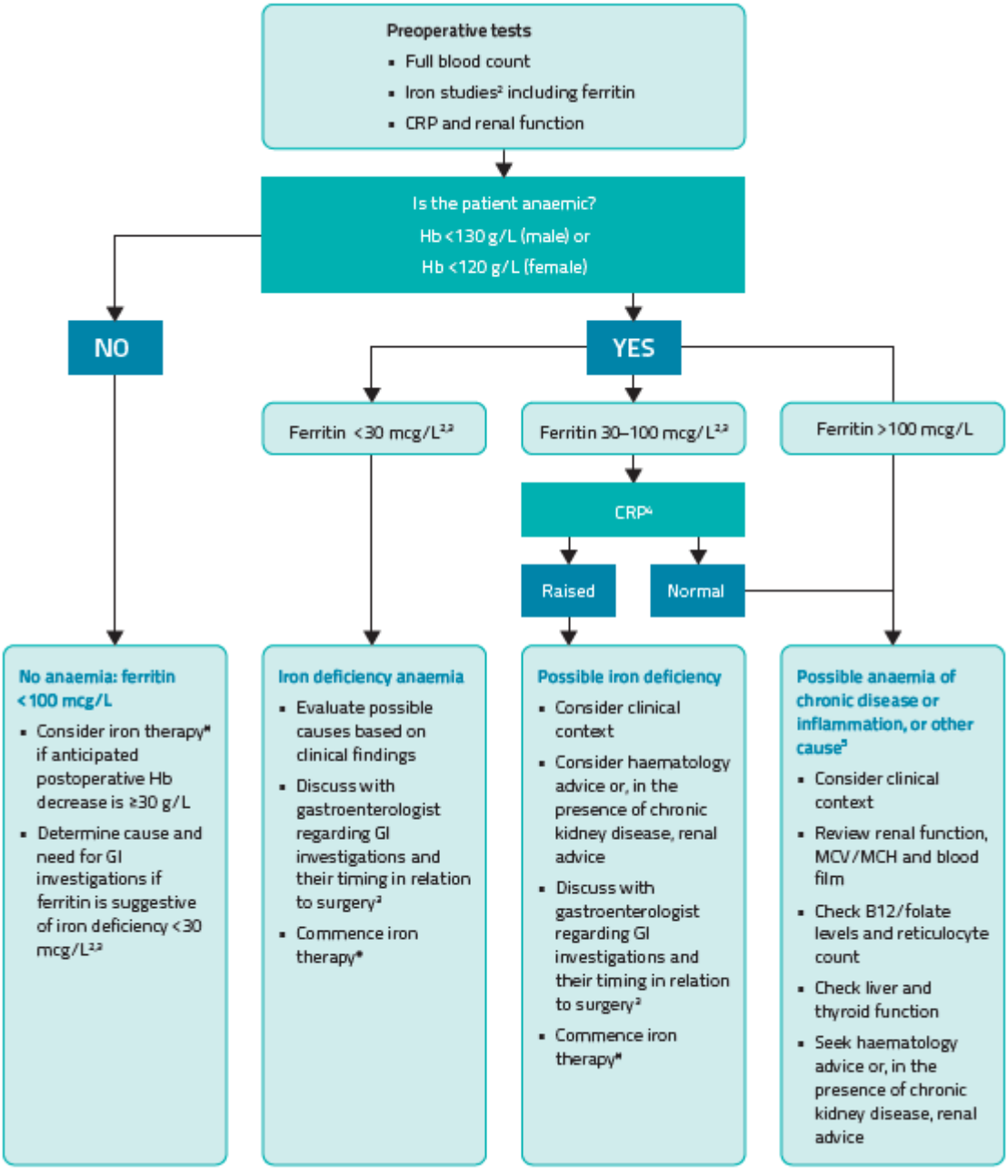
   Patients should be screened for anaemia (Hb<130g/l for males and <120g/l for females), iron deficiency (ferritin <15-30mcg/l) and suboptimal iron stores for those in whom substantial blood loss is anticipated (ferritin <100mcg/l). Investigations should include FBC, iron studies (including serum ferritin), CRP and renal function

3. **Manage**

   - Major, non-urgent surgery should be postponed to allow the treatment of anaemia and iron deficiency
   - Oral iron replacement should be targeted to patients with iron deficiency with or without anaemia whose surgery is scheduled 6-8 weeks after diagnosis, preferably by the general practitioner
   - Intravenous iron should be used in patients who do not respond to oral iron or are not able to tolerate it, or if surgery is planned for **< 6 weeks** after the diagnosis of iron deficiency
   - The diagnosis and treatment of anaemia and iron deficiency should commence as early as possible in the peri-operative period, and ideally as soon as the decision to undertake surgery is made, especially major surgery

   If iron infusion is required pre-op, the pre-assessment nurse and surgeons are to liaise with the patient's GP regarding iron infusion in the GP practice. If the GP practice does not offer such service, the SMP 1 team is to be contacted to arrange the infusion in DOSA.

   If peri-operative blood transfusion is required, consider a **single** unit transfusion first and re-check haemoglobin level after the transfusion. Recent international guidelines have reduced the transfusion thresholds for surgical patients to 70g/l (80 g/l for patients with a history of ischaemic heart disease) in the absence of active bleeding



2.13 Anaesthetic History

If there is a history of a severe reaction such as anaphylaxis, malignant hyperpyrexia or suxamethonium apnoea or previous difficult intubation, inform the anaesthetist responsible for the list. Make sure there is a medical alert in the notes.

2.14 Perioperative Management of Delirium

Delirium is a neuro-inflammatory condition that is characterised by inattention and fluctuating conscious level. Delirium is a major cause of preventable morbidity and mortality. It increases length of stay, reduces quality of life and increases dependency for basic activities of daily living.

Early screening and diagnosis has been demonstrated to reduce the severity and duration of delirium. For patients identified as at risk of post-operative delirium or cognitive dysfunction, alert stickers are placed on the perioperative nursing record by the pre-assessment nurse. The anaesthetists and nursing staff will avoid factors that may exacerbate the risk in the perioperative period.

Risk factors for delirium

Predisposing factors	Intra-op precipitating factors	Post-operative factors
Age	Cumulative time with low bispectral index value	Dehydration
Cognitive impairment	Variance in blood pressure	Sensory impairment
Complex comorbidities	Significant intraoperative blood loss	Sleep deprivation
Frailty, dementia, sensory impairment & previous episode of delirium	Hypothermia	Constipation & urinary retention Anaemia
Depression, alcoholism and cigarette smoking	Glucose and electrolyte disturbance- hypernatraemia, hypokalaemia/ hypomagnesaemia	Sepsis
Emergency surgery	Acid/base disturbance	Pain
Lab measures: dehydration, CRP, abnormal sodium and potassium, low albumin and haematocrit		Drugs (opioids, benzodiazepines, dihydropyridines)

Anaesthetic strategies for the prevention of delirium

- Avoiding and minimising the dose of high risk medications, including benzodiazepines and anticholinergics
- Avoid prolonged fasting and maintain hydration
- Use of depth of anaesthesia monitoring eg bispectral index (BIS) to guide titration of anaesthetic drugs to avoid excessively deep anaesthesia. A target value of between 40 and 60 for general anaesthesia is considered ideal.
- Multi-model analgesia to achieve adequate post-operative analgesia

It is unclear whether neuraxial anaesthesia compared with general anaesthesia reduces the development of delirium.

Behavioural and non-pharmacological strategies for the prevention of delirium

- Sensory enhancement (ensuring glasses, hearing aids or listening amplifiers)
- Mobility enhancement (ambulating at least twice a day)
- Cognitive orientation and therapeutic activities (tailored to the individual)
- Adequate pain control
- Cognitive stimulation tailored to the individual interests and mental status
- Simple communication standards and approaches to prevent the escalation of behaviours
- Nutrition and fluid repletion enhancement
- Sleep enhancement
- Medication review and appropriate medication management
- Multi-disciplinary ward round to reinforce interventions

2.15 Guidelines for Pre-Operative Investigations

The tests covered by this guideline are:

- Chest X-ray: do not routinely offer to patient before surgery
- Echocardiography (resting): do not routinely offer to patient before surgery.
  Consider resting echocardiography in patient who has:
    - A heart murmur and any cardiac symptom (including dyspnoea, pre-syncope, syncope or chest pain) or
    - Signs and symptoms of heart failure
- Electrocardiography (ECG; resting)
- Full blood count (haemoglobin, white blood cell count and platelet count)
- Glycated haemoglobin (HbA1c) testing: offer this test to diabetic having surgery if they have not been tested for the last 3 months before surgery

- Haemostasis tests: only order if indicated eg liver disease, high alcohol consumption and on warfarin
- Kidney function (estimated glomerular filtration rate, electrolytes, urea and creatinine)
- Lung function tests (spirometry, including peak expiratory flow rate, forced vital capacity and forced expiratory volume) +/- arterial blood gas analysis
  To be performed if unable to walk up two flights of stairs in conjunction with any one of the following:
  - Current smokers
  - Cigarettes/day for 20 years
  - Asthmatics or COPD
- Polysomnography: should be considered in patient with suspected sleep apnoea
- Pregnancy testing

  This should be performed, with informed consent, on any woman who says that it is possible that she may be pregnant
- Sickle cell disease/ trait tests:

  Do not routinely offer these tests
  Ask the person having surgery if they or any member of their family have sickle cell disease
  If the person is known to have sickle cell disease and has their disease managed by a specialist sickle cell service, liaise with the team before surgery
- Urine tests:

  Consider microscopy and culture of midstream urine sample before surgery if the presence of a urinary tract infection would influence the decision to operate

The recommendations are relevant for all type of surgery, taking into consideration of the following comorbidities:

- Cardiovascular
- Diabetes
- Obesity
- Renal
- Respiratory

The following recommendations for investigations are specific to surgery grade and ASA grade

Surgery grades

Surgery grades	Examples
Minor	• Excision of skin lesion • Drainage of breast abscess
Intermediate	• Primary repair of inguinal hernia • Excision of varicose veins in the leg • Tonsillectomy or adenotonsillectomy • Knee arthroscopy
Major or complex	• Total abdominal hysterectomy • Endoscopic resection of prostate • Lumbar discectomy • Thyroidectomy • Total joint replacement • Lung operations • Colonic resection • Radical neck dissection

ASA grades

The ASA (American Society of Anaesthesiologists) **Physical Status Classification System** is a simple scale describing fitness to undergo an anaesthetic.

ASA1	A normal healthy patient
ASA2	A patient with mild systemic disease
ASA3	A patient with severe systemic disease
ASA4	A patient with severe systemic disease that is a constant threat to life

Key to recommendations in tables

Yes: offer the test **Not routinely**: do not routinely offer the test **Consider**: consider the test (the value of carrying out the test may depend on specific patient characteristics)

Minor surgery

	ASA grade		
Test	**ASA1**	**ASA2**	**ASA 3 or ASA4**
Full blood count	Not routinely	Not routinely	Not routinely
Haemostasis	Not routinely	Not routinely	Not routinely
Kidney function	Not routinely	Not routinely	Consider in people at risk of AKI
ECG	Not routinely	Not routinely	Consider if no ECG results available from past 12 months
Lung function/ arterial blood gases	Not routinely	Not routinely	Not routinely
AKI, acute kidney injury			

Intermediate surgery

	ASA grade		
Test	**ASA1**	**ASA2**	**ASA 3 or ASA 4**
Full blood count	Not routinely	Not routinely	Consider for people with cardiovascular or renal disease if any symptoms not recently investigated
Haemostasis	Not routinely	Not routinely	Consider in people with chronic liver disease • If people taking anticoagulants need modification of their treatment regime, make an individual plan in line with AHC guideline • If clotting status needs to be tested before surgery, use point-of-care testing
Kidney function	Not routinely	Consider in people at risk of AKI	Yes
ECG	Not routinely	Consider for people with cardiovascular renal or diabetes comorbidities	Yes

Lung function/ arterial blood gases	Not routinely	Not routinely	Consider seeking advice from the respiratory physician as soon as possible after assessment for people who are ASA 3 or 4 due to known or suspected respiratory disease

Major or complex surgery

	ASA grade		
Test	**ASA 1**	**ASA 2**	**ASA 3 or ASA 4**
Full blood count	Yes	Yes	Yes
Haemostasis	Not routinely	Not routinely	Consider in people with chronic liver disease • If people taking anticoagulants need modification of their treatment regime, make an individual plan in line with AHC guideline • If clotting status needs to be tested before surgery, use point- of- care testing
Kidney function	Consider in people with AKI	Yes	Yes
ECG	Consider for people >65 if no ECG results available from past 12 months	Yes	Yes
Lung function/ arterial blood gas	Not routinely	Not routinely	Consider seeking advice from the respiratory physician as soon as possible after assessment for people who are ASA 3 or 4 due to known or suspected respiratory disease

Referral for an echocardiogram

Echo would be recommended if the answer is yes to any combination of 2 or more categories

Guideline criteria

1. Are there any *intermediate* clinical cardiac risk predictors present? Yes/No

2. Is the functional capacity poor? Yes/No

3. Is the surgery high risk (grade 4)? Yes/No

4. Is a murmur present? Yes/No

(If murmur associated with LVH on ECG/ cardiomegaly on CXR no further criteria need to be present to request an echo)

Note: if there are no intermediate cardiac risk predictors but minor ones exist then at least 2 other categories should be present to request an echocardiogram.

1. Intermediate clinical cardiac risk predictors are (any of the following):

- Mild angina (on strenuous activity or on climbing more than 1 flight of stairs)
- Previous MI (on history or pathologic Q waves on ECG)
- History of heart failure
- Diabetes
- Renal impairment

Minor clinical predictors: ***(Requires the presence of 2 other categories)***

- Advanced age (>60 yrs)
- Abnormal ECG (LVH, LBBB, ST-T abnormalities)
- Rhythm other than sinus (e.g. AF)
- History of stroke
- Hypertension

2. Poor functional capacity is any of the following:

- Unable to climb a flight of stairs
- Unable to walk more than 200 yards on the flat
- Unable to walk indoors
- Unable to perform activities of daily living

3. Grade 4 surgery:

- Aortic and other major vascular surgery (eg. AAA repairs)
- Colonic resection
- Major upper GI surgery (e.g. Oesophagectomies, Whipple's procedure)

It is not necessary to request an echocardiogram if one has been performed in the last 12 months, unless there is a significant deterioration in functional capacity or cardiac clinical risk

There is no acute pain service at AHC. This service may be developed in the future. The following is a simple guide on the prescription of analgesia in the post-operative period. Contact the on call anaesthetist for advice if necessary

Principles

- **ASSESS PAIN**- consider pain score, disease process, co-morbidities, previous analgesic requirements and age
- Use **ORAL ANALGESIA** where possible
- **BEGIN ANALGESIA** at an appropriate level, reassess regularly and titrate as required
- **DO NOT MIX OPIOIDS**. Replace a weak opioid with a strong one
- **ANTICIPATE AND TREAT** opioid related side effects
- **ROTATE** opioids if side effects persist

Analgesic ladder for acute pain management

	Pain score	Treatment
Mild Pain	1-3, no pain at rest and slight pain on movement	Non-opioid eg paracetamol+/- NSAID
Moderate Pain	4-7, intermittent pain at rest or moderate pain on movement	Add mild opioid eg tramadol
Severe Pain	>8, continuous pain at rest or severe pain on movement	Add strong opioid eg morphine, fentanyl or oxycodone

NSAIDs:

The main concern, in particular in the perioperative period, is renal toxicity. Therefore check creatinine before you prescribe. Consider parallel use of other nephrotoxic agents (eg ACE inhibitors, diuretics, aminoglycoside antibiotics) and watch for hypovolaemia, hypotension and decreased urine output.

Oral Opioids:

1. Tramadol or oxycodone immediate release (IR) tablets are the first choice opioids for oral titration of pain relief.

   Oxycodone IR can be prescribed as a PRN dose eg 5-10mg or up to 20mg

   1 hourly.

   In drug –seeking patients it may be useful for some patients to limit a certain amount per day eg 80mg

   NB Oxycodone is a drug that is abused and diversified in the community. It is not desirable to have patients being discharged with large quantities of oxycodone.

2. These immediate release preparations can be supplemented by tramadol or oxycodone slow- release tablets in those with ongoing opioid requirements or high opioid usage.

Suggested Standard Pain Therapies

Regular Oral Analgesia

1. Paracetamol

1g QID PO for 48 hours, then PRN

Reduce doses in elderly, liver dysfunction, heavy alcohol use, low body mass (<50kg)

2. NSAIDs and COX-2 inhibitors

Prescribe one only (with food) for 3-5 days, then PRN.

Use as part of multimodal analgesia after excluding contraindications (renal, cardiovascular, peptic ulcer disease, bleeding risk).

Always check renal function and fluid balance before prescribing.

Celecoxib	100-200mg	BD	Oral
OR			
Naproxen	250-500mg	BD	Oral
OR			
Ibuprofen	400mg	TDS	Oral
OR if nil by mouth			
Parecoxib	40mg	BD	IV

Opioid Analgesia for moderate or severe pain

- Prescribe only **ONE** opioid by **ONE** route
- Prescribe **EITHER** oxycodone IR**, OR** buprenorphine
- Tramadol **MAY** be co-prescribed with oxycodone or buprenorphine

Opioid analgesia remains the main stay of acute pain management

Tramadol	50-100mg	4 hourly	oral/ IV PRN	Max 400mg/24 hours
AND/OR				
Oxycodone IR	10-20mg	hourly	oral PRN	**Young age <40**
Oxycodone IR	5-10mg	2 hourly	oral PRN	**Older age 40-70**
Oxycodone IR	2.5-5mg	2 hourly	oral PRN	**Elderly age >70**
OR If nil by mouth, respiratory or renal impairment				
Buprenorphine (preferable if at risk group for addiction)	200-400mcg	2 hourly	S/L PRN	Young age to 65
	200-400mcg (start with 200mcg)	3 hourly	S/L PRN	Elderly 65-74
	Avoid using S/L Buprenorphine			Very elderly >75 or frail

Controlled (Slow) release Opioids

Controlled release (CR, SR) opioids **should not be prescribed *routinely*** in acute pain because of the risk of opioid overdose. However in some cases, SR opioids are required to reduce the amount of PRN opioid used ('step down'), or for chronic pain management.

Tramadol SR	50-150mg	BD	Oral
OR			
Targin (Oxycodone/ naloxone) CR		BD	Oral

Opioid safety tips

- **Sedation** (not respiratory rate) is the first sign of impending opioid overdose (also pin-point pupils)
- Write **"withhold if sedated"** on the medication chart if concerned about opioid sedation/ respiratory depression.

Opioid Tolerant Patients

Some useful strategies:

- Consider seeking advice from acute pain service consultant
- Continue usual opioid (**write give with PCA/ epidural**) next to order as the default action by nurses is to withhold longer acting opioids
- Epidurals/ regionals are useful but may not prevent opioid withdrawal and may not cover the site of "usual" pain, so give usual opioid as well
- Ketamine infusion (intra & post-operatively) 0.05-0.1mg/kg/hour
- Other intra-operative adjuvants eg lignocaine infusion
- Consider other non-opioids eg premedication with a gabanoid

3. Definitions

SMP	Senior Medical Practitioner
GPO	GP Obstetrician
DOSA	Day Of Surgery Admission
DOH	Department Of Health
#	Fracture
LUSCS	Lower Uterine Segment Caesarean Section
GA	General Anaesthetic
LA	Local Anaesthetic
LAWS	Local Anaesthetic With Sedation
AAA	Abdominal Aortic Aneurysm
DM	Diabetes Mellitus
BGL	Blood Glucose Level
IVC	Inferior Vena Cava
CVA	Cerebrovascular Accident
TIA	Transient Ischaemic Attack

AF	Atrial Fibrillation
LV	Left Ventricle
CHF	Congestive Heart Failure
VTE	Venous Thromboembolism
ACS	Acute Coronary Syndrome
MI	Myocardial Infarction
CrCl	Creatinine Clearance
DOAC	Direct Oral Anticoagulant
LMWH	Low Molecular Weight Heparin
HF	Heart Failure
VT	Ventricular Tachycardia
COPD	Chronic Obstructive Pulmonary Disease
APTT	Activated Partial Thromboplastin Time
TT	Thrombin Time
PT	Prothrombin Time

4. Roles and Responsibilities

The executive Director Medical Services is to endorse the guideline and authorise publication on the WACHS-GS network. All staff can use this document for guidance for booking emergency surgical cases for theatre, pre-operative assessment and investigations in surgical patients at Albany Health Campus

5. Compliance

Failure to comply with this policy document may constitute a breach of the WA Health system MP0031/16 Code of Conduct (Code). The Code is part of the Employment Policy Framework issued pursuant to section 26 of the *Health Services Act 2016* (WA) and is binding on all WACHS staff which for this purpose includes trainees, students, volunteers, researchers, contractors for service (including all visiting health professionals and agency staff) and persons delivering training or education within WACHS.
WACHS staff are reminded that compliance with all policies is mandatory. .

6. Records Management

All WACHS corporate records must be stored in the approved Electronic Documents and Records Management System.

Records Management Policy
Health Record Management Policy

7. Evaluation

This document will be reviewed by the HOD or a delegated specialist anaesthetist at Albany Health Campus every three (3) years to ensure that the content of the guideline is up to date according to latest evidence.

8. Standards

List the relevant National Safety and Quality Health Care Standards

- 1.14d, 2.7, 4.5, 4.6, 4.7, 4.8, 4.9, 6.8

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10. Related Forms

MR157A WACHS Insulin Infusion Order Chart

11. Policy Framework

Clinical Governance, Safety and Quality

This document can be made available in alternative formats on request for a person with a disability

Contact:	Director of Anaesthetics Albany (A. Poon)		
Directorate:	Medical Services	**TRIM Record #**	ED-CO-17-8840
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