Preoperative Evaluation

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Preoperative Evaluation: Overview

- How to assess risk
- To test or not to test…
- High yield medication reconciliation
- **No conflicts of interests or financial disclosures to add**

Preoperative Evaluation: patient population

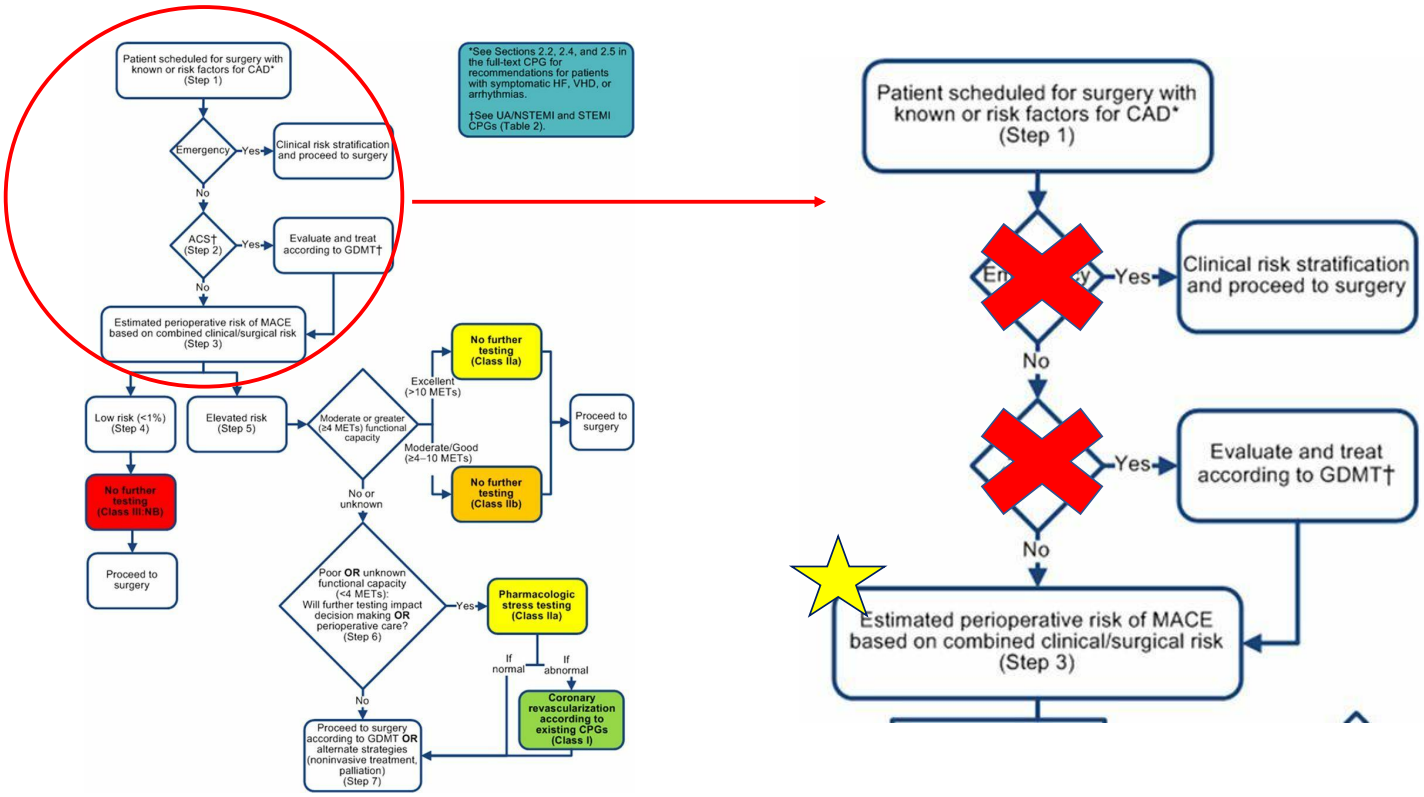
In scope:

Preoperative Evaluation: Overview

How to assess risk

To test or not to test…

High yield medication reconciliation



Fleisher et al. 2014 ACC/AHA Perioperative Guideline

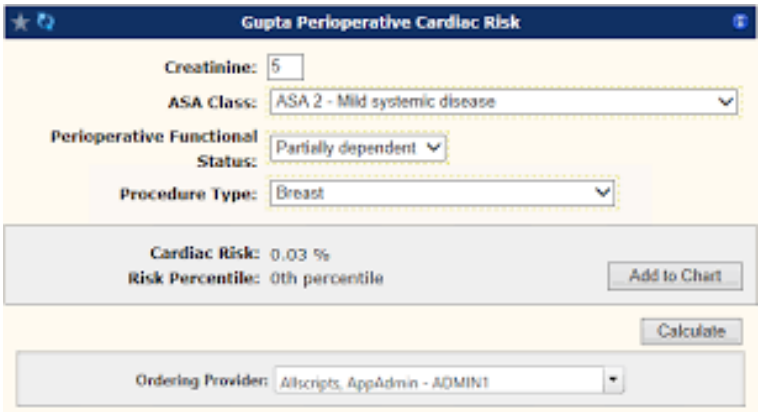
Revised cardiac risk index

- Estimates risk of major adverse cardiac event: MACE
- Simplest/fewest risk factors

Risk factors	RCRI class	Risk level	MACE risk
0	1	low	~0.5%
1	2	low	~1%
2	3	elevated	~5%
3+	4	elevated	~10%

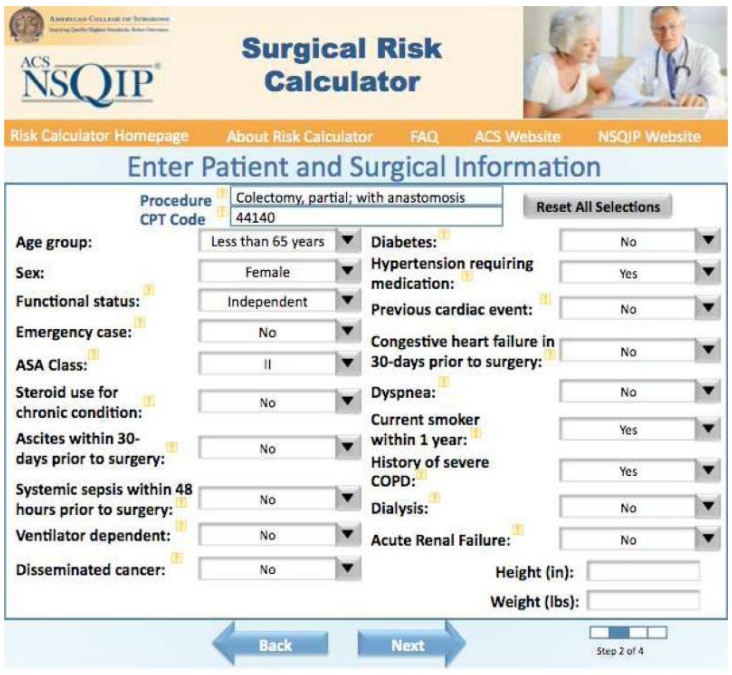
MICA (Gupta) Index

- Draws from National Surgery Quality Improvement Program (NSQIP) database on >400,000 patient outcomes
- 5 categories
- Predicts MI and cardiac arrest, but not all MACE (ie, excludes pulmonary edema and complete heart block)
- Subjectivity in ASA class and functional status



ACS NSQIP surgical risk calculator

- ~1.4 million patient database
- 20+ patient characteristics
  - Need CPT code for surgery



(A)

ACS NSQIP surgical risk calculator

- ~1.4 million patient database
- 20+ patient characteristics
  - Need CPT code for surgery
- Predicts 10+ different outcomes + 4 geriatric-specific outcomes
- Compares individual patient to average risk across each domain and overall

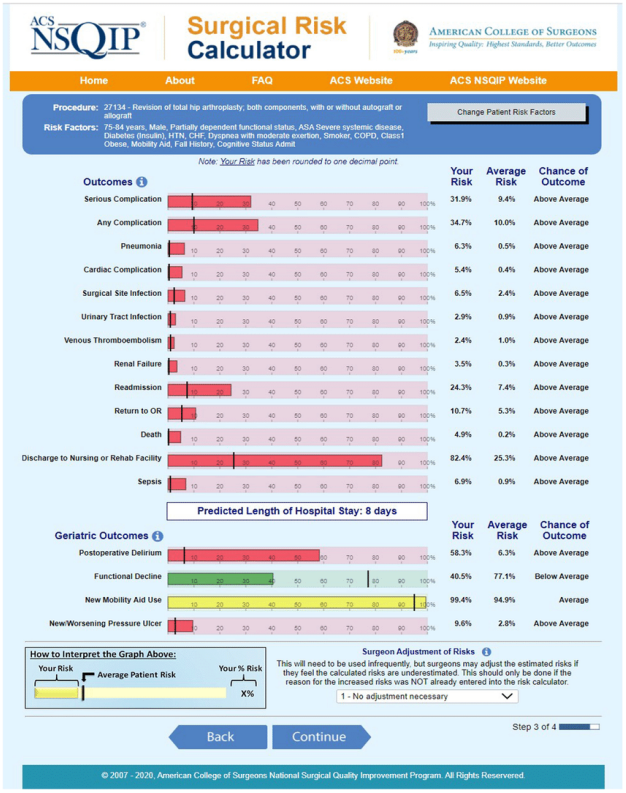


Table 3. Comparison of the RCRI, the American College of Surgeons NSQIP MICA, and the American College of Surgeons NSQIP Surgical Risk Calculator

	RCRI[131]	American College of Surgeons NSQIP MICA[115]	American College of Surgeons NSQIP Surgical Risk Calculator[114]
Criteria	…	Increasing age	Age
	Creatinine ≥2 mg/dL	Creatinine >1.5 mg/dL	Acute renal failure
	HF	…	HF
	…	Partially or completely dependent functional status	Functional status
	Insulin-dependent diabetes mellitus	…	Diabetes mellitus
	Intrathoracic, intra-abdominal, or suprainguinal vascular surgery	Surgery type:• Anorectal• Aortic• Bariatric• Brain• Breast• Cardiac• ENT• Foregut/hepatopancreatobiliary• Gallbladder/adrenal/appendix/spleen• Intestinal• Neck• Obstetric/gynecological• Orthopedic• Other abdomen• Peripheral vascular• Skin• Spine• Thoracic• Vein• Urologic	Procedure (CPT Code)
	History of cerebrovascular accident or TIA	…	…
	…	…	American Society of Anesthesiologists Physical Status Class
	…	…	Wound class
	…	…	Ascites
	…	…	Systemic sepsis
	…	…	Ventilator dependent
	…	…	Disseminated cancer
	…	…	Steroid use
	…	…	Hypertension
	Ischemic heart disease	…	Previous cardiac event

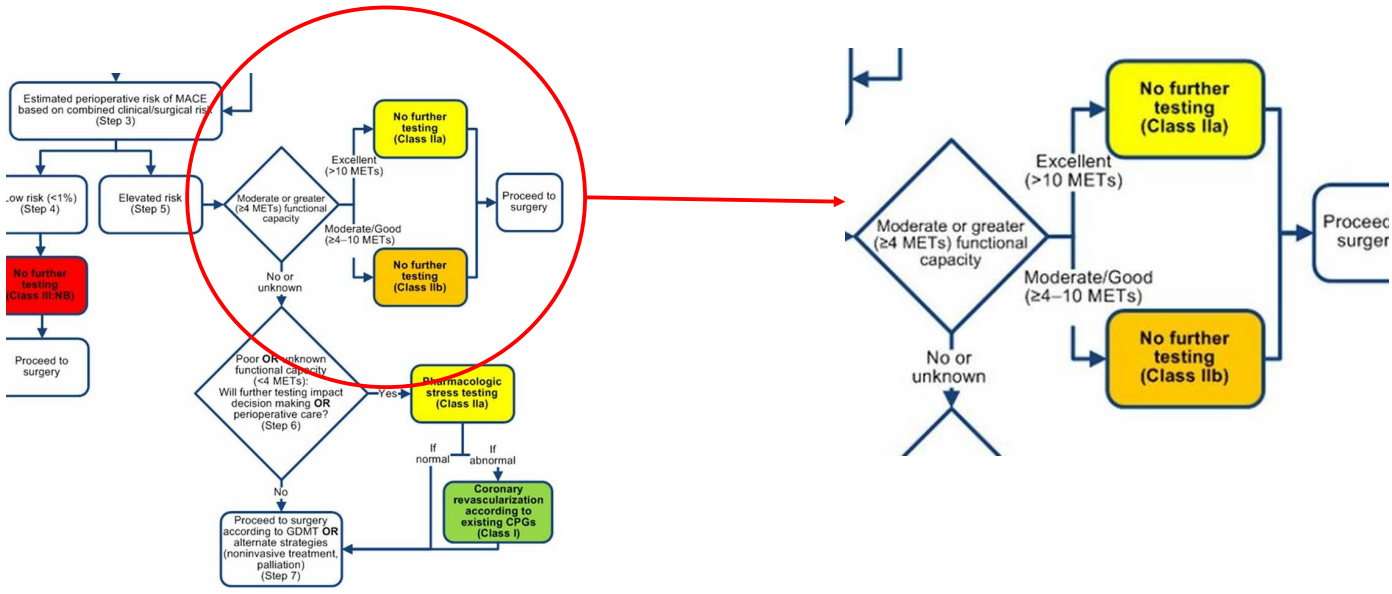
Fleisher et al. 2014 ACC/AHA Perioperative Guideline

Use outside original cohort	Yes	No	No
Sites	Most often single-site studies, but findings con sistent in multicenter studies	Multicenter	Multicenter
	RCRI[131]	American College of Surgeons NSQIP MICA[115]	American College of Surgeons NSQIP Surgical Risk Calculator[114]
Outcome and risk factor ascertainment	Original: research staff, multiple subsequent studies using variety of data collection strategies	Trained nurses, no prospective cardiac outcome ascertainment	Trained nurses, no prospective cardiac outcome ascertainment
Calculation method	Single point per risk factor	Web-based or open-source spreadsheet for calculation (http://www.surgicalriskcalculator.com/miorcardiacarrest)	Web-based calculator (www.riskcalculator.facs.org)

BMI indicates body mass index; COPD, chronic obstructive pulmonary disease; CPT, current procedural terminology; ENT, ear, nose, and throat; HF, heart failure; NSQIP MICA, National Surgical Quality Improvement Program Myocardial Infarction Cardiac Arrest; NSQIP, National Surgical Quality Improvement Program; RCRI, Revised Cardiac Risk Index; TIA, transient ischemic attack; and …, not applicable.

Fleisher et al. 2014 ACC/AHA Perioperative Guideline

Functional Status



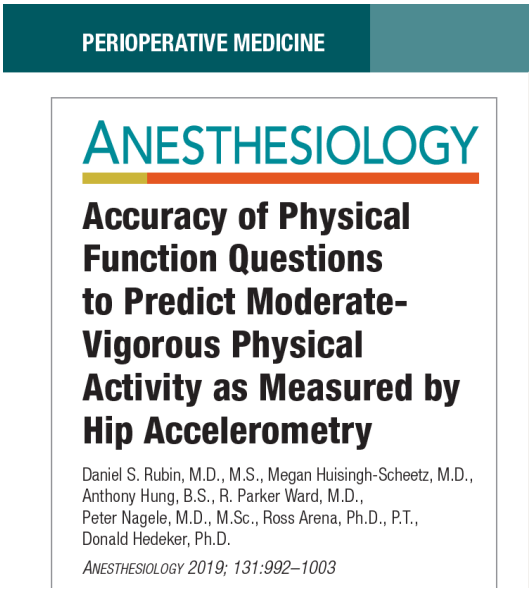
Fleisher et al. 2014 ACC/AHA Perioperative Guideline

Functional status

- Avoid “How active are you?” and other open-ended questions
- Practically helpful to divide into <4 METS and >4 METS → this is branch point in testing algorithm
- Many patients will have “unknown” status related to reason they’re having surgery

Physical activity	MET
Light intensity activities	**< 3**
sleeping	0.9
watching television	1.0
writing, desk work, typing	1.5
walking, 1.7 mph (2.7 km/h), level ground, strolling, very slow	2.3
walking, 2.5 mph (4 km/h)	2.9
Moderate intensity activities	**3 to 6**
bicycling, stationary, 50 watts, very light effort	3.0
walking 3.0 mph (4.8 km/h)	3.3
calisthenics, home exercise, light or moderate effort, general	3.5
walking 3.4 mph (5.5 km/h)	3.6
bicycling, <10 mph (16 km/h), leisure, to work or for pleasure	4.0
bicycling, stationary, 100 watts, light effort	5.5
sexual activity	5.8[10]
Vigorous intensity activities	**> 6**
jogging, general	7.0
calisthenics (e.g. pushups, situps, pullups, jumping jacks), heavy, vigorous effort	8.0
running jogging, in place	8.0
rope jumping	10.0

Functional status



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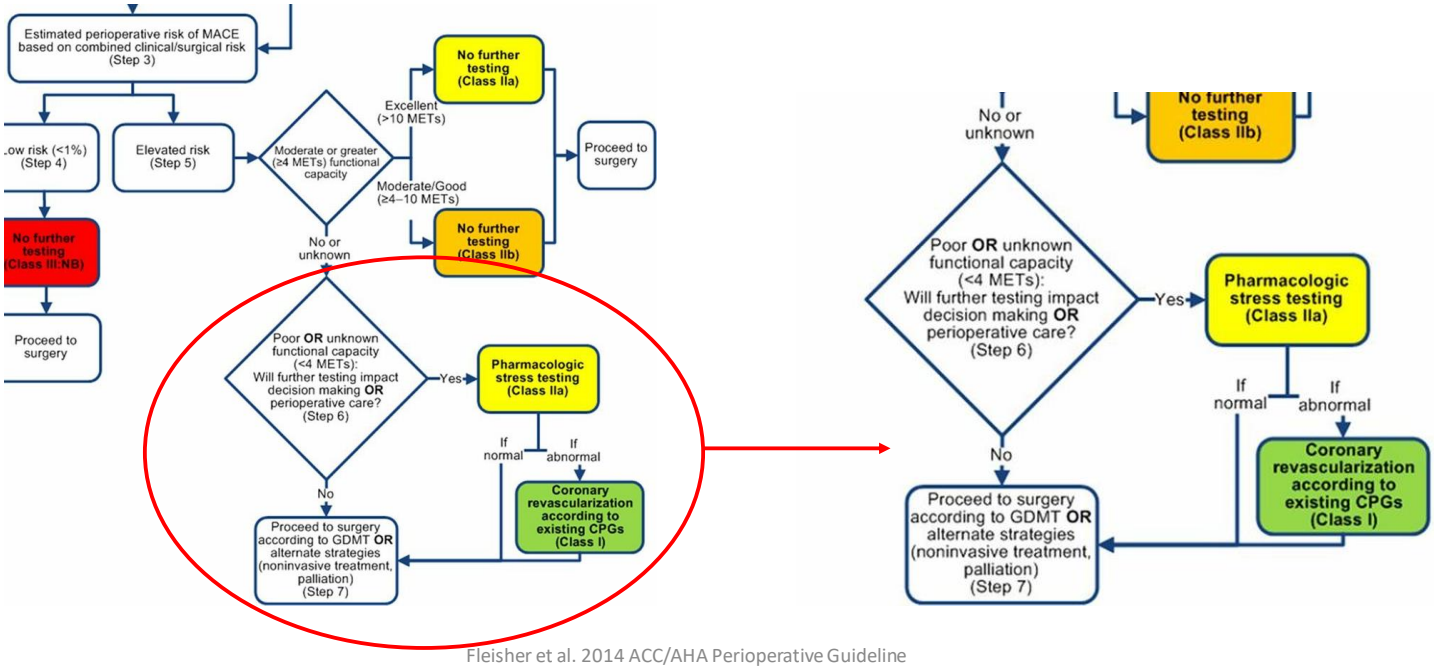
How to assess risk

To test or not to test…

High yield medication reconciliation



Fleisher et al. 2014 ACC/AHA Perioperative Guideline

Preoperative Testing

Sample Pre-Operative Testing Grid

	CBC	G&S	Creat	Lytes	Gluc	LFTs	INR & PTT	EKG	CXR
Surgical procedure on Group and Screen List (refer to **MSBOS).	■	■							
History of anemia, bleeding disorder and/or active bleeding. Major cardiovascular disease (i.e. exercise tolerance of METS <4 see table below). Cancer diagnosis. Age >70 or < 1 year old.	■								
History of renal, adrenal, pituitary or major systemic endocrine disease.			■	■					
Use of digoxin, lithium, diuretics, ACE-I or ARB. History of electrolyte abnormality.			■	■					
History of diabetes.			■	■	■				
History of systemic steroid use within 6 months.				■	■				
History of bleeding disorder, liver disease or malnutrition. Alcohol use >2 drinks/d for women and >3/d for men.						■	■		
Use of anticoagulant drugs (except ASA).							■		
Age >69. History of cardiac disease, peripheral, cerebral or pulmonary vascular disease. ≥ 2 risk factors (HTN, CKD, DM, OSA, BMI>35)								■	
Symptomatic respiratory or cardiac disease (METS <4 – see table below). History of lung cancer or mass.									■

If there is any doubt regarding appropriate preoperative testing please notify the Pre-Operative Clinic Anesthesiologist for guidance. Please avoid ordering repeat testing (and include current test results) if a patient has had recent similar testing and there are no new changes to the patient's health or therapies:
βhCG can be ordered, if result would change management, on the Preop Order Sheet.
Sickle cell screen can be ordered for high risk populations (West Central Africa, Saudi Arabia, East Central India, Southern Italy, Northern Greece, Southern Turkey, African American, Caribbean), if result would change management, on the Pre-op Order Sheet.
****MSBOS** = Maximum Surgical Blood Order Schedule

Choosing Wisely Canada: Drop the Preop. 2017

Preoperative testing: stress testing

- Stress testing overuse:
  - Large patient impact: 82,000–191,000
  - Excess Cost of Practice: $81 million – $180 million
  - Unnecessary delays in surgery
- Stress testing may be indicated IF:
  - Elevated/high risk surgery AND
  - High cardiac risk AND
  - Patient would be a revascularization candidate AND
  - Benefit >> risk of surgical delay

"That's right! No huffing and puffing for 30 minutes on a treadmill. We've developed a new stress test that is faster and more accurate."

Schwartz AL et al. JAMA Intern Med. 2014

Preoperative testing: stress testing

- Order testing as you would if patient were otherwise not having surgery (ie, symptom driven)
- Stress testing → cardiac revascularization should never be used to "get a patient through" surgery
- ACC/AHA
  - Class III: No Benefit

    "It is not recommended that routine coronary revascularization be performed before noncardiac surgery exclusively to reduce perioperative cardiac events ***(Level of Evidence: B)"***

Fleisher et al. 2014 ACC/AHA Perioperative Guideline

Preoperative Evaluation: Overview

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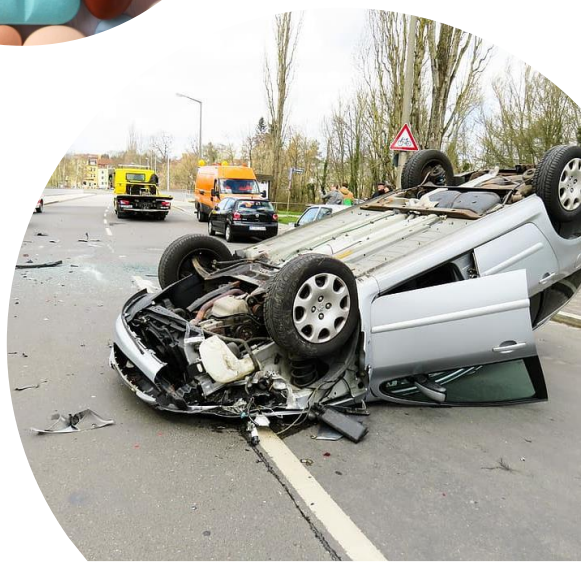
High yield medication reconciliation

High yield med rec

- Need a COMPLETE list of meds!
- Supplements/vitamins count…
- Scheduled and PRN
- We love clinical pharmacists!



High yield med rec

- Majority of meds can be either continued through surgery or held night before or day of
- Some exceptions:
  - Anticoagulants
  - Anti-platelets
  - Diabetic meds
  - **more complex meds (ie, biologics/IS) benefit from subspecialist input**

Anticoagulants

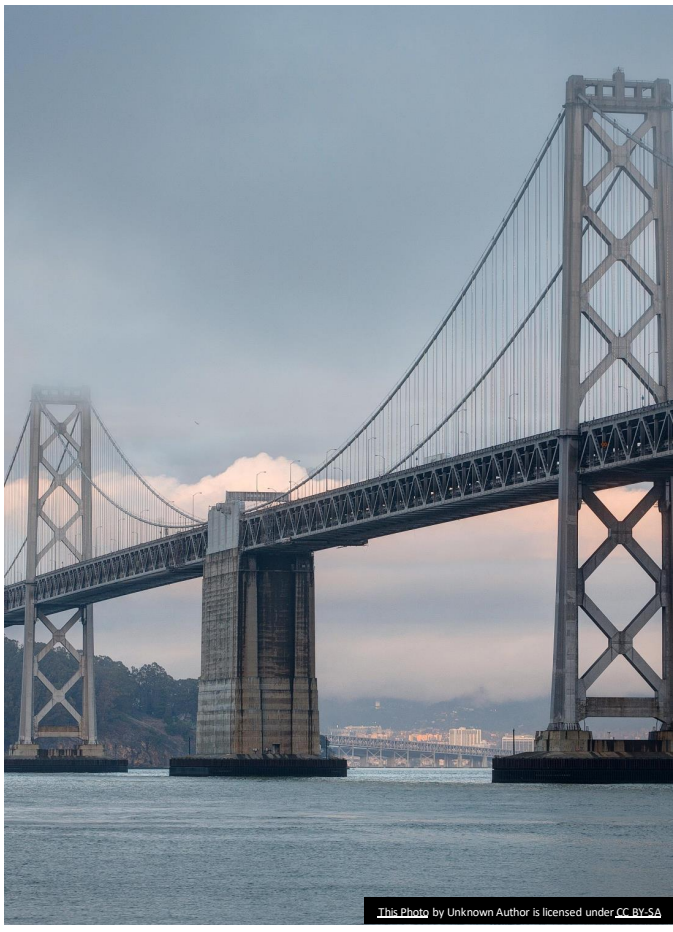
- Most procedures you will have input on will require interruption in full anticoagulation; exceptions are:
  - Endoscopy without biopsies
  - Dental
  - Superficial dermatology
  - Ophthalmology (ie, cataracts)

- What requires bridging, what does not?

Anticoagulants: bridging vs. not

- What requires bridging anticoagulation?
  - A-Fib with very high stroke risk (i.e. CHA2DS2-VASc = ≥7)
  - **A-Fib with recent stroke (<3 months)**
  - Mechanical valves (only exception: a newer model aortic valve and no other risk factors)
  - **Recent VTE (<3 months)**
  - VTE and a properly diagnosed severe thrombophilia (i.e. antiphospholipid antibody syndrome, Protein C or S deficiency, antithrombin 3 deficiency)

- **Bolded** above may be reasonably delayed >3 months to avoid bridging



Anticoagulants: bridging approach

Medication	When to stop prior to surgery	What to bridge with	When to start bridging
Warfarin	**5 days (goal INR <1.4)**	**LMWH or UFH**	**3 days prior**
DOACs	2 days (3 days if neuraxial anes or crcl <15 ml/min)	n/a	n/a
Lovenox	24 hours	n/a	n/a
Dabigatran	2-5 days, depending on crcl	n/a	n/a

- Resumption of anticoagulation after surgery at the discretion of surgeon and input from a general medicine consultant, if needed

https://michmed-clinical.policystat.com/policy/12036143/latest/#autoid-6jp3n

Antiplatelets

Medication	Conditions to consider	When to stop
Aspirin	h/o cardiac stents	7 days w/o stents; do not stop if stents present
clopidogrel, prasugrel, ticegralor	-PAD revascularization within prior 3 months -Acute coronary syndrome (ACS) within prior 6 months -Non-ACS coronary stent placement within prior 3 months -Stroke/TIA within 6 months	Procedure should be delayed; speak to cardiologist/vascular surgeon/neurologist
clopidogrel, prasugrel, ticegralor	-ACS within prior 6-12 months -Non-ACS coronary stent placed within prior 3-6 months	Guidelines link below vs. speak to cardiologist

- Typical duration of $P2Y_{12}$ inhibitor with cardiac stents
  - Bare metal stents: 30 days
  - Drug eluting stents: 3-6 months

https://michmed-clinical.policystat.com/policy/12036143/latest/#autoid-g2v4g

Pharmacy Services Perioperative and Periprocedure Diabetes Management for Adult Inpatients and Outpatients Not on Insulin Pump Guideline

PERIOPERATIVE and PERIPROCEDURE DIABETES MANAGEMENT For Adult Inpatients and Outpatients NOT ON INSULIN PUMP PROVIDER DOCUMENT	
DAY(s) BEFORE PROCEDURE	
1. Patient takes oral diabetes medications EXCEPT	Take usual dose
SGLT-2 inhibitors (listed below)	Hold for 3 days before procedure except ertugliflozin (4 days)
1. Patient takes evening or bedtime insulin	
• NPH	Take usual dose
• Mixed insulins	Take usual dose
• Glargine/GlargineU-300/Detemir /Reg U-500 (with no other insulin)	Take 50% of usual dose
• Degludec (with no scheduled meal insulin)	Take 50% of usual dose for 2 day before procedure
• Glargine /Glargine U-300/Detemir (as part of a regimen which includes scheduled meal insulin)	Take 70% of usual dose
• Degludec (as part of a regimen which includes scheduled meal insulin)	Take 70% of usual dose for 2 days before procedure
• Regular or aspart or lispro or glulisine or fiasp	Take usual dinner dose for regular meal Take 50% of usual dose for sugary beverage diet for bowel prep
1. Patient takes non-insulin injectables	Take usual dose
1. Patient uses insulin pump*	- See Periprocedure and Perioperative Insulin Pump Guidelines.
MORNING OF PROCEDURE	
1. Patient takes oral diabetes medications	HOLD dose
1. Patient takes am insulin	
• NPH	Take 50% of usual dose
• Mixed insulins	Take 50% of usual dose
• Glargine/Glargine U-300/ Detemir /Reg U-500/ Degludec (with no scheduled meal insulin)	Take 50% of usual dose
• Glargine/Glargine U-300/Detemir/Degludec (as part of a regimen which includes scheduled meal insulin)	Take 70% of usual dose
• Regular or aspart or lispro or glulisine or fiasp	HOLD doses
1. Patient takes non-insulin injectables	HOLD dose
1. Patient uses insulin pump*	See Periprocedure and Perioperative Insulin Pump Guidelines.
**Intraoperative and postoperative use of pump should be addressed on an individual basis in consultation with patient's endocrinologist*	

Preoperative Consultation: Take home points

- Use a structured risk assessment tool
  - best to prepare as much before clinic
  - Epic care everywhere is our friend
- Use a structured approach to activity
  - Future state: phones/watches take over…
- Use surgery and patient risk factor-specific approach to testing; stress testing in select cases
- Perform a detailed med rec with concrete patient instructions
  - Rely on clinical pharmacists, nursing, and sub-specialists for help

Questions?