Canadian Society of Internal Medicine
Annual Meeting 2016
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DO's and DON'Ts: Reducing unnecessary perioperative investigations

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The following presentation represents the views of the speaker at the time of the presentation. This information is meant for educational purposes, and should not replace other sources of information or your medical judgment.
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Conflict Disclosures

The speaker did not received fees/honoraria from any sources.

The speaker was involved in investigator-initiated studies within the past 2 years involving the following organizations:

Roche Diagnostics
Abbott Diagnostics
Objectives

• Identify the evidence for routine testing before elective non-cardiac surgery

• Describe indications for preoperative testing in various specific conditions

• Understand the impact of reducing preoperative testing on costs and patient outcomes
What would be the routine order for a typical 65 yo men undergoing hip replacement at your center?

1. CBC, creatinine, urea, Na+, K+, INR, PTT, ECG, chest X-ray, urine analysis
2. CBC, creatinine, urea, Na+, K+, INR, PTT, ECG, chest X-ray
3. CBC, creatinine, urea, Na+, K+, INR, PTT, ECG
4. CBC, creatinine, Na+, K+, INR, PTT
5. CBC, creatinine, Na+, K+
6. No routine testing done at my hospital
How much does this panel of tests cost?

3. CBC, creatinine, urea, Na+, K+, INR, PTT, ECG

1. $1 - $19
2. $20 - $49
3. $50 - $69
4. $70 - $89
5. $90 - $109
6. ≥ $110
How much do these tests cost?

1. CBC, creatinine, urea, Na+, K+, INR, PTT, ECG, chest Xray, urine analysis

$121.67
$108.70
$63.48

http://www2.gov.bc.ca/assets/gov/health/practitioner-pro/laboratory-services/schedule_of_fees_-_laboratory_services_payment_schedule.pdf
http://msssa4.msss.gouv.qc.ca/fr/document/d26ngest.nsf/3f4763bf7e3c23a78525660f00727c27/016cc4ac00b795bf85257f9c004b18e3?OpenDocument
How much do these tests cost?

2. CBC, creatinine, urea, Na+, K+, INR, PTT, ECG, chest X-ray

$110.72
$105.70
$57.48

http://www2.gov.bc.ca/assets/gov/health/practitioner-pro/laboratory-services/schedule_of_fees_-_laboratory_services_payment_schedule.pdf
http://msssa4.msss.gouv.qc.ca/fr/document/d26ngest.nsf/3f4763bf7e3c23a78525660f00727c27/016cc4ac00b795bf85257f9c004b18e3?OpenDocument
How much do these tests cost?

3. CBC, creatinine, urea, Na+, K+, INR, PTT, ECG

$55.26
$73.05
$30.63

http://www2.gov.bc.ca/assets/gov/health/practitioner-pro/laboratory-services/schedule_of_fees_-_laboratory_services_payment_schedule.pdf
http://msssa4.msss.gouv.qc.ca/fr/document/d26ngest.nsf/3f4763bf7e3c23a78525660f00727c27/016cc4ac00b795bf85257f9c004b18e3?OpenDocument
How much do these tests cost?

4. CBC, creatinine, Na+, K+, INR, PTT, ECG

$60.26 $68.05 $29.13
How much do these tests cost?

5. CBC, creatinine, Na+, K+, INR, PTT

$33.89
$57.00
$9.68

http://www2.gov.bc.ca/assets/gov/health/practitioner-pro/laboratory-services/schedule_of_fees_-_laboratory_services_payment_schedule.pdf
http://msssa4.msss.gouv.qc.ca/fr/document/d26nigest.nsf/3f4763bf7e3c23a78525660f00727c27/016cc4ac00b795bf85257f9c004b18e3?OpenDocument
How much do these tests cost?

6. CBC, creatinine, Na+, K+

$15.25

$31.00

$6.30

http://www.gov.bc.ca/assets/gov/health/practitioner-pro/laboratory-services/schedule_of_fees_-_laboratory_services_payment_schedule.pdf
http://msssa4.msss.gouv.qc.ca/fr/document/d26nigest.nsf/3f4763bf7e3c23a78525660f00727c27/016cc4ac00b795bf85257f9c004b18e3?OpenDocument
Evidence for preop testing

• CBC
• Creatinine
• Coagulation
• Urine analysis
• Chest radiograph
• ECG
• Other tests
Complete Blood Count
Preop anemia and postop CV events

Valentijn 2013

• Retrospective cohort
• 1041 patients - vascular surgery
• Preop anemia
  • Hb <130 g/L in men
  • Hb<120 g/L in women
• 24% preop anemia
• Preop anemia independently associated with 30-day postop CV events
  • aOR 1.7 (95% CI, 1.1-2.5)
Preop anemia and postop AKI

Walsh 2014

- retrospective study, administrative data
- 33,330 noncardiac surgeries
- association between preop Hb and postop AKI

- 29% surgeries preop Hb value <120 g/L
- lower preop Hb associated with higher risk of AKI
  - Hg between 101-120 g/L: aOR 2.0 (95% CI, 1.8-2.3)
  - Hg <81 g/L : aOR 3.7 (95% CI, 2.6-5.4)
- AKI postop associated with 30-day mortality
  - aOR 2.6 (95% CI, 2.0-3.3)

Preop anemia and postop mortality

Musallam 2011

• Retrospective cohort, administrative data
• 227,425 patients – noncardiac surgery
• Preop anemia
  • Htc <36.0% in women
  • Htc <39.0% in men

• Incidence of preop anemia: 30.44%
• Preop anemia associated with 30-day mortality
  • aOR 1.42 (95% CI, 1.31-1.54)
Preop low platelets and postop events

Munro 1997

• Systematic review of preop testing
• 9393 patients – 9 studies

• Lower incidence low platelets in most studies
  • 1.2%

• No change in preop management (3 studies)
• No adverse events (2 studies)
Preop low platelets and postop events

Glance 2014

• retrospective cohort, administrative database
• 316,644 patients – noncardiac surgery
• mild thrombocytopenia (plt 101–150): 4.0%
• moderate-to-severe thrombocytopenia (<100): 0.8%

• low platelet associated with more postop blood transfusion
  • mild: aOR 1.29 (95% CI, 1.18–1.39)
  • moderate-to-severe: aOR 1.76 (95% CI, 1.49–2.08)

• low platelet association with increased risk 30-day mortality
  • Mild: aOR, 1.31 (95% CI, 1.11–1.56)
  • moderate-to-severe: aOR, 1.93 (95% CI, 1.43–2.61)
Area of uncertainty

• anemia and thrombocytopenia themselves associated with adverse events or markers of patients with underlying disease?

• no evidence suggesting that corrective intervention improve outcome
What does the anesthesiology guideline say?

Canadian Society of Anesthesiology 2016

• Laboratory testing should **not** be performed on a routine basis and only obtained when results will change perioperative management

• Laboratory investigations should be performed when indicated by the
  • patient’s medical status,
  • drug therapy,
  • and the nature of the proposed procedure
What does the anesthesiology guideline say?

Canadian Society of Anesthesiology 2016

**Complete blood count**
- Major surgery requiring group and screen or group and match
- Chronic cardiovascular, pulmonary, renal, or hepatic disease
- Malignancy
- Known or suspected anemia
- Known bleeding diathesis,
- Known myelosuppression
Choosing Wisely Canada

Don’t order baseline laboratory studies (complete blood count, coagulation testing, or serum biochemistry) for asymptomatic patients undergoing low-risk non-cardiac surgery.

http://www.choosingwiselycanada.org/recommendations/anesthesiology/
Coagulation tests
Coagulation tests and postop events

Munro 1997

- Systematic review of preop testing
- INR
  - 10,082 patients – 15 studies
  - incidence abnormal routine test: 0% - 4.8%
  - change in management: median 0% (range 0%-2.9%) (8 studies)
- PTT
  - 11,670 patients - 16 studies
  - incidence abnormal test: median 4.3% (range 0%-16.3%)
  - change in management: median 0% (range 0%-2.8%) (9 studies)

- no association with adverse events (9 studies)
Preop coagulation – CSA Guidelines

Canadian Society of Anesthesiology 2016

INR and PTT

- Anticoagulant therapy
- Bleeding diathesis
- Liver disease

*No mention of coagulation tests before regional anesthesia
Preop coagulation tests – ASA Guidelines

Practice Advisory for Preanesthesia Evaluation

• no routine coagulation testing
• clinical characteristics to consider for ordering coagulation studies:
  • bleeding disorders
  • renal dysfunction
  • liver dysfunction
  • type and invasiveness of procedure
  • anticoagulant medications and alternative therapies

• not enough data to comment on the advisability of coagulation tests before regional anesthesia
Preop coagulation tests – British Guidelines

Guidelines on the assessment of bleeding risk prior to surgery or invasive procedures - British Committee for Standards in Haematology

- Recommend against routine coagulation testing in unselected patients (Grade B, Level III)

- Recommend assess bleeding history including detail of family history in all patients (Grade C, Level IV)

- If bleeding history negative, no further coagulation testing (Grade C, Level IV)

- If bleeding history positive or clear clinical indication (e.g. liver disease), a comprehensive assessment, guided by the clinical features required (Grade C, Level IV).
Preop coagulation tests – Italian Guidelines

Initial evaluation
(history and clinical examination)
(see Figure 1)

POSITIVE
Laboratory evaluation

NEGATIVE
No further evaluation

Initial haemostasis tests:
Full blood count + platelet count, PT, aPTT, fibrinogen

1 or more abnormal tests

Further appropriate evaluations

↑ PT
FVII

↑ aPTT
FIX
FXI

↑ PT + ↑ aPTT
FV, FVII
FIX, FX, FXI (FXII)

1

No abnormalities

Initial vWD evaluation:
vWF:Ag, vWF:RCo, FVIII:C

2

Further appropriate evaluations

BT or PFA
FXIII

Other abnormalities identified

Specific further assays for vWD:
- vWF:RCo/vWF:Ag
- vWF multimers
- collagen binding
- RIPA or platelet aggregation
- FVIII binding
- platelet vWF studies

Area of uncertainty

• Regional anesthesia?
Creatinine and electrolytes
Low eGFR and postop mortality

Cywinski 2015

• Retrospective cohort study
• 92,888 patients – inpatient noncardiac surgery

• decrease preop eGFR increased risk 30-day mortality
  • 10-unit decrease in eGFR: aOR 1.06 (95% CI, 1.04-1.09)

• addition of eGFR in addition to clinical factors resulted in minimal improvement in discrimination (change 0.001 c-statistic)
Low eGFR and postop mortality and AKI

**Mooney 2013**

- Systematic review
- 30 studies – cardiac and noncardiac surgery

- **All-cause mortality – 30 days** (noncardiac sx only - 3 studies)
  - eGFR <60 ml/min: pooled RR 2.82 (95% CI, 1.87-4.26)

- **Postop AKI** (noncardiac surgeries only – 2 studies)
  - eGFR <60 ml/min: pooled RR 2.77 (95% CI, 1.94-3.95)
Low eGFR and postop CV events

Andersson 2015

- retrospective cohort study
- 447,352 patients - noncardiac surgery

- Major cardiovascular events
  - Creatinine $>177$ uml/L: aOR 1.45 (95% CI, 1.33–1.59)
Hyponatremia and postop outcomes

Leung 2012

• retrospective cohort study (NSQIP)
• 964,263 patients – noncardiac and cardia surgery

• incidence hyponatremia: 7.8%

• hyponatremia increased risk
  • All-cause mortality: aOR 1.44 (95% CI, 1.38-1.50)
  • Major cardiac events: aOR 1.21 (95% CI, 1.14-1.29)
  • Wound infection: aOR 1.24 (95%CI, 1.20-1.28)
  • Pneumonia: aOR 1.17 (95%CI, 1.12-1.22)

Arch Intern Med. 2012;172(19):1474-1481
What does the anesthesiology guideline say?

Canadian Society of Anesthesiology 2016

Creatinine and electrolytes

Reasonnable indications:
• hypertension
• renal disease
• diabetes
• pituitary or adrenal disease
• digoxin or diuretic therapy or other drug therapies affecting electrolytes
Choosing Wisely Canada

Don’t order baseline laboratory studies (complete blood count, coagulation testing, or serum biochemistry) for asymptomatic patients undergoing low-risk non-cardiac surgery.

http://www.choosingwiselycanada.org/recommendations/anesthesiology/
Area of uncertainty

• CKD often already known, rarely provides new information
  • Additional value of preop creatinine?

• Interventions to prevent outcomes?
Urine analysis
Urine analysis

Munro 1997

• routine preop urinalysis finds abnormal results in 1–34.1% of patients,
• leads to a change of management in 0.1–2.8% of patients.

• Maybe reasonable
  • urologic interventions
  • symptomatic patients
Preop ECG and postop major CV events

Lee 1999
• Prospective cohort
• 4315 patients - noncardiac surgery (nonurgent)
• Pathologic Q-waves: RR 2.4 (95% CI, CI 1.3–4.2) of major CV events

Biteker 2012
• Prospective cohort
• 660 patients – noncardiac, nonvascular surgery
• only QTc prolongation independent predictor of major CV events
  • aOR 1.15 (95% CI 1.06-1.20)

• Several other studies, inconsistent results
What does the anesthesiology guideline say?

Canadian Society of Anesthesiology 2016

Electrocardiogram

Reasonable indications:
• heart disease
• diabetes
• other risk factors for cardiac disease
• subarachnoid or intracranial hemorrhage, cerebrovascular accident, head trauma

*no mention of age cutoff
Choosing Wisely Canada

Don’t order a baseline electrocardiogram for asymptomatic patients undergoing low-risk non-cardiac surgery

http://www.choosingwiselycanada.org/recommendations/anesthesiology/
Preop ECG – ASA Guidelines

• The Task Force did not reach consensus on a specific minimum age in those patients without specific risk factors.

• An ECG may be indicated for patients with known cardiovascular risk factors or for patients with risk factors identified in the course of a preanesthesia evaluation.
Area of uncertainty

• Age cutoff?
  • Based on VISION study, increase risk mortality 65 yo or older

• Baseline for comparison with postop ECG?
  • Postop ECG in PACU recommended in patients undergoing in-hospital noncardiac surgery
    • 65 yo or older
    • 45 – 64 yo with known CV disease
Chest X-ray
Preop chest X-Ray and periop management

Joo 2008
• systematic review of observational studies
• 14 studies - noncardiac and nonthoracic surgery

• majority of findings were expected or known (e.g. cardiomegaly, COPD)

• diagnostic yield (i.e. proportion abnormal CXRs):
  • low in patients under age of 50
  • 47% to 61% for patients > 70 yr of age
Preop chest X-Ray and periop management

Joo 2008

• led to further investigators: 2%-47% patients
  • further investig did not change management 90%

• 0.5% change in anesthetic management

• no difference in perioperative complications between patients with abnormal or normal chest radiographs
  • 2 highest quality studies showed independent association
Preop chest X-ray and periop management

Smetana 2006

• systematic review of preop pulmonary stratification

• same conclusion as other systematic review

• suggest preop chest X-ray
  • known cardiopulmonary disease
  • patients older than 50 years of age who are undergoing upper abdominal, thoracic, or abdominal aortic aneurysm surgery
What does the anesthesiology guideline say?

Canadian Society of Anesthesiology 2016

Chest radiograph

Reasonnable indications:
- cardiac disease
- pulmonary disease
- malignancy
Don’t order a baseline chest X-ray in asymptomatic patients, except as part of surgical or oncological evaluation.
Other tests
Pulmonary function tests

Based on 2006 ACP guidelines

• reasonable indications:

  • patients with COPD or asthma if clinical evaluation cannot determine if the patient is at best baseline and that airflow obstruction is optimally reduced.

  • patients with dyspnea or exercise intolerance unexplained after clinical evaluation.
Preop resting echocardiography

2016 CCS guidelines on periop cardiac risk assessment and management for patients undergoing noncardiac surgery

• recommend against preop resting echocardiography to enhance perioperative cardiac risk estimation (Strong recommendation, low-quality evidence)

• may be reasonable if clinical exam suggest undiagnosed
  • severe obstructive intra-cardiac abnormality
  • severe pulmonary HTN
  • cardiomyopathy

Preop cardiac stress tests

2016 CCS guidelines on periop cardiac risk assessment and management for patients undergoing noncardiac surgery

• recommend against performing preop pharmacological stress echocardiography to enhance perioperative cardiac risk estimation (strong recommendation, low-quality evidence)

• recommend against performing preop radionuclide imaging to enhance perioperative cardiac risk estimation (strong recommendation, moderate-quality evidence)

Preop NT-proBNP/BNP

Individual patient data meta-analysis (Rodseth 2014)

• 2179 patients – 18 studies

• Preop NT-proBNP/BNP independently associated with death or nonfatal MI at 30 days
  • aOR 3.40 (95% CI, 2.57-4.47) p<0.001

• Threshold value associated with lowest p value for death and MI
  • NTproBNP ≥300 ng/l
  • BNP ≥92 mg/l
Preop NT-proBNP/BNP

Risk of death or MI at 30 days after noncardiac surgery, based on patient’s preoperative NT-proBNP or BNP

<table>
<thead>
<tr>
<th>Test result</th>
<th>Risk estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT-proBNP &lt;300 ng/L or BNP &lt;92 mg/L</td>
<td>4.9%</td>
<td>3.9% - 6.1%</td>
</tr>
<tr>
<td>NT-proBNP value ≥300 ng/L or BNP ≥92 mg/L</td>
<td>21.8%</td>
<td>19.0% - 24.8%</td>
</tr>
</tbody>
</table>

- compared to RCRI, preop NT-proBNP/BNP results improved risk classification in 155 patients in 1000 patient sample
- based on risk categories <5%, 5-10%, >10-15%, >15%
Preop NT-proBNP/BNP

2016 CCS guidelines on periop cardiac risk assessment and management for patients undergoing noncardiac surgery

• recommend measuring NT-proBNP or BNP before noncardiac surgery to enhance perioperative cardiac risk estimation in patients
  • ≥65 years of age,
  • 45 to 64 years of age with significant cardiovascular disease,
    • coronary artery disease,
    • cerebral vascular disease,
    • peripheral arterial disease,
    • congestive heart failure,
    • severe pulmonary hypertension, or
    • severe obstructive intra-cardiac abnormality
      • e.g., aortic stenosis, mitral stenosis, hypertrophic obstructive cardiomyopathy
  • RCRI score ≥1

(Strong recommendation, moderate-quality evidence)
Why are unnecessary routine preop tests ordered?
Why Do Physicians Order Unnecessary Preoperative Tests? A Qualitative Study
Brown et al. 2011

• semi-structured interviews

• 19 physicians (5 anesthesiologists, 5 general surgeons, 2 orthopedic surgeons, 7 primary care physicians) and 4 nurse administrators

• urban medical school-affiliated tertiary care hospital (US)

• objectives
  • describe factors leading to preop tests order
  • Identify barriers to reducing unnecessary preop testing
Why Do Physicians Order Unnecessary Preoperative Tests? A Qualitative Study
Brown et al. 2011

• Factors leading to unnecessary preop tests ordering

1. Practice tradition
2. Belief That Other Physicians Want the Tests Done
3. Medicolegal worries
4. Concern About Surgical Delay or Cancellation
5. Lack of Awareness of Evidence and Guidelines
6. Suggested Strategies for Decreasing Unnecessary Testing

- Most interviewed believed patients could benefit from reduction in unnecessary preop testing
  - saving time and money
  - improving convenience
  - minimizing discomfort
  - limiting the need for follow up on false-positive results
  - decreasing surgical delays
  - reducing waste
Why Do Physicians Order Unnecessary Preoperative Tests? A Qualitative Study
Brown et al. 2011

• How to address barriers to decreasing unnecessary preop testing
  • communication and collaboration between healthcare professionals involved in periop care
  • multi-disciplinary national consensus preop care guidelines
  • Increase education and dissemination of guidelines (conferences, ground rounds, etc)
  • availability of point of care tests in the operating room
What is the impact of reducing preop testing?

• RCT – Toronto, ON
• 1061 patients – same day surgery
  • orthopedic, plastic, general, urology, ophthalmologic (excluding cataract), or spinal surgery

• random allocation stratified by age group
  1. preop testing according to Ontario Preop Testing Grid
  2. no preop testing

• outcomes within 7 to 30 days
  • MI, myocardial ischemia, cardiac arrest, CHF, arrhythmia, hypertension, hypotension, stroke, TIA, respiratory failure, hypoglycemia, diabetic ketoacidosis, nonketotic hyperosmolar syndrome, and sudden unexpected death

• intention-to-treat analysis

Anesth Analg 2009;108:467–75)
### APPENDIX A: Ontario Preoperative Testing Grid

<table>
<thead>
<tr>
<th>Test (adapted from GAC)</th>
<th>Criteria for tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete blood counts</td>
<td>Patient &gt;60 yr of age, anemia suspected</td>
</tr>
<tr>
<td>Electrolyte/creatinine</td>
<td>Currently taking diuretics, renal disease, diabetes</td>
</tr>
<tr>
<td>Blood glucose</td>
<td>Diabetes</td>
</tr>
<tr>
<td>PT/PTT</td>
<td>Currently on anticoagulants, coagulopathy, chronic liver disease</td>
</tr>
<tr>
<td>Sickle cell screening</td>
<td>Patient of African or Caribbean origin</td>
</tr>
<tr>
<td>ECG</td>
<td>All patients &gt;45 yr of age, cardiac history or hypertension</td>
</tr>
<tr>
<td>Chest radiograph</td>
<td>Pulmonary disease, heavy smokers</td>
</tr>
</tbody>
</table>
### Elimination of Preoperative Testing in Ambulatory Surgery - Chung et al. 2009

#### Table 1. Baseline characteristics

<table>
<thead>
<tr>
<th></th>
<th>No testing</th>
<th>Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>57.7%</td>
<td>57.7%</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-39</td>
<td>14.0%</td>
<td>13.8%</td>
</tr>
<tr>
<td>40-59</td>
<td>50.9%</td>
<td>51.0%</td>
</tr>
<tr>
<td>60 or greater</td>
<td>35.1%</td>
<td>35.1%</td>
</tr>
<tr>
<td>CAD</td>
<td>5.2%</td>
<td>4.8%</td>
</tr>
<tr>
<td>HTN</td>
<td>27.7%</td>
<td>31.7%</td>
</tr>
<tr>
<td>CVD</td>
<td>1.0%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>16.4%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Renal disease</td>
<td>0.2%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>24.8%</td>
<td>24.3%</td>
</tr>
<tr>
<td>General surgery</td>
<td>11.6%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Plastic</td>
<td>20.0%</td>
<td>20.7%</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>26.6%</td>
<td>26.4%</td>
</tr>
<tr>
<td>Urology</td>
<td>8.4%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Spinal surgery</td>
<td>7.8%</td>
<td>10.8%</td>
</tr>
<tr>
<td>General anesthesia</td>
<td>50.5%</td>
<td>52.4%</td>
</tr>
</tbody>
</table>

• testing group had 11.5% abnormal tests
  • 70 hematology or biochemistry results
  • 118 abnormal ECGs

• all abnormal tests expected because of heart disease or diabetes
  • No association between perioperative adverse events and abnormal testing results

• no significant differences in the rates of intraop and postop adverse events
  • intraop: RR 1.0 (95% CI, 0.4–3.0) (14 events)
  • postop: RR 0.8 (95% CI, 0.4–1.5) (37 events)

• increased revisit within 7 days in testing group
  • no testing: 11/499 (2.2%)
  • testing: 27/527 (5.1%)
  • RR 0.4 (95% CI, 0.2–0.9)
  • no hospital readmission, all other visits

• no difference in 8-30 days revisit

• no testing group
  • 1558 tests ordered and cancelled for 480 patients
  • cost savings: $18,938 ($38.50/patient)

• testing group
  • 1632 tests ordered and done for 527 patients
  • cost expense: $19,470
In summary

- Evidence and guidelines support reducing preop routine testing
- Testing should be tailored to patients condition and surgery
- Preop testing should be performed if will change patient management
- Reducing unnecessary preop testing can result in significant cost savings
- Need for future joint guidelines in periop assessment and management
Suggested readings

2016 CCS guidelines on perioperative cardiac risk assessment and management of patients undergoing noncardiac surgery
Duceppe et al., Can J Cardiol 2016

Choosing Wisely Canada
http://www.choosingwiselycanada.org/recommendations/anesthesiology/

Guidelines to the Practice of Anesthesia – Revised Edition 2016
Thank you!