Appropriate preoperative diagnostic testing “getting it right”

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On behalf of the pre-op testing team.
Disclosure

- **Faculty**: Dr. Eric Bohm
- **Relationships with commercial interests**:
  - **Grants/Research Support**: Funding received from Manitoba Patient Access Network (MPAN)
  - **Speakers Bureau/Honoraria**: None
  - **Consulting Fees**: None
  - **Other**: Director of Health Systems Performance, Centre for Healthcare Innovation;
Project Background
• 2010 MPAN funded the development of new pre-op testing guidelines

• Implementation undertaken by distributing to all RHA CMOs, PCPs, surgeons and PACs
## "Old" Preoperative Grid

### Routine Preoperative Lab Tests for Adult Patients (age ≥ 16 years) Undergoing Elective Surgery

<table>
<thead>
<tr>
<th>Test</th>
<th>CBC</th>
<th>ECG</th>
<th>Elect</th>
<th>CR or eGFR</th>
<th>Glc</th>
<th>INR</th>
<th>cTNT</th>
<th>TTE</th>
<th>Iron Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor surgery, age &lt; 50, any E.T.</td>
<td>No routinely indicated tests if patient is otherwise healthy</td>
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<tr>
<td>Minor surgery, age ≥ 50, E.T. ≥ 4 METs</td>
<td>No routinely indicated tests if patient is otherwise healthy</td>
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<td>Major surgery, age &lt; 50</td>
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<td>Major surgery, age ≥ 50</td>
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<tr>
<td>Vascular surgery</td>
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</tbody>
</table>

### Medical Considerations

- **Hypertension**
- **Cardiac disease, E.T. ≥ 4 METs**
- **Respiratory disease, E.T. ≥ 4 METs**
- **Stroke/TIA/Peripheral Vascular Disease**
- **Cancer**
- **Liver disease**
- **Diabetes mellitus**
- **BMI ≥ 40**
- **High risk for malnutrition**
- **Chronic kidney disease**
- **Thyroid disease**
- **Anemia**
- **Diabetic, ACE inhibitor, or ARB**
- **Coumadin**
- **Oral Contraceptives**
- **Digoxin**

### Other Preoperative Tests with Specific Indications

- Sickle cell screen: With appropriate pre- and post-test counseling, preoperative sickle cell screen should be offered to patients with a known family history of sickle cell disease.
- Antiepileptic drug (AED) levels: Should be obtained only for patients on carbamazepine, phenytoin, phenobarbital, or valproic acid who meet at least one of the following criteria: (1) a history of unstable AED levels, (2) a seizure within the last 6 months, or (3) undergoing major gastrointestinal surgery.

### Notes

- Preoperative pregnancy testing will be carried out by preoperative staff using existing procedures.
- Preoperative type and screen and group and held will be carried out by surgeons and preoperative clinic staff using existing procedures.
- There are no routine indications for preoperative pulmonary function tests, spirometry, or arterial blood gases.
- There are no routine indications for preoperative contrast, save for specific surgeries, at the surgeon’s discretion.
- Preoperative laboratory and physicals are also valid for 6 months, provided there has been no interval change in the patient’s condition.

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**Legend - Tests**

- **Electrolytes (sodium, potassium, chloride and bicarbonate)**
- **Cr and eGFR** Plasma Creatinine and if available, eGFR
- **Glc** Fasting plasma glucose
- **LFT** AST, ALT, ALK Phos, GGT, albumin and total and direct bilirubin
- **CXR** Chest X-Ray
- **Iron Indices** Serum Iron, TIBC, and ferritin

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**Legend - Patient Characteristics**

### Major Surgery

- Resection of organs (laparoscopic or open incision) in the neck, thorax, pelvis or abdomen, except laparoscopic cholecystectomy, open vascular surgery (except surgery w/stenting), endovascular procedures, endovascular surgery, head and neck surgery for malignancy (except basal cell carcinoma), spine surgery for discectomy, major joint replacement or fusion.

### Minor Surgery

- Defined by not meeting criteria for major surgery. Includes eye surgery (except cataract removal), nasal surgery, nasal septoplasty, breast surgery without flap reconstruction, direct or laparoscopic inguinal or umbilical hernia repair, diagnostic laparoscopy, tubal ligation, laparoscopic cholecystectomy, uterine D and C, hysteroscopy, endometrial ablation, cauter, tubal repair, laparoscopic appendectomy, medical procedures related to local reconstructive, arthroscopy, endoscopy, and diagnostic and therapeutic procedures. (SCT)

**Legend - Lab Tests**

- E.T. in METS
  - ≥ 4 METs: Able to complete one or more of the following activities, or on strenuous activity, without having chest pain or dyspnea walk up a hill, run a short distance, or climb a flight of stairs.
  - < 4 METs: No chest pain or dyspnea with ≥ 4 METs activities or able to complete them for any reason.

**Cardiac Disease**

- MI, Angina, CHF, Valvular heart disease, Atrial fibrillation or other Arrhythmia

**Renal Disease**

- Gross proteinuria or elevated creatinine

**Liver Disease**

- Includes jaundice, hepatitis, cirrhosis, Atrial fibrillation or other Arrhythmia

**High Risk for Malnutrition**

- Includes BMI < 19, unintentional loss of 10% body weight loss over previous 6 months, inflammatory bowel disease, and, emaciation, gastric, and pancreatic malignancy.

**High Risk for Anemia**

- Includes patients with a history of anemia, connective tissue disease (i.e., lupus, rheumatoid arthritis), inflammatory bowel disease, nephrosis, gross hematoma or gastrointestinal bleeding.

**High Risk for Iron Deficiency**

- Anemic patients with low MCV or high RDW on CBC.

**ARBS**

- Angiotensin receptor blocker.
1. Pre guideline implementation - (Nov 22-26, 2010)
   • Baseline data was established

2. 5 months post guideline implementation - (Sept 12-16, 2011)
   • 14.6% reduction in unnecessary tests

3. 2 Years post guideline implementation - (May 6-10, 2013)
   • 2.2% increase in unnecessary tests
Unnecessary testing still a big problem in Manitoba

• Rigorously developed preoperative lab test guideline had only a modest, transient effect on unnecessary testing

• Unnecessary tests were still ordered 30% of the time, with direct costs of > $2 million per year.

• Unnecessary tests can cause iatrogenic harm, delays
New project
Project Goal

- Manitobans receive the necessary and appropriate preoperative diagnostic testing for elective surgeries
- Accomplished through the sustainable implementation of the pre-op testing guidelines
- 25% reduction of unnecessary tests
Where are unnecessary tests being ordered?

- Baseline
- 5 months post
- 25 months post

- Pre Anesthetic Clinic/ Unknown
- Primary care
- Surgeon
Key Findings

- Problem of unnecessary ordering is shared by:
  - All surgical specialties
  - Primary Care Providers
  - PAC / Anesthesia

- 4 account for 60% of $ spent on unnecessary tests
  - Chest X Rays (21%)
  - LFTs (15%)
  - ECG (14%)
  - Electrolytes (13%)
Pre-op Process / Issues

Surgeon orders based on what they perceive PAC wants

Primary care → Surgeon → Primary care → PAC → Surgery

Surgeon tells Primary care what to order
## Issues

<table>
<thead>
<tr>
<th></th>
<th>Primary Care</th>
<th>Surgeon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines time-consuming to interpret</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Surgeon cover letters / forms do not support guidelines</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Unaware of guidelines</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Liability Concerns</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Easier to order unnecessary tests than cause potential delay</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>
The Intervention
On July 11, 2016 revised documents were rolled out to help reduce unnecessary testing. Applies to all adult patients undergoing elective surgery. Excludes: pediatric, emergency, cardiac, and caesarean section.
## Pre-op Packages

### What changed?

<table>
<thead>
<tr>
<th>Documents</th>
<th>What are the changes</th>
</tr>
</thead>
</table>
| Revised Pre-op testing guidelines | • Updated to match new CAS guidelines endorsed by CW Canada  
                                  • Simplifies requirements for minor surgeries  
                                  • Clarifies the definition of minor/major surgery  
                                  • Enhanced user – friendliness                                                                                                      |
| Interactive web tool    | • Tool assists in determining necessary pre-op tests  
                                  http://logixmd.com/preop                                                                                                               |
| Revised WRHA H&P        | • Incorporates pre-op guidelines in lab section  
                                  • Improved document flow  
                                  • EMR friendly features incorporated                                                                                                 |
| Patient cover letter    | • Standardized instruction to patients  
                                  • Consistent with WRHA policies and guidelines                                                                                           |
| Surgeon to PCP cover letter | • Standardized instruction to PCPs  
                                  • Interprets guidelines  
                                  • Removes cueing for unnecessary tests                                                                                                 |
Revised Pre-Op Grid

Routine Preoperative Laboratory Test Guidelines

**TESTS WITHIN 6 MONTHS OF SURGERY**

- **MINOR SURGERY**
  - Associated with an expected blood loss of ≤500mL, minimal fluid shifts and is typically done as an ambulatory basis (day surgery/no hospital stay).
  - Excludes cataract surgery; breast surgery without masectomy; liposuction; endoscopic procedures and laparoscopy.

- **MAJOR SURGERY**
  - Associated with an expected blood loss of ≥500mL, significant fluid shifts and typically at least one night in hospital.
  - Includes laparoscopic surgery (except uterine myomectomy and total laparoscopic hysterectomy), major open surgery, mastectomy, vascular or interventional surgery.
  - If surgery is typically ambulatory but the patient has a medical or social reason for inpatient admission (e.g., DVA support at home, still consider the surgery minor even though this was not intended.

**EXCLUSIONS**

- This guideline does not apply to patients undergoing cardiac surgery or coronary artery bypass surgery.

**CLINICAL JUDGMENT**

Additional tests may be appropriate for patients with complex or unusual surgical conditions.

**ORTHOPEDEAIC SURGERY**

- **MINOR**
  - Arthrocentesis, arthroscopy, ACL repair
  - single-ligament knee or hip arthroscopy
  -hardware removal without infection
  - Tendon surgery
  - Surgeries on the foot
  - Dislocation

- **MAJOR**
  - Knee, shoulder, hip, ankle, and elbow surgery
  - Spinal surgery
  - Biplanar
  - Spinal surgery
  - Endoscopic

**PLASTIC SURGERY**

- **MINOR**
  - Carpal tunnel release
  - Dacryocystorhinostomy

- **MAJOR**
  - Major and minor tendon surgery
  - Small or partial flap and skin grafts
  - Breast and skin carcinoma resection
  - Lipomaexcision
  - Rheumatoid arthritis
  - Other surgery for benign breast disease

**THORACIC SURGERY**

- **MINOR**
  - Endoscopy
  - Thoracentesis
  - Thoracic duct ligation

- **MAJOR**
  - Mediastinum
  - Pleuropericardial

**URETHROLOGY**

- **MINOR**
  - Cystoscopy, retrograde pyelography, ureteroscopy

- **MAJOR**
  - Ureteral reimplantation
  - Laparoscopic pyeloplasty
  - Spinal cord stimulation
  - Vascular access

**NERVOSURGERY AND SPINAL SURGERY**

- **MINOR**
  - Intracranial surgery

- **MAJOR**
  - Intracranial surgery
  - Spinal surgery
  - Spinal cord stimulation

**OPHTHALMOLOGY**

- **MINOR**
  - Cataract extraction

- **MAJOR**
  - Cataract extraction and other ophthalmic procedures
Revised Pre-Op H&P

<table>
<thead>
<tr>
<th>PART A – ALERTS</th>
<th>No</th>
<th>Yes</th>
<th>Describe (e.g., reason, language, details)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Patient Requires a Proxy</td>
<td>☐</td>
<td>☑</td>
<td>Reason</td>
</tr>
<tr>
<td>B. Interpreter Required</td>
<td>☐</td>
<td>☑</td>
<td>Language</td>
</tr>
<tr>
<td>C. Previous Difficult Airway</td>
<td>☐</td>
<td>☑</td>
<td>Describe, and identify facility of event</td>
</tr>
<tr>
<td>D. Known/Suspected Obstructive Sleep Apnea</td>
<td>☐</td>
<td>☑</td>
<td>Clinically Suspected Assessment Pending</td>
</tr>
<tr>
<td>E. Advance Reaction to Previous Anesthesia (patient or relative)</td>
<td>☐</td>
<td>☑</td>
<td>Describe</td>
</tr>
<tr>
<td>F. Previous Adverse Reaction to Transfusion</td>
<td>☐</td>
<td>☑</td>
<td>Describe</td>
</tr>
<tr>
<td>G. Bloodborne Infections</td>
<td>☐</td>
<td>☑</td>
<td>Hepatitis A Virus, Hepatitis C Virus, Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>H. Other Infections</td>
<td>☐</td>
<td>☑</td>
<td>Methicillin-resistant Staphylococcus aureus, Clostridium difficile</td>
</tr>
</tbody>
</table>
| I. Allergies | ☐ | ☑ | Describe
| See attached |
| J. History of Present Illness | | | |

**PART C – PHYSICAL**

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>Body Mass Index (BMI)</th>
<th>Blood Pressure</th>
<th>Heart Rate</th>
<th>SpO2</th>
</tr>
</thead>
</table>

**PART D – REVIEW OF SYSTEMS**

- **Central Nervous System**
- **Cardiovascular**
- **Respiratory**
- **Gastrointestinal**
- **Hematologic & Lymphatic**
- **Endocrine & Metabolic**
- **Gastrointestinal**
- **Neurovascular**
- **Dermatologic**
- **Other**

**PART E – OPTIMIZATION**

- Blood Management Service
- Consult intake
- Consider referral for major surgery and assesses, new treatment, and new medications
- Patient has anemia

**PART F – LABORATORY SCREENING**

- Check for hemoglobin, blood glucose, and electrolytes
- Consult guideline

**FOR MINOR SURGERY**

- Order CBC, additional tests may be indicated for some patients

**FOR MAJOR SURGERY**

- Order CBC, ECO, Na+, K+, Ca, Mg, Cr, Fr, Fr

Examiner Provider: __________________________
Examination Date: __________________________
Phone: __________________________
Fax: __________________________

Comments: __________________________

Do not attach extensive examiner notes
Summary of changes

WRHA H&P

• Deletion of duplicated or irrelevant information:
  – Demographics, Health care directives, VRE alert

• Formatting for easier use:
  – Interpretation in PAC; Copy/ Paste from EMR; Hyperlinks

• **Optimization section** to support interventions that could improve postoperative outcomes, including timely referral to **Blood Management Service**

• **Laboratory Screening section** provides summary of new guideline to assist providers in choosing which tests to order.
Document Access

• NEW Routine Preoperative Lab Test Guidelines
  – Visit http://www.wrha.mb.ca/extranet/eipt/EIPT-003.php to download an electronic version
  – Visit http://logixmd.com/preop to access the interactive web-based tool

• NEW WRHA Preoperative History & Physical Form
  – Contact EMR provider for electronic version

• If you would like a laminated copy of the guidelines please stop by the Choosing Wisely booth
Ophthalmology – Cataracts
Cataracts Intervention

• Patients undergoing a cataract procedure are placed into 2 categories (Red/ Green)
  – Green patients are no longer required to have a H&P completed (60%)
  – Red patients will continue to have H&P completed (40%)

• Revised H&P form for Cataract patients created removing cues for unnecessary tests
The results – Cataracts

% of Cataract patients with tests ordered when not indicated

Audit 1 Nov 2010
Audit 2 Sept 2011
Audit 3 May 2013
Audit 4 Nov 2014
Audit 5 Aug 2015
Audit 6 Mar 2016

Choosing Wisely Manitoba
Acknowledgments

Questions
MINOR SURGERY
Associated with an expected blood loss of <500mL, minimal fluid shifts and is typically done on an ambulatory basis (day surgery/same day discharge)*. It includes cataract surgery; breast surgery without reconstruction; laparoscopic cholecystectomy and tubal ligation; and most cutaneous, superficial, endoscopic and arthroscopic procedures.

DO NOT ORDER PREOP TESTS including: chest x-rays, Na⁺, K⁺, Cl⁻, TCO₂, serum glucose, CBC, ECG, INR, urinalysis, renal, liver or thyroid function tests in asymptomatic** patients.

**ASYMPTOMATIC implies the patient does not have no or worsened symptoms to suggest a new lab test abnormality. (e.g. if the patient does not have no or worsened symptoms of an arrhythmia, congestive heart failure, dyspnea or ischemic heart disease, an ECG would not be recommended).

MAJOR SURGERY
Associated with an expected blood loss of >500mL, significant fluid shifts and typically, at least one night in hospital*. Includes laparoscopic surgery (except cholecystectomy and tubal ligation); open resection of organs; large joint replacements; mastectomy with reconstruction; and spine, thoracic, vascular, or intracranial surgery.

* If the surgery is typically ambulatory but the patient has a medical or social reason for overnight admission (i.e. OSA, no support at home), still consider the surgery minor in determining which lab tests to order.

MAJOR SURGERY, ALL AGES: Other tests indicated by patient characteristics & medications

- Oral Corticosteroids, DM or BMI > 40: add Hemoglobin A1C or fasting plasma glucose.
- Malnutrition, BMI > 40, or Liver disease: add liver function tests and INR.
- At high risk for iron deficiency: add serum iron, TIBC and Ferritin.
- Thyroid disease: add TSH.

For more information, see choosingwiselycanada.org/recommendations/anesthesiology

Chest X-rays – Not recommended for any surgery except to facilitate the diagnosis of new/worsened symptoms, or if ordered by the surgeon prior to thoracic surgery or to work up a malignancy.

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