

# Foundations of Resource Stewardship

## Preceptor Guide

*Part of the CanMEDS Resource Stewardship Curriculum Toolkit Series*

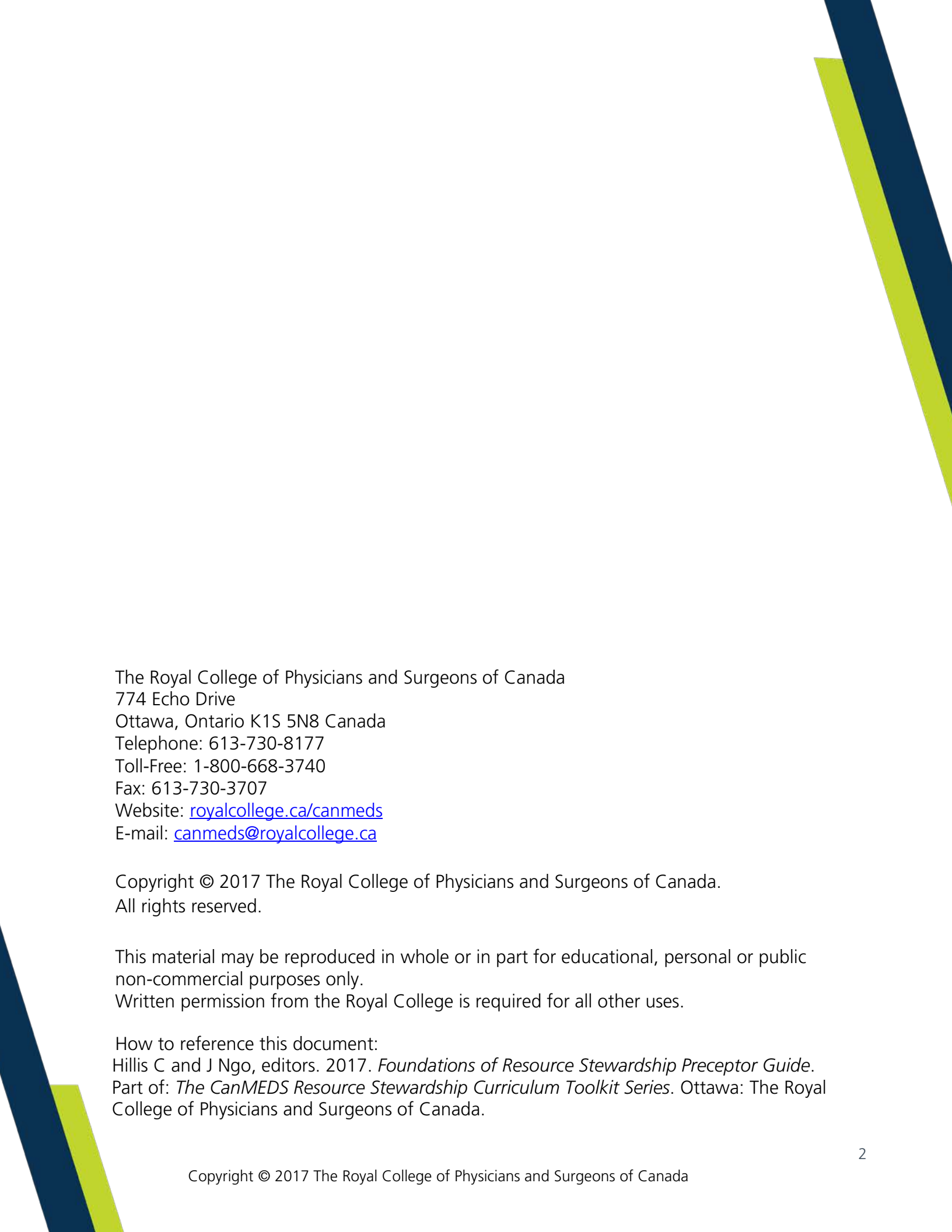
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## PREAMBLE

This toolkit is intended for educators who wish to deliver foundational resource stewardship content to residents. The main purpose of this toolkit is to increase awareness of resource stewardship and to start conversations about how to integrate resource stewardship in everyday clinical encounters. The toolkit is designed to be flexible to allow facilitators to modify the content and presentation style to suit the needs of their audience. We recommend taking every opportunity to engage learners in the “interactive moments” to spark conversations about their experiences and to discuss strategies for future practice.

The toolkit contains a selection of slide sets with different clinical cases to suit the needs of different specialty programs. If the clinical cases within the slide sets do not suit the needs of your audience instructions are provided on how to modify the cases. We suggest reviewing Choosing Wisely Canada recommendations to assist in generating cases more relevant to your discipline.

Resource stewardship is a challenging topic to teach complicated by large variation in clinical learning environments. There are many barriers to practicing resource stewardship and this toolkit aims to provide residents with an opportunity to discuss these barriers and, more importantly, strategies to overcome them. Our hope is that this toolkit will establish the importance of resource stewardship to residents and work towards changing attitudes.

## How to Use This Toolkit

This toolkit consists of a core set of slides, with the option to tailor the presentation (selecting slides from the alternate slide deck) for specialty-specific, target-audience relevance.

*Disclaimer:* the alternate slide deck does not have specialty-specific cases for all subspecialties; if your specialty is not represented, please use the cases as a guide from which to build your own customized case.

## IMPORTANT NOTE TO PRESENTER:

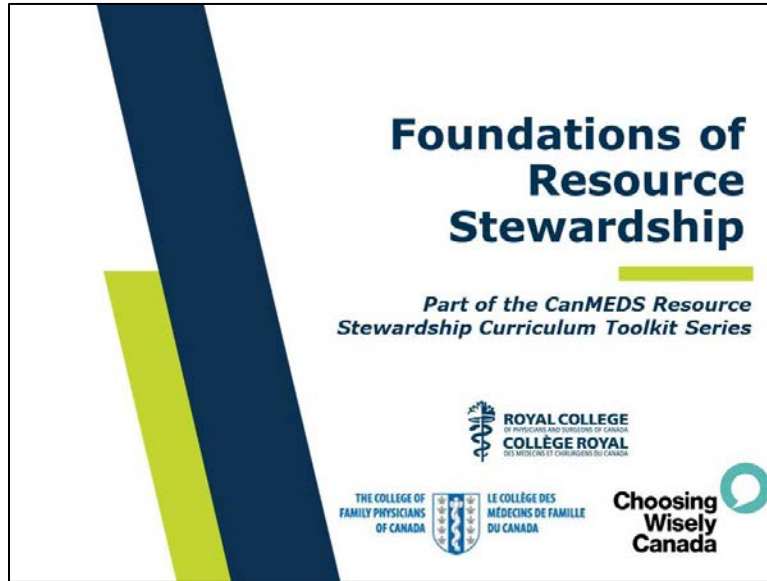
There are **5 pre-developed cases** to choose from:

1. **Medicine/Emergency Medicine** – unnecessary investigations for acute kidney injury due to urinary retention, resulting in treatment of asymptomatic bacteriuria
2. **Pediatrics/Primary Care** – unnecessary use of H2 blocker therapy in infant with reflux leading to medication side-effect
3. **Psychiatry/Primary Care** – unnecessary benzodiazepine use in the elderly for insomnia, leading to fall
4. **Surgical/Primary Care** – unnecessary investigations and management of minimally symptomatic inguinal hernia
5. **Surgical/Anesthesia/Internal Medicine/Primary Care** – unnecessary pre-operative investigations leading to incidentaloma and surgical delay

**You will return to the case twice throughout the module** to help ground theory in practice. At these points throughout the document, you will be prompted to select the case that best suits your own speciality. **You will see the following heading followed by links to each pre-developed case:**

## CASE STUDY

**Slide 1:**



This toolkit will provide faculty and trainees a foundational knowledge of resource stewardship principles and the ability to recognize opportunities in daily practice to apply resource stewardship concepts through clinical care, teaching and assessment.

## Slide 2:

### Objectives

After completing this module, trainees will be able to:

- Define common terminology in resource stewardship
- Differentiate between rationing and resource stewardship
- Discuss ethical aspects of resource stewardship
- Recognize the harm associated with overuse
- Identify drivers of overuse
- Discuss strategies to improve resource stewardship
- Identify examples of overuse in their specialty and opportunities for improved resource stewardship



## CASE STUDY

**Slides 3-5** introduce an anchoring case study to begin discussion of waste in healthcare and resource stewardship.

Click to be directed to your specialty-specific case:

1. [Medicine/Emergency Medicine](#) (p.8)
2. [Pediatrics/Primary Care](#) (p. 11)
3. [Psychiatry/Primary Care](#) (p. 14)
4. [Surgical/Primary Care](#) (p. 17)
5. [Surgical/Anesthesia/Internal Medicine/Primary Care](#) (p. 20)


If you have opted to use your own customized case, [click here to resume core presentation on slide 6](#) (p. 24)

Slide 3:

Medicine/Emergency Medicine

### Case – Mr. Akay Aye

- 80M is assessed by the Emergency Medicine resident regarding a 4 day history of fatigue and oliguria. He has no abdominal pain.
- Past medical history: hypertension; dyslipidemia; benign prostatic hyperplasia. No new medications.



- Physical exam: alert and oriented. BP 158/72, HR 94, RR 16, T 36.8, SPO<sub>2</sub> 96% on room air. Moist mucous membranes, Jugular venous pressure 2cm above sternal angle. Firm abdomen.
- Basic investigations are sent
- 1L normal saline fluid bolus ordered
- Internal Medicine is consulted for admission

We begin our discussion of resource stewardship and waste in healthcare by introducing an anchoring Case Study.

In this case, an 80M with known benign prostatic hyperplasia arrives to the ED with oliguria. He is found to have acute kidney injury and a firm abdomen on exam, but with no other significant physical exam abnormalities or laboratory derangements. In this case, a simple solution would have been to bladder-scan the patient for a post-void residual to diagnose urinary retention. However, the case will go through the trainee's over-investigation of the patient's presenting complaint, and care that is very much, non-patient centred (excessive imaging investigations, multiple phlebotomies for blood testing, etc.)

The specific Choosing Wisely recommendation(s)<sup>1</sup> addressed by this case include:

1. Urine culture

*Long Term Care Medical Directors Association of Canada*

- **Don't do a urine dip or urine culture unless there are clear signs and symptoms of a urinary tract infection (UTI).**

*Association of Medical Microbiology and Infectious Diseases Canada*

- **Don't collect urine specimens for culture from adults who lack symptoms localizing to the urinary tract or fever unless they are pregnant or undergoing genitourinary instrumentation where mucosal bleeding is expected.**

2. Treatment of asymptomatic bacteriuria

*Canadian Geriatrics Society*

- **Don't use antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present.**



*Canadian Society of Hospital Medicine*

- **Don't prescribe antibiotics for asymptomatic bacteriuria (ASB) in non-pregnant patients.**

*Canadian Nurses Association*

- **Don't recommend antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present.**

*Canadian Urological Association*

- **Don't use antimicrobials to treat asymptomatic bacteriuria in the elderly.**

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<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website: <https://choosingwiselycanada.org/recommendations/>

Slide 4:

Medicine/Emergency Medicine	
<b>Case – Mr. Akay Aye</b>	
Investigation	Result
Hemoglobin	126 (120-160 g/L)
WBC	9.8 (4-10 x 10 <sup>9</sup> /L)
Sodium	135 (135-145 mmol/L)
Potassium	4.6 (3.5-5 mmol/L)
Bicarbonate	20 (20-24mmol/L)
Creatinine	370 (50-90 µmol/L); 90µmol/L 1 month ago
Urea	24.5 (2.0-8.0 mmol/L)
INR	1.1 (0.9-1.2)
Urinalysis	Moderate leucocytes; trace nitrites
Urine culture	Results Pending

- After reviewing the investigation results, the Internal Medicine resident orders ceftriaxone 1gm IV q24h for possible Urinary Tract Infection (UTI).
- Admission orders are placed by resident with additional investigations:
  - Blood cultures x 3 sets
  - TSH; liver enzymes (ALT, GGT, ALP, Bili, albumin)
  - Abdominal ultrasound (urgent)
  - CT-KUB
  - Repeating order: Cr, urea, electrolytes, Ca, PO<sub>4</sub>, Mg, q6h
  - INR, PTT, CBC in the AM

**\*Note to presenter: Interactive Moment** - Presenter to pause and ask the trainees to reflect on the tests they would order. Trainees may wish to discuss a detailed approach to acute kidney injury. This should be de-emphasized. Trainees should instead be encouraged to discuss how their differential diagnosis, based on history and physical exam, allows them to appropriately determine and prioritize subsequent investigations and treatments.

**Questions to pose to trainees:**

You are the Medicine resident on-call overnight at a tertiary care academic centre.


1. What additional investigation(s) and/or treatment(s), if any, would you order urgently in the ER?
2. What additional investigation(s) and/or treatment(s), if any, would you order as part of the admission order set?
3. Are there any initial investigations and/or treatment(s) thus far that you would *not* have ordered? Why would you not have ordered these?

Slide 5:

Medicine/Emergency Medicine

### Case – Mr. Akay Aye

- CT KUB demonstrates distended bladder.
- Upon insertion of the Foley catheter, 1400ml of amber-coloured urine is retrieved.
- Creatinine falls to 280umol/L the first morning of admission.
- Mr. Akay Aye is initiated on pharmacotherapy for BPH. After 2 days, he urinates well without the need for intermittent catheterization.
- Mr. Akay Aye's urine culture results return, with high colony count for E. Coli. He is stepped down to an oral antibiotic to complete 7 days of antibiotic treatment for his presumed UTI.



**\*Note to presenter: Interactive Moment** - Presenter to pause and ask trainees whether the patient has had an appropriate work-up.

**Questions to pose to trainees:**

1. Has Mr. Akay Aye received appropriate care? Has there been any waste in the care that Mr. Akay Aye has received?
2. Has the Internal Medicine resident demonstrated good resource stewardship?

At this point, trainees may deliberate on what 'appropriate care' and 'resource stewardship' really mean. These concepts will be discussed in the next slides.

After reviewing these concepts, we will return to the case of Mr. Akay Aye to generate further discussion about the appropriateness of his care, and on potential harms to this patient and to our healthcare system.

**Part 1 OF THE CASE ENDS HERE.**


[Click here to resume core presentation on slide 6](#) (p. 24)

Slide 3:

Pediatrics/Primary Care

## Case - Baby Reeve Flux

- 4-month old Reeve Flux is assessed by a Family Medicine (FM) resident for his routine immunizations. His parents are concerned about a 3 week history of diarrhea.
- Birth history: Full term, low birth weight. Brief hospitalization at birth due to hypoglycemia.
- Past medical history: Assessed in clinic by the FM resident several times in the past, due to persistent spit-ups. An upper gastrointestinal (GI) series was performed which was inconclusive for gastroesophageal reflux disease.



- Feeding: Exclusively breast fed
- Medications:
  - Vit D drops
  - Ranitidine for reflux (initiated 6 weeks ago)

We begin our discussion of resource stewardship and waste in healthcare by introducing an anchoring Case Study.

In this case, a 4-month-old male infant is assessed at a primary care clinic for his routine vaccinations. Recent onset of diarrhea is incidentally brought up as a concern. Several weeks prior, he was investigated for gastrointestinal reflux (GERD) and initiated on ranitidine due to his parents' persistent concerns that the infant was spitting up.

In this case, overuse is evident because the infant was subjected to diagnostic work-up for GERD. Despite being clinically well, he was unnecessarily treated with ranitidine, which contributed to the medication side-effect of diarrhea.

The specific Choosing Wisely Canada recommendation(s)<sup>1</sup> that are relevant to this case include:

*Canadian Pediatric Society*

- Don't routinely use acid blockers or motility agents for the treatment of gastroesophageal reflux in infants.**

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<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website: <https://choosingwiselycanada.org/recommendations/>

Slide 4:

Pediatrics/Primary Care

## Case - Baby Reeve Flux

- Current history:
  - After every feed, he spits up a small amount of partially digested food particles.
  - No agitation or inconsolable crying associated with these episodes.
  - Loose stools started 3 weeks ago; 6-8/day; semi formed; no fever; no blood in stools.
- Physical exam: Growing well, all parameters crossing 15th centile (10th centile at birth). No dehydration, no rash, active, partial sitting and neck holding.
- Due to persistent reflux and new onset diarrhea, he was referred to a Pediatric Gastroenterologist.



**\*Note to presenter: Interactive Moment** - Presenter to pause and ask the trainees to reflect on the tests they would order. Trainees may wish to discuss a detailed approach to manage GERD. This should be de-emphasized. Trainees should instead be encouraged to discuss how their differential diagnosis, based on history and physical exam, allows them to appropriately determine and prioritize subsequent investigations and treatments.

**Questions to pose to trainees:**

You are the resident working at the Family MD office.


1. What additional investigation(s) and/or treatment(s), if any, would you have ordered for his reflux?
2. What additional investigation(s) and/or treatment(s), if any, would you order for his diarrhea?
3. Are there any initial investigations and/or treatment(s) thus far that you would *not* have ordered? Why would you not have ordered these?
4. Has the Family Medicine resident demonstrated good resource stewardship?

Slide 5:

Pediatrics/Primary Care

## Case - Baby Reeve Flux

- A Pediatrics resident assesses Baby Reeve in the GI clinic and orders further testing to work-up the diarrhea.
- At the follow up visit, all investigations ordered were unremarkable.



Investigation	Results
Stool bacterial culture	Negative
Rotavirus latex agglutination	Negative
Serum Anion gap	10 (8-12 mEq/L)
Serum Albumin	44 (37-55mg/L)

**\*Note to presenter: Interactive Moment** - Presenter to pause and ask trainees whether the patient has had an appropriate work-up.

**Questions to pose to trainees:**

1. Has baby Reeve received appropriate care?
2. Has there been any overuse in the care that Baby Reeve has received?
3. Have the Family Medicine resident, and later, the Pediatrics resident, demonstrated resource stewardship?

At this point, trainees can discuss whether this case illustrates how they understand overuse and resource stewardship. These concepts will be discussed in the next slides.

After reviewing these concepts, we will return to the case of Baby Reeve to generate further discussion about how overuse in this case harmed the patient, and potentially the healthcare system.

**Part 1 OF THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 6](#) (p. 24)




Slide 3:

Psychiatry/Primary Care

### Case - Mrs. Hanna Fall

- 73F is assessed at the ED after sustaining a fall while rising from a chair. She is limping with an unbalanced gait.
- Past medical history: Elevated body mass index (BMI) 29; depression; recent-onset insomnia x 4 months.
- Medications: Trazodone 50 mg p.o. qhs. Lorazepam 0.5 mg qhs was initiated two weeks prior by a Family Medicine (FM) resident for insomnia.
- Physical exam : Alert and oriented. Speaks in full sentences. BP 140/72, HR 94, RR 16, T 36.8, SPO2 96% on room air. Tender and restricted left hip range of motion .



We begin our discussion of resource stewardship and waste in healthcare by introducing an anchoring Case Study.

In this case, a 73-year-old female patient presents with a fall, resulting in a hip fracture in the context of benzodiazepine use for insomnia. She requires surgical repair and later, extended-duration rehabilitation prior to returning home. Although falls are not uncommon in elderly, prevention is possible if risk factors are appropriately considered and avoided.

The specific Choosing Wisely Canada recommendation(s)<sup>1</sup> that are relevant to this case include:

*Canadian Geriatrics Society*

- **Don't use benzodiazepines and other sedative-hypnotics in older adults as first choice for insomnia, agitation or delirium**

*The Canadian Society for Hospital Medicine*

- **Don't use benzodiazepines and other sedative-hypnotics in older adults as first choice for insomnia, agitation or delirium.**

*Canadian Psychiatric Association*

- **Don't use benzodiazepines or other sedative-hypnotics in older adults as first choice for insomnia.**

**A useful handout for residents:**

<http://www.choosingwiselycanada.org/materials/insomnia-and-anxiety-in-older-people-sleeping-pills-are-usually-not-the-best-solution/>

<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website: <https://choosingwiselycanada.org/recommendations/>


## Slide 4:

Psychiatry/Primary Care

### Case - Mrs. Hanna Fall

- The ED resident orders a hip and pelvic x-ray, which reveals a femoral neck fracture.
- Baseline bloodwork is also obtained.
- Mrs. Fall is admitted to the Orthopedic Surgery service for further management.

Investigation	Results
Hemoglobin	126 (120-160 g/L)
Platelets	205 (150-140 10E9/L)
INR	1.1 (0.9-1.2)
PTT	32 (20-40 sec)
Type and Crossmatch	O -



**Note to presenter: Interactive Moment** - Presenter to pause and ask the trainees to reflect on the tests they would order. Trainees may wish to discuss a detailed approach to management of sleep disorders. This should be de-emphasized. Trainees should instead be encouraged to discuss how their differential diagnosis, based on history and physical exam, allows them to appropriately determine and prioritize subsequent investigations and treatments.

#### Questions to pose to trainees:

You are the Emergency Medicine resident on-call taking care of Mrs. Fall.

1. What additional investigation(s) and/or treatment(s), if any, would you order?
2. Are there any initial investigations and/or treatment(s) thus far that you would *not* have ordered? Why would you not have ordered these?



Slide 5:

Psychiatry/Primary Care

### Case - Mrs. Hanna Fall

- After admission by the Orthopedic Surgery team, Anesthesia is consulted for a pre-operative assessment.
- The Anesthesia resident orders a pre-operative baseline work up, including ECG, chest x-ray, brain natriuretic peptide (BNP), and troponin level (in addition to the baseline bloodwork that had been ordered in the ED).
- Pre-op investigation results are unremarkable.
- Mrs. Fall is taken to the OR for left hip hemiarthroplasty with regional anesthetic.



**Note to presenter: Interactive Moment** - Presenter to pause and ask trainees whether the patient has had an appropriate work-up and management.

**Questions to pose to trainees:**

1. Has Mrs. Fall received appropriate care? Has there been any overuse in the care that Mrs. Fall has received?
2. Have the care providers (Family Medicine resident prescribing benzodiazepine; ED resident; Orthopedic Surgery resident; Anesthesia resident) demonstrated resource stewardship?

At this point, trainees can discuss whether this case illustrates how they understand overuse and resource stewardship. These concepts will be discussed in the next slides.

After reviewing these concepts, we will return to the case of Mrs. Hanna Fall to generate further discussion about how overuse in this case harmed the patient, and potentially the healthcare system.


**Part 1 OF THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 6](#) (p. 24)

### Slide 3:

#### Surgery/Primary Care

### Case - Mr. Ernie Ah



- 80M is assessed by the Family Medicine resident for right groin lump.
- Lump became noticeable after bending down to fix the wheel on his walker that was caught in the carpet.
- The lump is not painful and does not limit activities.
- Past medical history: DMII, HTN, hip OA.
- Physical exam: alert and oriented. BP 158/72, HR 94, RR 16, T 36.8, SPO<sub>2</sub> 96% on room air. Minimally tender inguinal hernia (size of a hen's egg) on the right side, above the inguinal ligament. The hernia reduces spontaneously when the patient is supine.

We begin our discussion of resource stewardship and waste in healthcare by introducing an anchoring Case Study.

Acknowledgement to Dr. Michael Kwan, General Surgeon at the University of Calgary, for reviewing the context for plausibility and applicability.

In this case, an 80M is assessed at a primary care clinic regarding a new right groin lump. The lump is asymptomatic, and thought to be an inguinal hernia on exam. However, the patient is sent for ultrasonography to confirm the presence of the hernia, and he is referred to see General Surgery for consideration of surgical management. The patient is booked for surgery. Subsequently, the patient experiences ongoing post-operative pain requiring repeated visits to the general surgeon and the family physician for follow-up, and is dependent on oxycodone to manage his pain for an extended duration of time.

The specific Choosing Wisely Canada recommendation(s)<sup>1</sup> that are relevant to this case include:

*The Canadian Association of General Surgeons*

- **Avoid repair of minimally symptomatic inguinal hernias where appropriate by offering an option of watchful waiting for up to two years**

<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website:


<https://choosingwiselycanada.org/recommendations/>

### Slide 4:

Surgery / Primary Care

### Case - Mr. Ernie Ah

- 80M with suspected asymptomatic right inguinal hernia.
- Family Medicine Resident sends Mr. Ah for a US, to confirm the diagnosis, to rule out complications and to provide objective evidence to facilitate referral to General Surgery.
- US visualizes a small 3 cm reducible inguinal hernia.
- Mr. Ah is called back to the office to discuss the results and the potential complications of an unrepaired inguinal hernia.
- General Surgery referral is initiated, triaged as semi-urgent.



**Note to presenter: Interactive Moment** - Presenter to pause and ask the trainees to reflect on the tests they would order. Trainees may wish to discuss a detailed approach to manage asymptomatic hernias. This should be de-emphasized. Trainees should instead be encouraged to discuss how their differential diagnosis, based on history and physical exam, allows them to appropriately determine and prioritize subsequent investigations and treatments.

#### Questions to pose to trainees:

You are the resident in the Family MD office.

1. What additional investigation(s) and/or treatment(s), if any, would you have ordered?
2. How would you manage this patient's condition?
3. Would you refer the patient to see a general surgeon?

You are the resident working in the General Surgery office.


1. Is this the type of patient that should be referred for semi-urgent assessment by General Surgery?
2. Would you have obtained the baseline US for this patient? Why or why not?

### Slide 5:

#### Surgery/Primary Care

### Case - Mr. Ernie Ah

- The General Surgery resident assesses the patient in clinic.
- Explains that unrepaired hernias can lead to complications, such as hernia incarceration, and discusses surgical repair. The patient wishes to proceed.
- The staff surgeon's schedule reveals OR availability in 4 months' time.
- The patient is booked for hernia repair.
- The patient has an uncomplicated Day Surgery and is discharged home.
- The surgeon arranges routine follow-up in 4 weeks' time.



**\*Note to presenter: Interactive Moment** - Presenter to pause and ask trainees whether the patient has had an appropriate work-up.

#### Questions to pose to trainees:

1. Has Mr. Ah received appropriate care? Has there been any overuse in the care that Mr. Ah has received?
2. Have the resident physicians (Family Medicine, General Surgery) involved in this case demonstrated resource stewardship?

At this point, trainees can discuss whether this case illustrates how they understand overuse and resource stewardship. These concepts will be discussed in the next slides.

After reviewing these concepts, we will return to the case of Mr. Ernie Ah to generate further discussion about how overuse in this case harmed the patient, and potentially the healthcare system.

#### **Part 1 OF THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 6](#) (p. 24)




Slide 3:

Surgical/Anesthesia/Internal Medicine/Primary Care/Pre-op

## Case - Mrs. Alda Ritis

- 65F is seen at Orthopedic pre – assessment clinic for knee osteoarthritis causing pain and limiting mobility.
- Past medical history: HTN.
- Physical exam: alert and oriented. BP 138/72, HR 94, RR 16, T 36.8, SPO<sub>2</sub> 96% on room air. BMI 28. Severe crepitus and pain on knee joint examination with limited range of motion .
- Orthopedic surgeon recommends right total knee arthroplasty to manage severe osteoarthritis.



We begin our discussion of resource stewardship and waste in healthcare by introducing an anchoring Case Study.

In this case, a 65-year-old female is advised to undergo an elective orthopedic procedure to manage knee osteoarthritis. She is otherwise healthy and is a low-risk surgical candidate. However, during the routine pre-operative assessment, a CXR was ordered, and incidentally, a lung nodule was detected. Further investigation ultimately leads to increased patient anxiety and delays her elective procedure.

The case highlights unnecessary preoperative testing that sometimes occurs as part of “routine work-up” in low-risk surgical procedures.

The specific Choosing Wisely Canada recommendation(s)<sup>1</sup> that are relevant to this case include:

*Society of General Internal Medicine*

- **Don't perform routine pre-operative testing before low-risk surgical procedures.**

*Canadian Society for Transfusion Medicine*

- **Don't order unnecessary pre-transfusion testing (type and screen) for all preoperative patients.**

*Canadian Anesthesiologists' Society*

- **Don't order baseline laboratory studies (complete blood count, coagulation testing, or serum biochemistry) for asymptomatic patients undergoing low-risk non-cardiac surgery.**
- **Don't order a baseline electrocardiogram for asymptomatic patients undergoing low-risk non-cardiac surgery.**
- **Don't order a baseline chest X-ray in asymptomatic patients, except as part of surgical or oncological evaluation.**

*Canadian Association of General Surgeons,*

- **Avoid admission or preoperative chest X-rays for ambulatory patients with unremarkable history and physical exam.**

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<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty.* Last retrieved July 31, 2017, from Choosing Wisely Canada's website:

<https://choosingwiselycanada.org/recommendations/>

**Slide 4:**

Surgical/Anesthesia/Internal Medicine/Primary Care/Pre-op

## Case - Mrs. Alda Ritis

- Mrs. Ritis is assessed by the Anesthesia resident in the Pre-operative Clinic.
- Mrs. Ritis has no history of any medical conditions aside from HTN; she has had no prior surgery.
- She is a lifelong non-smoker and consumes alcohol socially.
- She swims laps 4 times/week for 1 hour each time.
- The Anesthesia resident orders baseline lab work including a CBC, chemistry panel, coagulation factors, HbA1C; an electrocardiogram (EKG); and a chest radiograph (CXR).



**Note to presenter: Interactive Moment** - Presenter to pause and ask the trainees to reflect on the tests they would order. Trainees may wish to discuss detailed preoperative management of low risk patients. This should be de-emphasized. Trainees should instead be encouraged to discuss how the history and physical exam allows them to appropriately select and prioritize investigations.

**Questions to pose to trainees:**

You are the Anesthesia resident.

1. What additional investigation(s) and/or treatment(s), if any, would you have ordered for her reflux?
2. What additional investigation(s) and/or treatment(s), if any, would you order as part of the pre-operative assessment?
3. Are there any initial investigations thus far that you would *not* have ordered? Why would you not have ordered these?

Slide 5:

**Surgical/Anesthesia/Internal Medicine/Primary Care/Pre-op**

## Case - Mrs. Alda Ritis

- The CXR shows a small nodule at right lung apex.
- The surgeon delays her knee replacement to refer her to Respiriology for workup. The Respiriology resident assesses the patient, ordering a chest CT, which shows a 1.2 cm calcified lung nodule with no high-risk features.
- For "thoroughness", the Respiriology resident orders a CT-guided lung biopsy.

Investigation	Result
Hemoglobin	126 (120-160 g/L)
WBC	9.8 (4-10 x 10 <sup>9</sup> /L)
Platelets	205 (150-140 10E9/L)
Sodium	135 (135-145 mmol/L)
Potassium	4.6 (3.5-5 mmol/L)
Creatinine	80 (50-90 μmol/L)
INR	1.1 (0.9-1.2)
PTT	32 (20-40 sec)
HbA1C	5.8 (4.0-6.0%)

**Note to presenter: Interactive Moment** - Presenter to pause and ask trainees whether the patient has had an appropriate work-up.

Has Mrs. Ritis received appropriate care? Has there been any overuse in the care that Mrs. Ritis has received?

Have the resident physicians (Anesthesia and Respiriology) involved in this case demonstrated resource stewardship?

At this point, trainees can discuss whether this case illustrates how they understand overuse and resource stewardship. These concepts will be discussed in the next slides.

After reviewing these concepts, we will return to the case of Mrs. Alda Ritis to generate further discussion about how overuse in this case harmed the patient, and potentially the healthcare system.

**Part 1 OF THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 6](#) (p. 24)



## Slide 6:

### Resource Stewardship

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## Resource stewardship = parsimonious medicine

Care that uses the most efficient means to effectively diagnose a condition and treat patients. It respects the need to use resources wisely, and ensures that resources are equitably available and used judiciously.

**Resource stewardship is the appropriate and responsible use of resources to achieve high value, effective care.**

The ACP Ethics Manual (Sixth Edition) suggests that “Physicians have a responsibility to practice effective and efficient healthcare and to use healthcare resources responsibly. Parsimonious care that uses the most efficient means to effectively diagnose a condition, and treat a patient, respects the need to use resources wisely...”<sup>1</sup>

Berwick<sup>2</sup> has noted three types of quality and safety problems related to stewardship:

- 1) Underuse – omission of appropriate care (ex. failure to order a screening colonoscopy for a 50-year-old patient with a family history of colon cancer).
- 2) Misuse – failure to properly execute clinical care plans and procedures<sup>2</sup> (ex. ordering a screening colonoscopy in an 80-year-old patient with average risk of colon cancer; guidelines suggest stopping screening in adults aged 75 and older).
- 3) Overuse – unnecessary use of health resources and procedures that are not supported by evidence, or that may be duplicative of other tests previously done<sup>2</sup> (ex. ordering multiple colon cancer screening modalities for the same average-risk patient, such as fecal immunohistochemical testing (FIT) followed by colonoscopy and/or CT colonography).

Data suggests that we have traditionally focused QI efforts on underuse problems.<sup>3</sup> While underuse problems are important, we now need to also recognize that there are overuse problems – that is the impetus for resource stewardship. Resource stewardship can address overuse.

You may have encountered other terms and concepts that are synonymous with overuse. Some of these terms include over diagnosis; over testing; overtreatment; too much medicine; inappropriateness; overutilization; waste; low-value care.

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<sup>1</sup> Snyder L, American College of Physicians Ethics, Professionalism and Human Rights Committee. 2012 American College of Physicians Ethics Manual: sixth edition. *Annals of Internal Medicine*. **156**(1 Pt 2):73-104.

<sup>2</sup> Berwick, DM. 2002. A User's Manual for the IOM's 'Quality Chasm' Report. *Health Affairs*. **21**(3): 80-90.

<sup>3</sup> Kale MS, TF Bishop, AD Federman and S Keyhani. 2013. Trends in the Overuse of Ambulatory Healthcare Services in the United States. *JAMA Internal Medicine*. **173**(2):142-148.

## Slide 7:



How is high-value care defined?

Providing high-value care means providing the highest quality care at the lowest cost. As demonstrated by the value equation - **value can be improved by either increasing quality or decreasing cost.**

Quality is defined by the Institute of Medicine<sup>1</sup> as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.”

The Institute of Medicine has six Quality domains<sup>1</sup>:

- **Safe:** Avoiding injuries to patients from the care that is intended to help them
- **Patient-Centered:** Providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring patient values guide all clinical decisions
- **Efficient:** Avoiding waste, including waste of equipment, supplies, ideas, and energy
- **Effective:** Providing services based on scientific knowledge to all who could benefit, and refraining from providing services to those unlikely to benefit
- **Equitable:** Providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status
- **Timely:** Reducing waits and sometimes harmful delays for both those who receive and those who give care

The burden of care for patients can be significant; this is an often under-recognized harm, or “cost” in health care. When discussing cost, monetary considerations often come to mind, but “cost” should be viewed more broadly as expenses, both financial and non-financial, to the patient, to the system, and to society.

**(THERE IS AN INTERACTIVE EXERCISE RELATED TO COST COMING UP)**

Providing high-value care does not equate to healthcare practitioners selecting the lowest-cost care option in every case. Some low-cost interventions may decrease value if they provide minimal benefit, or if they unjustifiably increase downstream costs. Conversely, some high-quality treatments (i.e. chemotherapy; coronary artery bypass grafting surgery (CABG)) may be expensive, yet they offer good value because they help to achieve the best possible patient outcome<sup>2</sup>.

In their 2014 Policy document, the CMA indicated that they believe “fiscal benefits and cost savings of exercises in accountability and appropriateness in clinical care are a by-product rather than the primary focus of these exercises.”<sup>3</sup>

Value is an important concept to understand when making clinical decisions, helping us to remember that for each additional procedure and associated cost, the relative clinical benefits and patient experience should be factored into the ultimate treatment decision<sup>2</sup>.

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<sup>1</sup> Institute of Medicine (IOM). 2001. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, D.C: National Academy Press.

<sup>2</sup> Institute for Healthcare Improvement. *Open School Course TA 103: Quality, Cost, and Value in Health Care*. Last retrieved November 21, 2016 from <http://ihi.org> on

<sup>3</sup> Canadian Medical Association. *CMA Policy Document PD15-05. Appropriateness in Health Care*. Last retrieved July 27, 2017 from <http://policybase.cma.ca/dbtw-wpd/Policypdf/PD15-05.pdf>

## Slide 8



The definition of quality, the value equation and the notion that cost goes far beyond dollars and cents.

**\*Note to presenter: Interactive Moment** – the presenter can ask the audience what non-monetary “costs” that patients, the system, and society may face when unnecessary care is delivered.

**Direct costs to patients:** out-of-pocket expenses (i.e. parking, transportation); time; anxiety; iatrogenic harm.

**Direct costs to the system:** time; personnel resources; equipment, supplies and procedural expenses; increased wait-times across the system.

**Downstream costs and harm to patients:** further follow-up appointments and procedures; long-term side effects (i.e. cellular damage and malignancy risk related to CT imaging); hospital-acquired infections; exposure to multi-drug resistant microorganisms.

**Opportunity costs:** time the patient spends away from work and responsibilities; time and resources directed away from other patients who may be in greater need; system delays resulting from unnecessary resource use.

The impact of inappropriate use of treatments and procedures can also be viewed from a micro-meso-macro systems perspective.

### Micro:

Individual harm to patients and their family, including direct harm (examples: time, anxiety, related out-of-pocket expenses, clinical harm, false-positives); direct downstream impact (examples: follow-ups and further procedures, long-term side effects, cumulative radiation exposure from imaging, infections acquired from exposure to healthcare facilities); and opportunity costs (example: time spent away from work, family and responsibilities)

**Meso:**

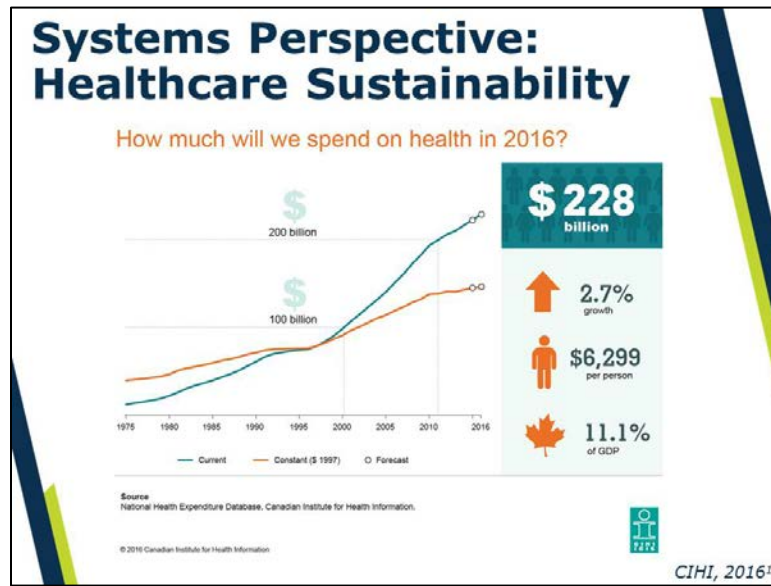
Harms to the health system and its organizations, including time, financial cost, personnel resources, overburdened emergency departments

**Macro:**

Deplete finite resources that could be redistributed to address other societal needs, which ultimately impacts population health outcomes. Examples of societal needs include:

- Health Promotion (examples: disease prevention, promotion of health equity, addressing the social determinants of health)
- Other publicly-funded sectors (examples: education, housing, environment, public transportation, infrastructure)

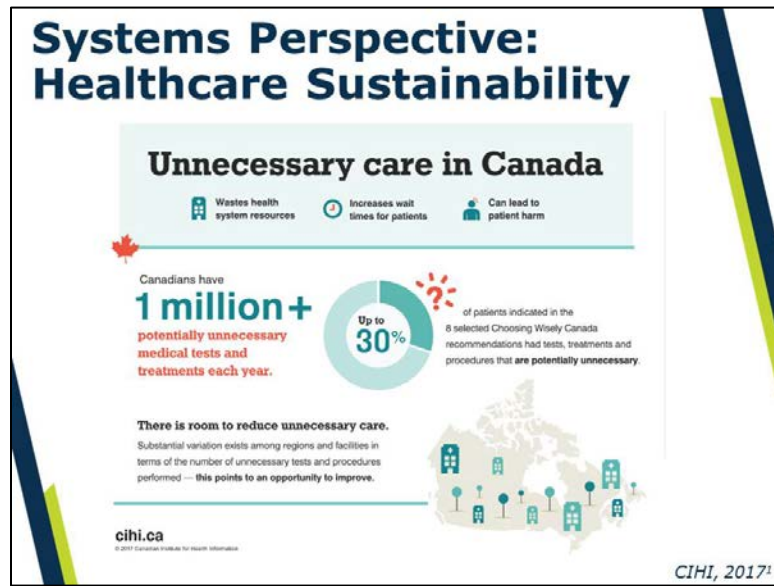
## Slide 9:



Before delving into the specifics of resource stewardship, it is important to take a broader systems perspective. The concepts of sustainability and waste are rooted in growing concern about healthcare spending. In 2016, healthcare spending in Canada was estimated at \$228 billion<sup>1</sup>, which has increased by \$68 billion since 2007. Healthcare costs grow by 2.7 percent per year.

<sup>1</sup>Canadian Institute for Health Information. *National Health Expenditures: How much does Canada spend on health care?* Last retrieved July 31, 2017 from <https://www.cihi.ca/en/nhex2016-topic1>

## Slide 10:



A recent Choosing Wisely Canada - CIHI report<sup>1</sup> highlighted that up to 30 per cent of healthcare spending can be unnecessary, demonstrating how overuse and unnecessary care have been driving increases in healthcare spending.

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<sup>1</sup>Canadian Institute for Health Information. *Unnecessary Healthcare in Canada*. Last retrieved July 31, 2017 from <https://www.cihi.ca/en/unnecessary-care-in-canada-infographic>



## Slide 11:



This is adapted from an interesting paper by Don Berwick that discusses the “wedges of waste” in the US healthcare system. The paper discusses the increasing waste in healthcare. The percentage of a nation’s GDP spent on healthcare, in a sustainable system, should be constant. Berwick identifies wedges (or increases) in this percentage, projected to be directly attributable to each type (wedge) of waste. Two wastes, failures of care delivery and care coordination, reflect issues with underuse and misuse, while another wedge represents overuse (overtreatment). There is an estimate that nearly 30 per cent of care delivered is duplicative, or unnecessary, and may not improve patients’ health<sup>1</sup>.

Physicians are key to resolving the expenditure problems faced by all health systems worldwide. Physician decision-making drives 80 per cent of all healthcare costs<sup>2</sup>. For instance, consider that physicians determine which patients are seen and how frequently; which patients are hospitalized; which tests, procedures, and surgical operations are administered; which technologies are used; and which medications are prescribed.

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<sup>1</sup> Berwick D and AD Hackbarth. 2012. Eliminating Waste in US Health Care. *JAMA*. **307**(14):1513-1516

<sup>2</sup> Emmanuel R and A Steinmetz. 2013. Will Physicians Lead on Controlling Healthcare Costs? *JAMA*. **310**(4):374-375

## Slide 12:

### Stewardship ≠ Rationing

"There is a misperception that resource stewardship and rationing care are one in the same. **This is not true.** **Rationing** is when health care providers decide who receives effective health care tests, treatments or procedures based on certain criteria, such as age. **Resource stewardship** is when health care providers do not provide care to patients which evidence shows is not effective. These decisions are made collaboratively with the patient. We need to give each patient the care that they need, but also consider what they don't need and avoid care that can cause harm."

*-Dr. Wendy Levinson  
IHI Open School course video<sup>1</sup>*

**A common misunderstanding is that resource stewardship is rationing of healthcare<sup>1</sup>.** Resource stewardship is *not* about rationing care. Rationing care refers to mechanisms to allocate limited healthcare resources. For instance, a patient in the emergency department following a motor vehicle accident will have immediate or rapid access to a CT, as compared to a patient referred by their family physician for a CT for a non-urgent concern.

Rationing is sometimes politicized by media or other interest groups as the prevention of access to healthcare services. Rationing can become a politically sensitive issue, for example around expensive cancer medications and the clinical criteria (e.g., tumour size, type) for patients to access such medications.<sup>2</sup>

Resource stewardship, however, is not about prioritizing access to care, but rather about utilizing the most efficient means to diagnose or treat a disease.<sup>3</sup>

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<sup>1</sup> IHI Open School - *Resource Stewardship in Medicine*. Last retrieved July 31, 2017 from <https://vimeo.com/93605940>

<sup>2</sup> American College of Physicians. *Medical Ethics and the Stewardship of Healthcare Resources*. Last retrieved July 27, 2017 from <https://www.acponline.org/clinical-information/ethics-and-professionalism/ethics-issues-and-position-papers/medical-ethics-and-the-stewardship-of-health-care-resources>.

<sup>3</sup> Canadian Medical Association. *CMA Policy Document PD15-05. Appropriateness in Health Care*. Last retrieved July 27, 2017 from [https://www.cma.ca/Assets/assets-library/document/en/advocacy/policy-research/CMA\\_Policy\\_Appropriateness\\_in\\_Health\\_Care\\_PD15-05-e.pdf](https://www.cma.ca/Assets/assets-library/document/en/advocacy/policy-research/CMA_Policy_Appropriateness_in_Health_Care_PD15-05-e.pdf)

Slide 13:



Providing high-value care aligns with important ethical principles, which include:

**Beneficence:** Promote the well-being of others.

**Non-maleficence:** Do no harm to others.

**Justice:** Distribute resources fairly and equitably.

**Autonomy:** Respect the individual's rights and opinions.

The IHI Open School Module TA 103: Quality, Cost, and Value in Healthcare explains that the principles of “**beneficence** and **non-maleficence** support care that improves patient outcomes while minimizing harm and costs. **Justice** means allocating time, money, and energy into high-value interventions, so that finite resources are being used appropriately and neither wasted nor underutilized.”<sup>1</sup>

Ordering unnecessary interventions that are of minimal benefit to patient, yet may cause physical harm to patients (such as exposure to ionizing radiation with imaging; antibiotic-associated diarrhea; or worse, *C. difficile* infection) or adverse financial consequences for patients (such as time spent away from work; out-of-pocket expenses such as parking fees, medication costs) is counter to the principle of non-maleficence. Furthermore, spending scarce resources on unnecessary interventions depletes finite resources that could be redistributed to address other societal needs, thus undermining the medical profession's commitment to the ethical principle of social justice.<sup>2</sup>

**Autonomy** is an individual's right to make his or her own healthcare decisions. If patients ask for low-value interventions, should healthcare professionals grant these requests?

**\*Note to presenter: Interactive Moment** - The speaker can pose the following questions to trainees:

“Think about a situation when a patient asked you for a test that you didn’t think would add value to their care, or change clinical management”; or

“How might you address a patient who requests an unnecessary test?”

You may choose to hear from the learners their responses to these questions, or have them reflect and share during a later interactive moment. Alternatively, you could have them share their reflection with someone sitting close to them.

Patients can only exercise the right to make their own informed healthcare decisions when they have access to the full information and proper understanding of the evidence-based options available, and the risks and benefits of each care option. Respecting patient autonomy requires that health professionals educate, inform, and counsel patients about the evidence and rationale for selecting (or not selecting) a given intervention. The principle of autonomy does not advocate for physician compliance with patients’ demands for non-evidenced-based care.<sup>1, 2</sup>

As will be discussed later on in this Foundations Toolkit, as well as in the separate Communications Toolkit, when a patient is adamant about getting a test, the most important question to ask is, “What is your greatest worry?” Dr. Wendy Levinson explains that if clinicians can address the patient’s worries, the patient may no longer request the test. Dr. Levinson further acknowledges, however, that if, after a deep discussion with the patient, he/she is persistent, the clinician may consider ordering the test, because in some cases, the psychosocial benefits, which contribute to value, may outweigh the costs.<sup>1</sup> However, one systematic review found that the psychological benefits of ordering a test for reassurance are minimal.<sup>3</sup>

Ultimately, discussing appropriateness of tests, treatments and procedures are a part of providing patient-centered care. Patient-centred care should be distinguished from patient-directed care. In the former, patients’ goals and preferences are considered with the best available evidence and clinical judgement, often using shared decision-making, to help inform the right care for each person. In patient-directed care, clinicians provide interventions to satisfy patients’ requests; some of these interventions may lack evidence, and could even be harmful.

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<sup>1</sup> Leon-Carlyle M, R Srivastava and B Wong. 2014. *IHI Open School Online Courses. TA 103: Quality, Cost, and Value in Health Care*. Last retrieved December 16, 2016 from: <http://app.ihi.org/lms/home.aspx>

<sup>2</sup> Levinson W, S Ginsburg , FW Hafferty, CR Lucey. 2014. Fair and Ethical Stewardship of Healthcare Resources. In: Levinson W, Ginsburg S, Hafferty FW, Lucey CR, eds. *Understanding Medical Professionalism*. New York, NY: McGraw-Hill.

<sup>3</sup> van Ravesteijn H, I van Dijk, D Darmon, F van de Laar, P Lucassen, T Olde Hartman. 2012. The reassuring value of diagnostic tests: A systematic review. *Patient Education and Counseling*. **86**(1):3-8

## CASE STUDY

For **slides 14-15**, we return to the anchoring case study. Please continue with the case study you selected at the start of the presentation

Click to be directed to your specialty-specific case:

1. [Medicine/Emergency Medicine](#) (p.37)
2. [Pediatrics/Primary Care](#) (p. 40)
3. [Psychiatry/Primary Care](#) (p. 43)
4. [Surgical/Primary Care](#) (p. 46)
5. [Surgical/Anesthesia/Internal Medicine/Primary Care](#) (p. 49)


If you have opted to use your own customized case, [click here to resume core presentation on slide 16](#) (p. 53)

Slide 14:

Hospital Medicine

## Case – Mr. Akay Aye: Harm from Care

- Mr. Akay Aye does well after being discharged from hospital, and completes his 7-day course of antibiotic therapy.
- He develops loose stools and his frequent bathroom visits become burdensome.
- He visits his Family MD and is reviewed by the Family Medicine resident, who checks his electrolytes and creatinine and orders stool Culture and Sensitivity (C&S), Ova and Parasites (O&P) and Clostridium Difficile Toxin.
- After waiting 48 hours, Mr. Akay Aye receives a call from his Family MD's office reassuring him that the investigation results are normal.



**\*Note to presenter: Interactive Moment** - This is an exercise to evaluate the true “costs” of care for Mr. Akay Aye. What were the direct costs to Mr. Akay Aye and to the system? What about downstream costs and opportunity costs?

Recall that earlier when you introduced the concept of value, you provided the learners with categories of costs. If learners are struggling to come up with examples of costs you can remind them of these categories.

**Direct costs to Mr. Akay Aye:**

- Delay in treatment of obstructive etiology of renal failure due to over-reliance on testing and underuse of physical exam and bedside bladder scanning to diagnose the problem.
- Anxiety associated with extensive laboratory testing and of multiple radiographic procedures
- Confusion about the clinical significance of positive urine culture.
- Sleep interruption from frequency of phlebotomy; blood loss from frequent phlebotomy (refer back to initial orders in the Case Study), pain and other risks with phlebotomy.

**Downstream costs to Mr. Akay Aye:**

- Exposure to CT radiation (cellular damage and malignancy risk related to CT imaging).<sup>1,2</sup>
- Antibiotic treatment for E.coli positive urine culture with medication costs and the risk of medication side effects.

**Direct costs to system:**

- Personnel resources directed away from other patients while performing Mr. Akay Aye's frequent phlebotomies.



- Use of a CT time slot for Mr. Akay Aye, directed away from a patient who has a necessary indication for the test.

**Downstream costs to system:**

- Antibiotic treatment for E.coli positive urine culture contributes to the risk of systemic antimicrobial resistance and development of infections such as C. difficile.

**Opportunity costs:**

- Laboratory and radiology department delays and increased wait-times due to providing these unnecessary services for Mr. Akay Aye.

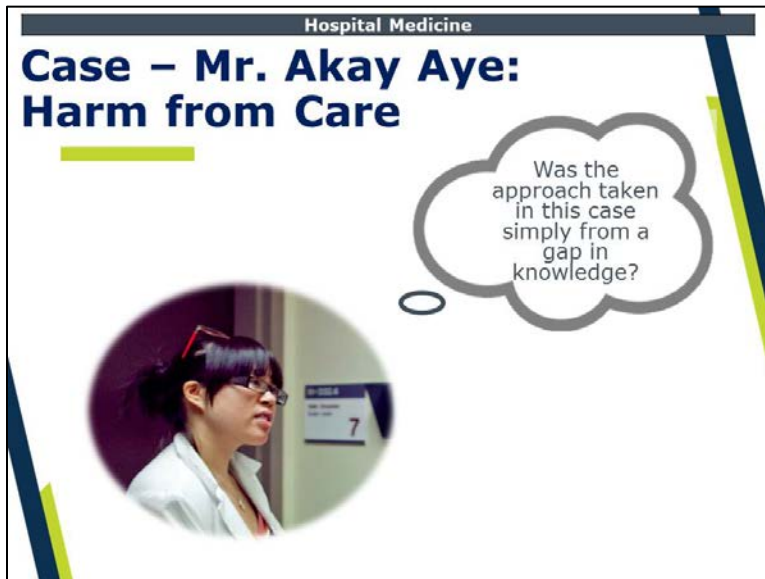
- If referred to Nephrology or Urology, would increase the wait-list and wait-times for other patients referred to this Speciality service.

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<sup>1</sup> Sodickson A, PF Baeyens, kp Andriole, LM Prevedello, RD Nawfel, R Hanson and R. Khorasani. 2009. Recurrent CT, cumulative radiation exposure, and associated radiation-induced cancer risks from CT of adults. *Radiology*. **251**(1):175-84.

<sup>2</sup> Pearce MS, JA Salotti, MP Little, K McHugh, C Lee, KP Kim, NL Howe, CM Ronckers, P Rajaraman, AW Craft, L Parker, and A Berrington de González. 2012. Radiation exposure from CT scans in childhood and subsequent risk of leukaemia and brain tumours: a retrospective cohort study. *The Lancet*. **380**(9840):499-505.

Slide 15:



Resource stewardship goes beyond appropriateness. It is understanding that underuse, misuse and overuse are examples of harm. Trainees are often quickly able to come up with examples of how inappropriate or wasteful care has resulted in harm to patients such as the one in this case.

Let us say that the resident in this case now understands the harms, and is committed to becoming a champion for resource stewardship.

Was this case simply a medical “knowledge gap” for the resident? If he were to encounter a similar case on-call tonight, how likely would he follow resource stewardship principles, and provide high-value care to the next patient?

The answers to these questions are complex, as the resident’s behaviour was likely driven by a number of factors, only one of which may have been a knowledge gap. Trainees not only encounter barriers to practicing resource stewardship, but may even have enablers that drive their overuse behaviour. Going forward, you will explore these barriers with the learners and discuss opportunities to overcome them.

**THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 16](#) (p. 53)



**Slide 14:**

Pediatrics/Primary Care

## Case - Baby Reeve Flux: Harm from Care

- As Reeve continued to weight gain despite the spit-ups, his Ranitidine was stopped with reassurance that 'spit-ups' are not true reflux.
- At the follow-up GI appointment three weeks later, the diarrhea had resolved.



**\*Note to presenter: Interactive Moment:** This is an exercise to evaluate the true “costs” of care for Baby Reeve. What were the direct costs to Baby Reeve, his parents, and to the system? What about downstream costs and opportunity costs?

Recall that earlier when you introduced the concept of value, you provided the learners with categories of costs. If learners are struggling to come up with examples of costs you can remind them of these categories.

**Direct costs to Baby Reeve and family:**

- Anxiety associated with laboratory testing and of radiographic procedures.
- Confusion about the clinical significance of reflux and weight gain.
- Onset of diarrhea due to medication side effect.
- Interruption in normal activity due to frequent diarrhea.
- Additional urgent care visits; pain during phlebotomy.
- Time off work; parking and other expenses associated with repeated visits.

**Downstream costs to Baby Reeve:**

- Exposure to radiation with upper GI series.
- Potential antibiotic treatment (depending on care provider) for diarrhea.

**Direct costs to system:**

- Lab personnel resources directed away from other patients while performing Baby Reeve’s unnecessary tests.
- Use of an imaging time slot for Baby Reeve, directed away from a patient who has a necessary indication for the test.

**Downstream costs to system:**

- If Baby Reeve is treated with ranitidine for an extended duration of time, this could result in a change in his microbial flora, thus increasing the risk of infection.

**Opportunity costs:**

- Laboratory and radiology department delays and increased wait-times due to providing these unnecessary services for Baby Reeve.

- If referred to Gastroenterology, would increase the wait-list and wait-times for other patients referred to this Specialty service.

Slide 15:

Pediatrics/Primary Care

## Case - Baby Reeve Flux: Harm from Care

Was the approach taken in this case simply from a gap in knowledge?

How can trainees consider the resource stewardship implications for Baby Reeve's case?

Would they make different clinical decisions for a similar patient? The answers to these questions are complex, as the resident's behaviour was likely driven by a number of factors, only one of which may have been a knowledge gap. Trainees not only encounter environmental and cultural barriers to practicing resource stewardship, but may even have enablers that drive their overuse behaviour. Going forward, you will explore these barriers with the learners and discuss opportunities to overcome them.

**THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 16](#) (p. 53)

**Slide 14:**

Psychiatry/Primary Care

### Case - Mrs. Hanna Fall: Harm from Care

- Mrs. Fall's post-op course from the left hip hemiarthroplasty was complicated by significant pain requiring multiple analgesics, including acetaminophen, Gabapentin, and hydromorphone.
- She had a prolonged hospital stay due to delayed progress with rehabilitation goals.
- She was eventually transferred to a rehabilitation centre, where she remained for 3 months.
- Once discharged, home-care was arranged for bath assist.
- Her lorazepam was tapered and then stopped. She was reassessed by her Family MD for insomnia and her hydromorphone was gradually tapered off.



**Note to presenter: Interactive Moment:** This is an exercise to evaluate the true “costs” of care for Mrs. Fall. What were the direct costs to Mrs. Fall and to the system? What about downstream costs and opportunity costs?

Recall that earlier when you introduced the concept of value, you provided the learners with categories of costs. If learners are struggling to come up with examples of costs, you can remind them of these categories.

**Direct costs to Mrs. Fall**

- Harm caused by side effect of benzodiazepine medication
- Exposure to radiation (X-Ray)
- Pain and suffering due to fall, and exposure to risks of opiate medications to treat post-operative pain
- Prolonged hospital admission and later, rehabilitation facility
- Anxiety associated with admissions and future loss of independence

**Downstream costs to Mrs. Fall:**

- Exposure to radiation (cellular damage and malignancy risk related to CT imaging)
- Potential for pneumonia, pressure ulcers, etc. after post-operative immobility
- Potential for exacerbation of pre-existing depression
- Home-care and mobility aid costs

**Direct costs to system:**

- Admission to hospital for a potentially preventable cause (including OR time, etc....)
- Consultative services by multiple specialty care providers

**Opportunity costs to system:**

- Laboratory and radiology department delays and increased wait-times due to providing these services for Mrs. Fall, which could have been prevented
- Increase in waitlist time for rehabilitation facility
- Increased demands on home-care services after Mrs. Fall is sent home from the rehabilitation facility.

**Slide 15:**



How can trainees consider the resource stewardship implications for Mrs. Hanna Fall's case?

Would they make different clinical decisions for a similar patient? The answers to these questions are complex, as the resident's behaviour was likely driven by a number of factors, only one of which may have been a knowledge gap. Trainees not only encounter environmental and cultural barriers to practicing resource stewardship, but may even have enablers that drive their overuse behaviour. Going forward, you will explore these barriers with the learners and discuss opportunities to overcome them.

**THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 16](#) (p. 53)

### Slide 14:

Surgery/Primary Care

### Case – Mr. Ernie Ah: Harm from Care

- Mr. Ernie Ah experiences surgical site pain. He sees the Family MD the next day for reassessment and additional analgesic medication.
- 2 weeks later, Mr. Ernie Ah is still in pain. The Family MD palpates a right groin bulge.
- Mr. Ernie Ah is sent for a repeat US, which shows a small seroma. He is maintained on scheduled acetaminophen and oxycodone PRN for pain.
- His scheduled follow-up appointment with the General Surgeon was uneventful and he was discharged from surgical care.
- 6 months later, Mr. Ernie Ah is still experiencing pain, and a right-sided lump is still palpable. His family MD sends him for another repeat US, which reveals hernia recurrence.



**\*Note to presenter: Interactive Moment:** This is an exercise to evaluate the true “costs” of care for Mr. Ernie Ah. What were the direct costs to Mr. Ernie Ah and to the system? What about downstream costs and opportunity costs?

Do you think Mr. Ernie Ah would have chosen to proceed with the surgery if he knew of these risks, as well as the benefits?

Recall that earlier when you introduced the concept of value, you provided the learners with categories of costs. If learners are struggling to come up with examples of costs you can remind them of these categories.

#### **Direct costs to Mr. Ernie Ah:**

- Anxiety associated with going for US imaging of his hernia, as well as repeat US to evaluate post-operative pain and potential surgical complications.
- Time attending unnecessary testing and follow-up appointments.
- Out of pocket expenses attending the appointments and purchasing analgesic medication.
- Iatrogenic harm following the operation, with development of chronic inguinal pain.

#### **Downstream costs to Mr. Ernie Ah:**

- Follow-up appointments with Family MD to manage pain and hernia recurrence.
- Potential surgical re-referral +/- operation for recurrent hernia.
- Potential analgesic medication-dependency; associated medication costs; and the risk of medication side effects.



**Direct costs to system:**

- Personnel resources (Radiology technicians, Surgical team, Family physician) directed away from other patients, while involved in Mr. Ernie Ah's investigations and management.
- Use of time slots for Mr. Ernie Ah, directed away from other patients who have a necessary indication(s) for the test and/or procedure.

**Opportunity costs for system:**

- Radiology department, operating room, and Family Medicine office delays and increased wait-times due to providing these unnecessary services for Mr. Ernie Ah.
- Increase in the wait-list and wait-times for other patients referred to the General Surgery service.

**Opportunity costs for Mr. Ernie Ah:**

- Time the patient spends away from activities, friends, and family at appointments and recovering from surgery.
- Activity limitations resulting from chronic inguinal pain.



Slide 15:

The slide is titled "Surgery/Primary Care" and "Case - Mr. Ernie Ah: Harm from Care". It features a circular photograph of a man in blue scrubs and glasses looking down. A thought bubble next to him contains the text: "Was the approach taken in this case simply from a gap in knowledge?"

How can trainees consider the resource stewardship implications for Mr. Ernie Ah's case?

Would they make different clinical decisions for a similar patient? The answers to these questions are complex, as the resident's behaviour was likely driven by a number of factors, only one of which may have been a knowledge gap. Trainees not only encounter environmental and cultural barriers to practicing resource stewardship, but may even have enablers that drive their overuse behaviour. Going forward, you will explore these barriers with the learners and discuss opportunities to overcome them.

**THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 16](#) (p. 53)

**Slide 14:**

Surgical/Anesthesia/Internal Medicine/Primary Care/Pre-op

## Case – Mrs. Alda Ritis: Harm from Care

- After 4 months of investigation and follow-up appointments, her nodule is determined to be benign based on pathology results.
- She is booked for her knee surgery three months later.
- She undergoes the operation without complications.



**Note to presenter: Interactive Moment** - This is an exercise to evaluate the true “costs” of care for Mrs. Ritis. What were the direct costs to Mrs. Ritis and to the system? What about downstream costs and opportunity costs?

Recall that earlier when you introduced the concept of value, you provided the learners with categories of costs. If learners are struggling to come up with examples of costs you can remind them of these categories.

**Direct costs to Mrs. Ritis:**

- Anxiety associated with investigation for nodule.
- Time attending unnecessary testing and follow-up appointments.
- Out of pocket expenses attending the appointments (parking, loss of work hours).
- Pain and suffering from invasive biopsy procedure.

**Downstream costs to Mrs. Ritis:**

- Radiation exposure from CT and X-ray.
- Potential worsening of arthritis due to delay in surgery and potential for weight gain due to immobility.
- Longer time unpaid.

**Direct costs to system:**

- Personnel resources (radiology technicians, surgical team) directed away from other patients while involved in Mrs. Ritis’ investigations and management.
- Use of radiology time slots for investigation, directed away from other patients who have a necessary indication(s) for the test.

### **Opportunity costs for system:**

- Radiology department, operating room, and orthopedic office delays and increased wait-times due to providing these unnecessary services for Mrs. Ritis.
- Increase the wait-list and wait-times for other patients referred to Respiriology and Interventional Radiology.

### **Opportunity costs for Mrs. Ritis:**

- Time the patient spends away from activities, friends, and family at appointments and recovering from surgery.

\*Here, the exceptional resident may question the appropriateness of arthroplasty in the first place; they may highlight the emerging evidence that patients who engaged in Shared Decision Making are more likely to avoid or delay knee arthroplasty.

Please refer to the following resources for additional discussion points on the appropriateness of knee arthroplasty:

- CBC Radio. *Read this before you get your knee replaced*. Last retrieved July 27, 2017 from: <http://www.cbc.ca/radio/whitecoat/blog/read-this-before-you-get-your-knee-replaced-1.4052504>
- Stacey D, M Taljaard, G Dervin, P Tugwell, AM O'Connor, MP Pomey, L Boland, S Beach, D Meltzer and G Hawker. 2016. Impact of patient decision aids on appropriate and timely access to hip or knee arthroplasty for osteoarthritis: a randomized controlled trial. *Osteoarthritis Cartilage*. **24**(1):99-107
- Stacey D, F Légaré, K Lewis, MJ Barry, CL Bennett, KB Eden, M Holmes-Rovner, H Llewellyn-Thomas, A Lyddiatt, R Thomson and L Trevena. 2014. Decision aids for people facing health treatment or screening decisions. *Cochrane Database Syst Rev*. **28**(1):CD00143.

Slide 15:

Surgical/Anesthesia/Internal Medicine/Primary Care/Pre-op

## Case – Mrs. Alda Ritis: Harm from Care

Was the approach taken in this case simply from a gap in knowledge?

How can trainees consider the resource stewardship implications for Mrs. Alda Ritis' case?

Would they make different clinical decisions for a similar patient? The answers to these questions are complex, as the resident's behaviour was likely driven by a number of factors, only one of which may have been a knowledge gap. Trainees not only encounter environmental and cultural barriers to practicing resource stewardship, but may even have enablers that drive their overuse behaviour. Going forward, you will explore these barriers with the learners and discuss opportunities to overcome them.

**THE CASE ENDS HERE.**

[Click here to resume core presentation on slide 16](#) (p. 53)

## Slide 16:

### Residents and Resource Stewardship

Comparing patients seen in ER by supervised residents vs. only attending physicians:

- Higher hospital admission rates (21 per cent vs. 14 per cent)
- More use of advanced imaging (28 per cent vs. 21 per cent)
- Longer median ER stay (226 minutes vs. 153 minutes)

*Pitts SR et al. 2014. JAMA<sup>1</sup>*

**\*Note to presenter: Interactive Moment** - Consider asking trainees their interpretation of this data.

The training environment plays an important role in shaping trainees resource stewardship competencies. There are many cultural and behavioural drivers for unnecessary care for trainees during training. Research by Pitts et al.<sup>1</sup> in JAMA demonstrates that when residents co-manage patients with attending physicians, that patients have longer lengths of stay; are more likely to be admitted to hospital; and have more imaging tests, than if seen by an attending physician alone.

**\*Note to presenter:** You may choose to discuss this study as a transition point going into the next few slides that discuss why medical training drives overuse and what some of these drivers are.

The setting where a physician is trained has a lasting impact on that physician's future practice pattern. Several studies have demonstrated that the greatest determining factor of a physician's pattern of resource utilization is the intensity of resource utilization in the setting in which they trained.<sup>2,3,4</sup> This would suggest that the residency training years are critical in determining a trainee's ability to practice resource stewardship throughout their career.

**\*Note to presenter:** [Slide 28](#) (p.71) will go through these studies that emphasize the importance of the training environment on trainees' future practice patterns.

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<sup>1</sup> Pitts SR, SR Morgan, JD Schragger and TJ Berger. 2014. Emergency Department Resource Use by Supervised Residents vs Attending Physicians Alone. *JAMA*. **312**(22):2394-2400

<sup>2</sup> Chen C, S Petterson, R Phillips, A Bazemore and F Mullan. 2014. Spending patterns in region of residency training and subsequent expenditures for care provided by practicing physicians for Medicare beneficiaries. *JAMA*. **312**(22):2385-2393

<sup>3</sup>Sirovich BE, RS Lipner, M Johnston and ES Holmboe. 2014 The association between residency training and internists' ability to practice conservatively. *JAMA Internal Medicine*. **174**(10):1640-9.

<sup>4</sup>Dine CJ, LM Bellini, G Diemer, A Ferris, A Rana, G Simoncini, W Surkis, C Rothschild, DA Asch , JA Shea and AJ Epstein. 2015. Assessing Correlations of Physicians' Practice Intensity and Certainty During Residency Training. *Journal of Graduate Medical Education*. **7**(4):603-609.



## Slide 17

What barriers to  
stewardship and  
incentives for  
overuse do  
**physicians**  
encounter?

In this section we will discuss barriers to resource stewardship (and incentives for overuse). First, discuss factors affecting all physicians, then those that are unique to trainees.

**\*Note to presenter: Interactive Moment** - Why might physicians experience barriers when practicing resource stewardship?

It is clear that many of the barriers that all physicians encounter are shared with those faced by trainees (the shared barriers are denoted by an asterisk in the preceptor notes belonging to the next slide). Consider highlighting those that are different. It would greatly enhance your point if you provided a personal example about the transition from trainee to faculty, and how your stewardship behaviours may have changed. Trainees may also wonder how your approach and perception of resource stewardship changed when you transitioned between residency and independent practice. The breadth and depth of the discussion may vary depending on how much time you have allotted for this session.

Once all responses have been exhausted, the next slide can be presented with the list of barriers (hopefully of which most have already been discussed).

## Slide 18



Barriers and incentives experienced by physicians include: *(those common to trainees are indicated by an asterisk\*)*

### **Culture of medicine:**

- \*Discomfort of "do nothing" approach: discomfort with inaction and may feel compelled to take any action, as opposed to no action, in alleviating patient's concerns.
- \*Discomfort with diagnostic uncertainty: providers feel compelled to order tests to chase down a definitive diagnosis, even if this information is unlikely to change clinical management.
- \*Culture of "more is better": a desire to be thorough and to leave no stone unturned.

### **Physician-related factors:**

- Established habit: providers may have been trained to pursue certain interventions that may lack therapeutic value for a specific clinical scenario, and due to established habit, have challenges deviating from their usual behaviour.
- \*Challenges applying the evidence: providers may be unable to keep up-to-date with new evidence; have poor knowledge of the evidence; or may misapply evidence.
- \*Lack of feedback: providers do not receive feedback on their practice patterns, and thus, are uninformed of whether an action is low-value or harmful to patients.
- \*Time constraints: busy physicians may not have time for a thorough discussion with patients on why an intervention is inappropriate.
- Reimbursement model: fee-for-service funding models encourage physicians to see higher patient volumes, as opposed to remunerating physicians for spending more time with patients.

- Healthcare payment model: in many markets, costs are constrained by consumers' ability to pay; in the Canadian healthcare system, services are ordered by physicians who are unaware and/or unaffected by cost, and received by patients who bear, at most, only a portion of the costs.

#### **Patient-related factors:**

- \*Patient requests and expectations: patients may request or expect tests or treatments that they have heard about or read about on the internet; physicians may feel pressured to satisfy patients' requests.

#### **Physician-related factors:**

- Defensive medicine: physicians may order additional tests to make sure that they have ruled out a condition out of fear of litigation if they 'miss a diagnosis'.
- Consulting and referring providers' requests and expectations: specialist physicians may decline to assess a patient unless all of their requested "baseline" investigations have been obtained in advance of the appointment; similarly, some specialists may accept inappropriate referrals or proceed with tests and procedures that are not clinically indicated, to satisfy the referring physician's request (ex. a referral to physiatry or neurology for nerve conduction testing).
- \*Curiosity: providers may be curious to know what the investigation results may show; to confirm their own clinical suspicions; or out of a desire to gain clinical experience, even when a test or intervention is unlikely to change overall patient outcome.

#### **Health-system structure:**

- Financial incentives: since physicians are remunerated for performing certain procedures, the incentives are misaligned in some cases, and can result in unnecessary ordering of tests and procedures – for example, since cardiologists can bill to perform an ECHO, there is a disincentive to performing fewer ECHOs as this could have financial implications.

#### **Industry influence:**

- \*New technologies: providers and patients may value highly technologic care, and may believe that the newest, most expensive technologies are superior, when these technologies may not have been proven to actually lead to improved care.
- Marketing to physicians: marketing strategies, such as funded events or honoraria, by hospitals, pharma, and device makers, may bias physicians towards selecting newer interventions that may not be superior to tried and tested options (for instance, newer agent from the same class of drug with marginally improved benefit; use of newer surgical supplies and equipment when existing technologies would work equally well).
- Marketing to consumers: patients may be influenced by marketing strategies that encourage them to ask their physicians about new tests and treatments (for instance, direct-to-consumer advertising on US channels or in US magazines that Canadian patients can access).

It is important to recognize that while providers cite patient-related factors as a common driver of resource overuse, this is overstated as the evidence suggests that patient demand may not be as big a driver of unnecessary tests and treatments as we may assume. One study in oncology patients found that “Patient demands occur in 8.7 per cent of patient-clinician encounters in the outpatient oncology setting. Clinicians deem most demands or requests as clinically appropriate. Clinically inappropriate demands occur in 1 per cent of encounters, and clinicians comply with very few.”<sup>1</sup>

Patients may request to have tests, interventions, or prescriptions for a variety of reasons, such as anxiety, misinterpretation of online information, or social or work-related stressors. Unfortunately, test ordering in patients at low risk of serious illness does little to reassure them or reduce anxiety.<sup>2</sup>

Another issue is that patients may falsely equate more testing to better care. However, if physicians counsel patients, then these better-informed patients are less likely to continue to request unnecessary interventions. Similarly, the literature suggests that provision of health education is the best way to increase patient satisfaction.<sup>3,4,5,6</sup> A discussion about the perceived barriers to these discussions may occur in this session but is dealt with in greater detail in the Communications Toolkit accompanying this toolkit.

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<sup>1</sup>Gogineni K, KL Shuman, D Chinn, NB Gabler and EJ Emanuel. 2015. Patient Demands and Requests for Cancer Tests and Treatments. *JAMA Oncology*. **1**(1):33-9.

<sup>2</sup>Rolfe A and C Burton. 2013. Reassurance after diagnostic testing with a low pretest probability of serious disease: systematic review and meta-analysis. *JAMA Internal Medicine*. **173**(6):407-16

<sup>3</sup>Parmar MS. 2016. A Systematic Evaluation of Factors Contributing to Overdiagnosis and Overtreatment. *Southern Medical Journal*. **109**(4): 272-276

<sup>4</sup>Rothberg MB, SK Sivalingam, R Kleppel, M Schweiger, B Hu, KR Sepucha. 2015. Informed decision making for percutaneous coronary intervention for stable coronary disease. *JAMA Internal Medicine*. **175**(7):1199-206

<sup>5</sup>Robbins JA, KD Bertakis, LJ Helms, R Azari, EJ Callahan and DA Creten. 1993. The influence of physician practice behavior on patient satisfaction. *Family Medicine*. **75** (1):17-20

<sup>6</sup>Hammett RJH, RD Harris. 2002. Halting the growth in diagnostic testing. *Medical Journal of Australia*. **177**(3):124-5

**Slide 19:**

What are  
**trainee-specific**  
barriers to  
stewardship and  
incentives for  
overuse?

**\*Note to presenter: Interactive Moment** - Before presenting the barriers on the slide to follow, this would be an excellent opportunity to open the floor for trainees to volunteer their own perceived barriers to resource stewardship that are in addition to those discussed previously. Additionally, they can be prompted to volunteer their own anecdotal experiences to illustrate one of these points. Once all responses have been exhausted, the next slide can be presented with the list of barriers (that hopefully have already been discussed).

## Slide 20:



### Why resource stewardship is challenging for Trainees:

#### Knowledge gaps:

- The nature of training and lack of clinical experience for trainees may result in over investigation.<sup>1</sup>

#### Culture of medicine and training environment:

- As trainees, we are taught to focus on harms of 'missing something' and underemphasize harms due to over investigation.
- Need to rule out "zebra": the educational focus on "weird and wonderful" conditions frequently present availability bias to residents, leading them to order investigations to rule out diagnoses that are often of sufficiently low likelihood based on history and physical examination alone.<sup>2</sup>
- Pre-emptive ordering for efficiency: residents may pre-emptively order tests as a means of "expediting" a work-up or to facilitate discharge, even when some of these tests would be deemed unnecessary after results from initial tests.
- Lack of time for discussion with patients and families: busy residents may not have time for a thorough discussion with patients on why an intervention is inappropriate.<sup>3</sup>

#### Drivers for overuse:

- Faculty role modelling: "It's how we're taught": residents are frequently exposed to and adopt behaviours engrained in medical culture that lead to unnecessary use of healthcare resources (refer to slide 28 for discussion of "Hidden Curriculum").<sup>1,4</sup>
- Lack of feedback: it is more common for residents to receive praise for 'working patients up thoroughly', and less common for them to receive praise for demonstrating restraint.<sup>5</sup>



### Trainee-related factors:

- Curiosity: residents may be curious about a patient's clinical presentation and order unnecessary tests even when the subsequent interventions will have little or no impact on management.
- Desire to gain experience: similar to above, residents may "over order" investigations or perform procedures that are not directly indicated as a means of gaining experience, despite the fact that they will not affect subsequent decisions.<sup>6</sup>

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<sup>1</sup> Pitts SR, SR Morgan, JD Schragger and TJ Berger. 2014. Emergency Department Resource Use by Supervised Residents vs Attending Physicians Alone. *JAMA*. **312**(22):2394-2400

<sup>2</sup> Detsky AS and AA Verma. 2012. A new model for medical education: celebrating restraint. *JAMA*. **308**(13):1329-30.

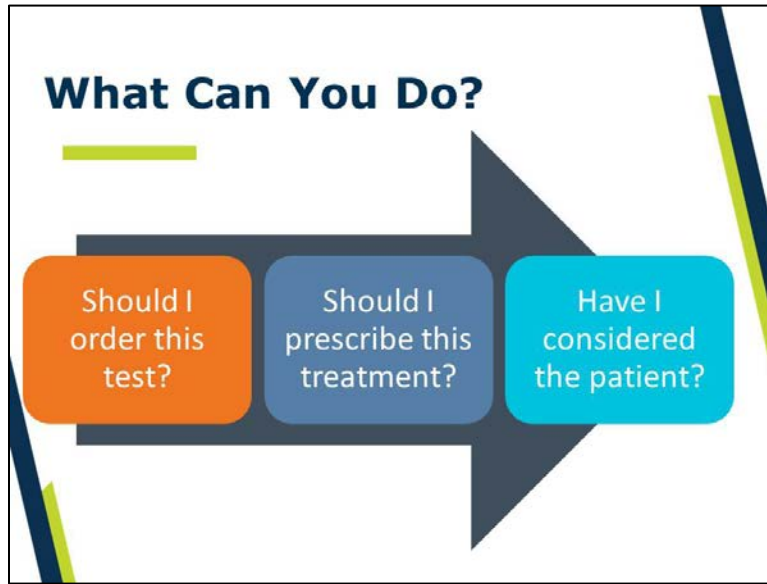
<sup>3</sup> Zikmund-Fisher BJ, JT. Kullgren, A Fagerlin, ML Klamerus, SJ Bernstein, and EA Kerr. 2017. Perceived Barriers to Implementing Individual Choosing Wisely® Recommendations in Two National Surveys of Primary Care Providers. *Journal of General Internal Medicine*. **32**(2): 210–217.

<sup>4</sup> Leep Hunderfund AN, LN Dyrby, SR Starr, J Mandrekar, JM Naessens, JC Tilburt, P George, EG Baxley, JD Gonzalo, C Moriates, SD Goold, PA Carney, BM Miller, SJ Grethlein, TL Fancher, and DA Reed. 2017. Role Modeling and Regional Health Care Intensity: U.S. Medical Student Attitudes Toward and Experiences with Cost-Conscious Care. *Academic Medicine*. **92**(5):694-702

<sup>5</sup> Weinberger SE. 2011. Providing high-value, cost-conscious care: a critical seventh general competency for physicians. *Annals of Internal Medicine*. **155**(6):386-8.

<sup>6</sup> Lakhani A, E Lass, WK Silverstein, KB Born, W Levinson and BM Wong. 2016. Choosing Wisely for Medical Education': Six Things Medical Students and Trainees Should Question. *Academic Medicine*. **91**(10): 1374-1378.

## Slide 21:



You have discussed the barriers to resource stewardship. It is important to balance this discussion with a “call-to-action” with tangible next steps for residents on how they can incorporate resource stewardship into their training and future practice. The objective of the next series of slides is to present trainees with tangible steps that they can take towards improving their own resource stewardship practice.

Within each patient encounter, these steps can be briefly summarized by asking oneself three questions:

- 1. Should I order this test?**
- 2. Should I prescribe this treatment?**
- 3. Have I considered the patient?**

## Slide 22:

### 1. Should I Order This Test?

- 1 Will this test help me to make a diagnosis?
- 2 Will this test potentially result in a change in management?
- 3 Is this test redundant with existing information?
- 4 Is there a reasonable pre-test probability for this test to be useful?
- 5 Does the benefit of the test outweigh the risk to the patient?

*Adapted from SCARCE Clinical Criteria for Diagnostic Tests*

These questions presented are ones that every trainee should consider before ordering any diagnostic test, even for those tests perceived to be small and inconsequential (e.g. ECG, chest x-ray, urinalysis). With an understanding of the underlying concepts regarding a diagnostic test's characteristics, trainees will be better equipped to approach this set of questions.

**\*Note to presenter: Interactive Moment** - Trainees can be asked to provide examples for each question where, upon reflecting on the question, a test would be inappropriate to order.

#### 1. Will this test help me to make a diagnosis?

There are many situations where the history and physical examination provide sufficient information to make a diagnosis. Furthermore, the addition of further investigations in these circumstances may not provide any additional clinical information. If the test will not contribute to a diagnosis, one should always reflect on whether the test is truly necessary. For example, in the absence of red flags, and a supporting history and physical examination, imaging is not required to diagnose mechanical back pain. Often, imaging does not contribute to a specific diagnosis, yet, clinically insignificant incidental findings may arise that could lead to patient anxiety and additional unnecessary investigations.

#### 2. Will this test potentially result in a change in management?

There are many situations where a test result would yield no additional information that would affect clinical management. Aside from the direct costs of these tests, many are associated with further downstream costs for both the patient and the healthcare system, for instance, due to incidental findings. For example, current recommendations advise against routinely obtaining ECGs in low-risk patients without concerning symptoms. These tests have not been shown to change clinical management or to improve patient outcomes.

### **3. Is this test redundant with existing information?**

If a test will not provide additional clinical information, there is rarely a good reason to proceed with it. For example, if a test will only lend further support to what is already strongly supported by existing information (history, physical examination, or other diagnostic investigations that have already been conducted), it is worth reflecting on whether the results will alter management. Additionally, if the same test has already been conducted elsewhere (e.g. a different healthcare centre), it would be prudent to retrieve those results rather than repeating the test.

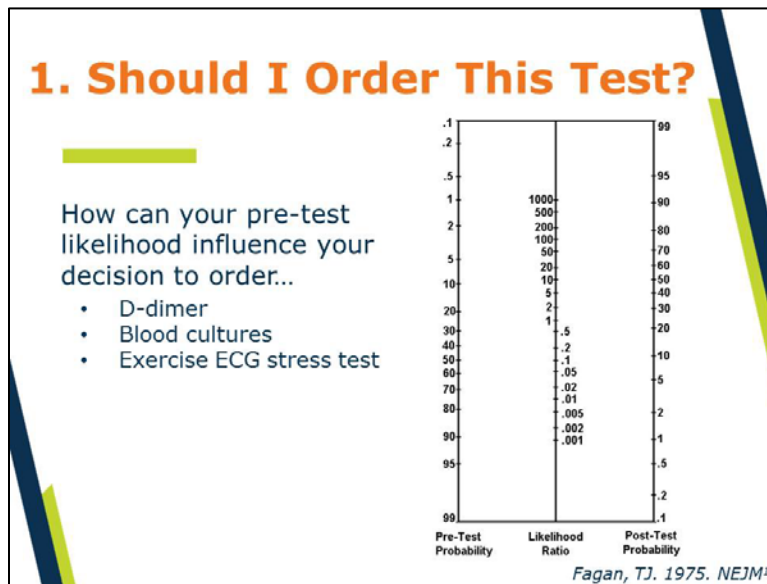
### **4. Is there a reasonable pre-test probability for this test to be useful?**

The utility of a test is limited by the pre-test probability for any given patient, and the inherent sensitivity and specificity of the test. A proper consideration of the pre-test probability of a patient having a given condition will aid the provider in deciding whether a test is warranted to further “risk stratify” that patient. For example, while a D-dimer is highly sensitive for a pulmonary embolism, it is not specific. Accordingly, its utility is limited to “ruling out” the condition in patients already at low risk. For patients in whom the pre-test probability is moderate to high, the D-dimer loses its utility.

### **5. Does the benefit of the test outweigh the risk to the patient?**

While some tests may receive a passing grade after consideration of the above questions, the next consideration should be whether the benefits of the test outweigh the risks. There are many situations in which, despite the fact that a test could aid diagnosis and could alter management, the potential harms to the patient would outweigh the potential benefits. These may include situations where a preferred test would place the patient at higher risk of certain adverse events (e.g. use of contrast dye in patients with renal insufficiency), thus necessitating a discussion around alternative, less risky investigations. If a less invasive test is chosen, one must again consider if it could answer the clinical question being posed, as proceeding with a less invasive test may, in some cases, provide inadequate diagnostic information.

## Slide 23:



**\*Note to presenter:** This section details a number of concepts in evidence-based medicine and clinical epidemiology. Depending on your comfort with these concepts and the level of your audience, you may wish to vary the depth of your discussion. All trainees should understand each test's particular characteristics that increase the probability of diagnosing a disease. A nuanced discussion of clinical epidemiology is outside the scope of this toolkit, and trainees can be directed to many other available resources to learn more about these topics.

**\*Note to presenter: Interactive Moment** - Trainees can be prompted to discuss how the utility of the tests listed (D-dimer, blood cultures, exercise ECG stress test) varies depending on the patient's pre-test likelihood of disease. *Note: examples of investigations can be changed depending on target audience.*

Consider presenting several quick, one-line case scenarios (relevant to your specialty) for each example discussed, and have the trainees discuss why they would or wouldn't order the given test.

For the D-dimer example, consider the following cases. For each case presented, the positive likelihood ratio for the D-dimer is assumed to be 2.0, and the negative likelihood ratio is assumed to be 0.18.<sup>1</sup>

- 76-year-old female with uterine cancer presenting with pleuritic chest pain, tachycardia, and signs of a DVT.
  - This patient's Well's score would be high, giving an approximate pretest probability of 78per cent. A negative D-dimer would lead to a posttest probability of only 39per cent, which would still be insufficient to rule out a PE. Given the high pretest probability, this patient requires more definitive imaging to complete the work-up.

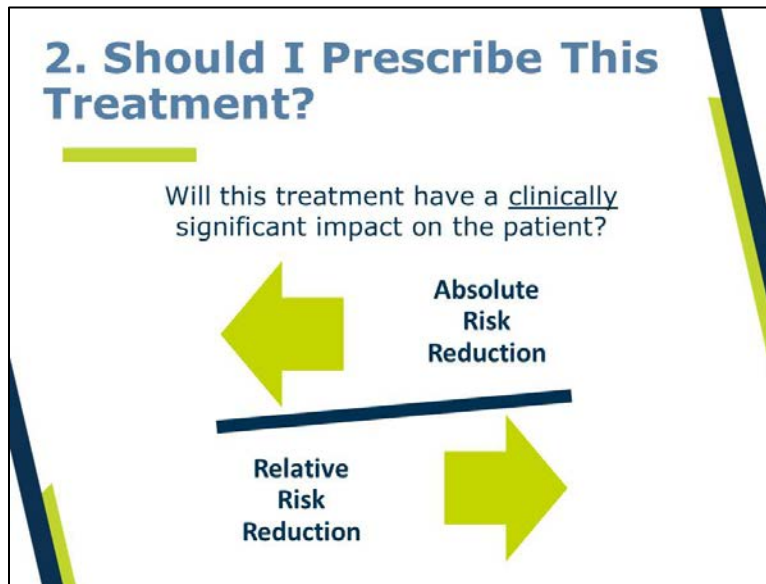
- 34-year-old healthy male presenting with atypical chest pain, normal vitals and physical examination, and no VTE risk factors.
  - This patient's Well's score would be low, giving an approximate pretest probability of 3per cent. A negative D-dimer would lead to a posttest probability of 1per cent, which would be sufficient to rule out a PE. Given the low pretest probability, a D-dimer has utility in ruling out a PE in this population. However, a positive D-dimer would lead to a posttest probability of 6per cent.

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<sup>1</sup>Fagan, TJ. Nomogram for Bayes's Theorem. 1975. *New England Journal of Medicine*. **293** (5): 257. **Copyright © 1975 Massachusetts Medical Society**. Reprinted with permission from *Massachusetts Medical Society*.

<sup>2</sup> Chunilal S, JW Eikelboom, J Attia, M Miniati, AA Panju, DL Simel and JS Ginsberg. 2003. Does this patient have pulmonary embolism? *JAMA* **290**(21):2849.



**Slide 24:**



Understanding the evidence behind treatment decisions is paramount to practicing resource stewardship. The decision to recommend a certain treatment to a patient is often dependent on the perceived “effect of treatment”. Unfortunately, the way in which many publications (and patient-directed materials!) describe the effect of a treatment can make it difficult to appreciate the actual difference between treatment and placebo. A key aspect towards approaching the challenge critically appraising the literature evidence is to understand the difference between absolute risk and relative risk. Studies often present relative risk as opposed to absolute risk data for new treatments, as the former demonstrates a more dramatic “effect”. However, it is important to understand that absolute risk provides information on how likely an event is to occur, while relative risk does not.

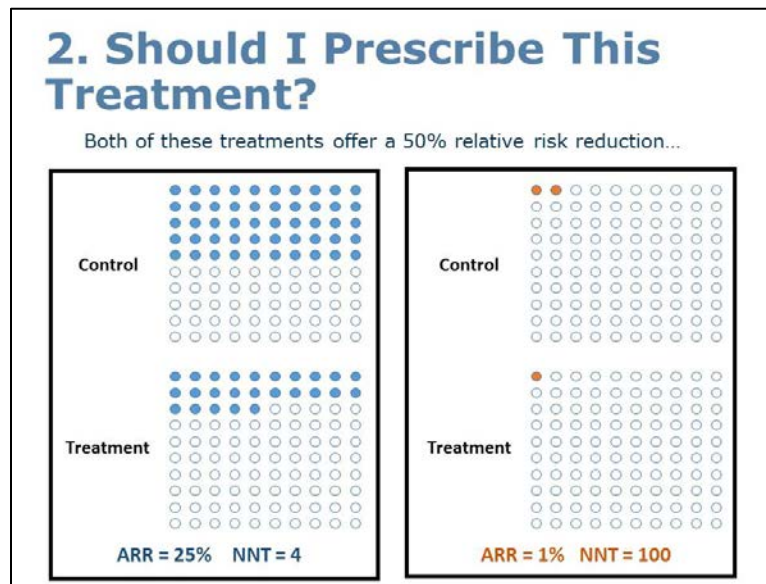
Absolute risk reduction (ARR) is calculated as the absolute difference between a treatment group’s event rate and the comparison group’s event rate, while the relative risk reduction (RRR) is calculated as the treatment group’s event rate divided by the comparison group’s event rate.

It is also important to consider applicability of Randomized Controlled Trial (RCT) results on your patient. One systematic review found that 38.5 per cent of RCTs excluded older adults; that 81.3 per cent excluded individuals with common medical conditions; and that 54.1 per cent excluded individuals receiving commonly prescribed medications.<sup>1</sup>

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<sup>1</sup> Van Spall HGC, A Toren, A Kiss and RA Fowler. 2007. Eligibility Criteria of Randomized Controlled Trials Published in High-Impact General Medical Journals: A Systematic Sampling Review. *JAMA*. **297**(11):1233-1240.

## Slide 25:



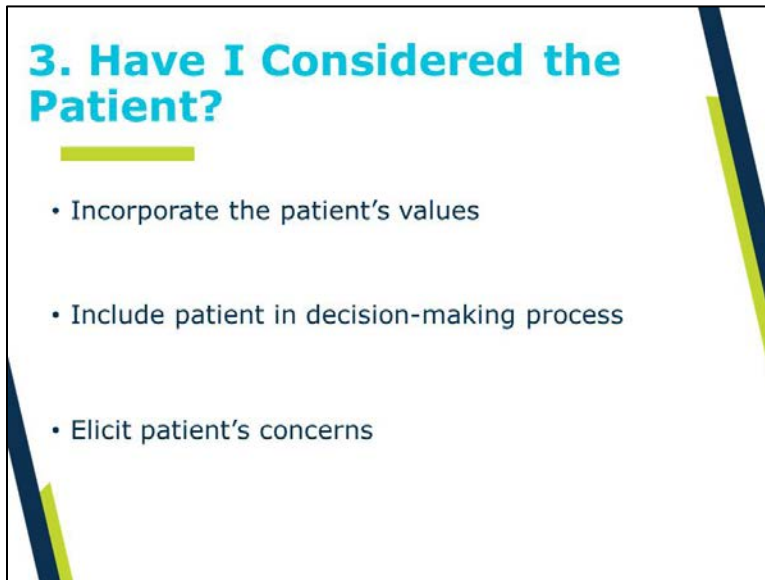
This slide is meant to visually demonstrate how a 50 per cent relative risk reduction (RRR) can differ, depending on the overall absolute risk reduction (ARR). In both cases, the shaded boxes represent an adverse outcome (e.g. cardiovascular mortality). In the first box, the outcome occurs in 50/100 (50per cent) individuals exposed to control, and 25/100 (25per cent) of individuals exposed to Treatment A. This is a 25 per cent absolute risk reduction, translating into a number needed to treat (NNT) of 4. In the second box, the outcome occurs in 2/100 (2per cent) of individuals exposed to control, and 1/100 (1per cent) of individuals exposed to Treatment B. This is a 1 per cent absolute risk reduction, translating into an NNT of 100. In both cases, the RRR was the exact same, but the ARR was markedly different (25 fewer events per 100 treated patients, versus 1 fewer event per 100 patients treated). Accordingly, it becomes clear how the additional information provided by an ARR can be quite substantial when it comes to clinical decision making.

A common example that reflects this issue is the clinical scenario of anticoagulation and atrial fibrillation. Studies have demonstrated that, for all patients with atrial fibrillation, anticoagulation yields a RRR in the incidence of stroke by approximately two-thirds (as compared to placebo). However, given the risks associated with life-long anticoagulation (e.g. major bleeding), the decision to recommend this is largely restricted to patients where the benefit of stroke prophylaxis would outweigh the risks. Based on the concepts discussed above, the recommendation for anticoagulation is made in groups of patients with higher baseline risks of stroke (e.g. CHADS<sub>2</sub> score  $\geq 1$ ). In patients at low risk of stroke (e.g. CHADS<sub>2</sub> score = 0), the ARR of anticoagulation is exceedingly small, and the risks of therapy generally outweigh the benefits.

**Optional Videos:** these videos briefly illustrate the concepts of absolute and relative risk

1. The Body of Evidence. *Drugs & The Media: Relative vs. Absolute Risk*. Last retrieved July 31, 2017 from [https://www.youtube.com/watch?v=ew\\_5eTcm7bk](https://www.youtube.com/watch?v=ew_5eTcm7bk)
2. Kaiser Health News. *Lazris & Rifkin's Risk-Benefit Characterization Theater*. Last retrieved July 31, 2017 from <https://www.youtube.com/watch?v=UZIY6Q4m-MM>

**Slide 26:**



### 3. Have I Considered the Patient?

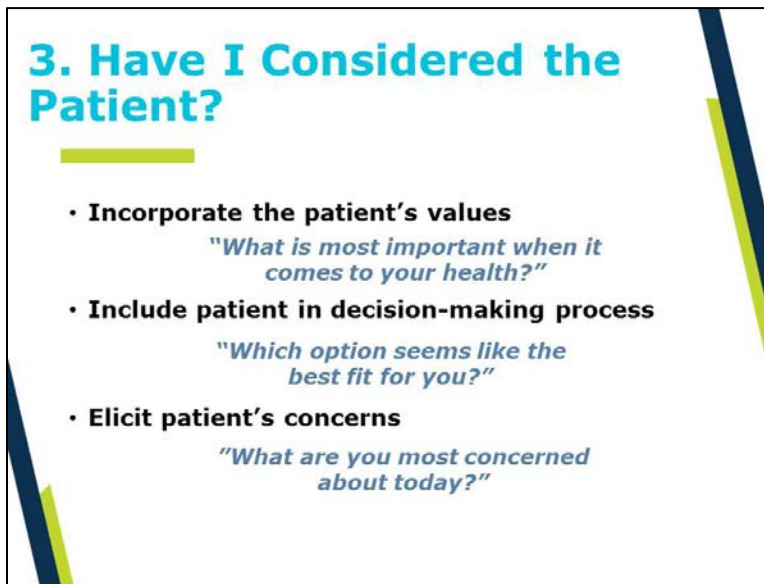
- Incorporate the patient's values
- Include patient in decision-making process
- Elicit patient's concerns

**\*Note to presenter:** The accompanying [Communications Toolkit \[royalcollege.ca/resourcestewardship\]](http://royalcollege.ca/resourcestewardship) delves deeper into issues and strategies pertaining to patient communication.

The ultimate question that should be asked in every patient encounter is whether the patient has been considered. This question should include reflection on whether you have incorporated the patient's values, whether the patient has been a participant in the decision-making process, and whether the patient's concerns have been properly elicited.

**\*Note to presenter: Interactive Moment** - Trainees can be prompted to provide examples of the questions that they can ask during a patient encounter to elicit the above information. On the next slide, we present examples of how to ask these questions.

**Slide 27:**

A rectangular box containing the slide content. The title '3. Have I Considered the Patient?' is in blue. Below it is a yellow horizontal line. Three bullet points are listed, each with a bold title and a blue italicized question. The box is decorated with blue and yellow diagonal stripes on the right and left sides.

### 3. Have I Considered the Patient?

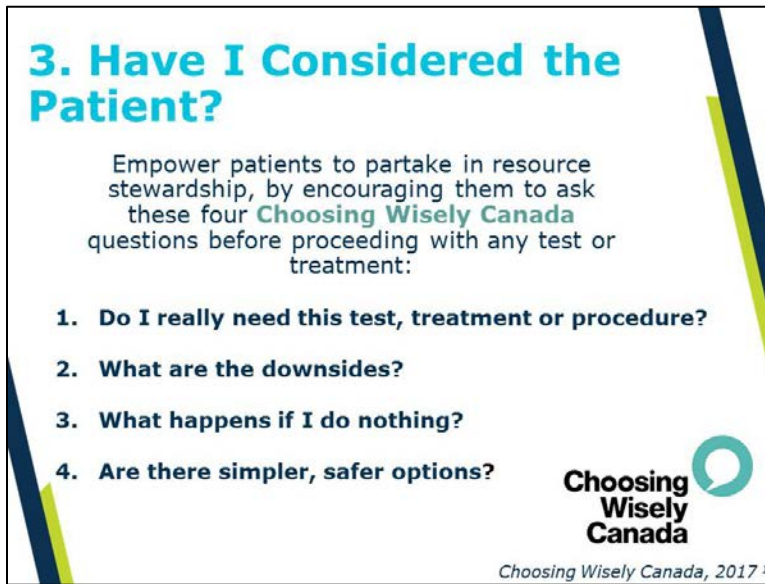
- **Incorporate the patient's values**  
*"What is most important when it comes to your health?"*
- **Include patient in decision-making process**  
*"Which option seems like the best fit for you?"*
- **Elicit patient's concerns**  
*"What are you most concerned about today?"*

One approach that trainees may consider using to elicit patient values and concerns is the FIFE model.<sup>1</sup> This model reminds the physician to explore the patient's feelings about their illness, the ideas and meanings they attach to their illness, the impact of the illness on their daily function, and their expectations for their physician.

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<sup>1</sup> Weston WW, JB Brown and MA Stewart. 1989. Patient-centred interviewing part I: understanding patients' experiences. *Canadian Family Physician*. **35**:147–151.

## Slide 28:



### 3. Have I Considered the Patient?

Empower patients to partake in resource stewardship, by encouraging them to ask these four **Choosing Wisely Canada** questions before proceeding with any test or treatment:

1. **Do I really need this test, treatment or procedure?**
2. **What are the downsides?**
3. **What happens if I do nothing?**
4. **Are there simpler, safer options?**

**Choosing Wisely Canada**

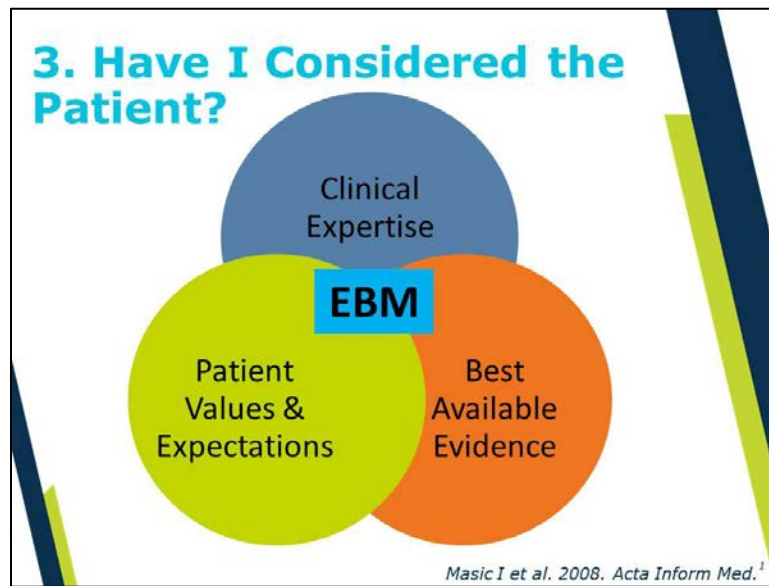
*Choosing Wisely Canada, 2017<sup>1</sup>*

An opportunity sometimes missed is to explore the patient's role in resource stewardship. Patients should be encouraged to ask the four Choosing Wisely questions listed above prior to proceeding with any test or treatment. Care providers should be prepared to have a conversation with patients about these important questions, and should empower their patients to take an active role in informed consent.

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<sup>1</sup>Choosing Wisely Canada. *When it comes to your health, sometimes LESS is more.* Last retrieved August 31, 2017, from Choosing Wisely Canada's website: <http://www.stmichaelshospital.com/pdf/education/choosing-wisely-4-questions.pdf>

## Slide 29:



One of the common pitfalls when discussing evidence-based medicine is that the bottom-line for the patient can be directly extrapolated from the bottom-line of the relevant literature, leading to so-called “cookbook medicine”. However, both clinical expertise and each individual patient’s values and expectations must be taken into account.

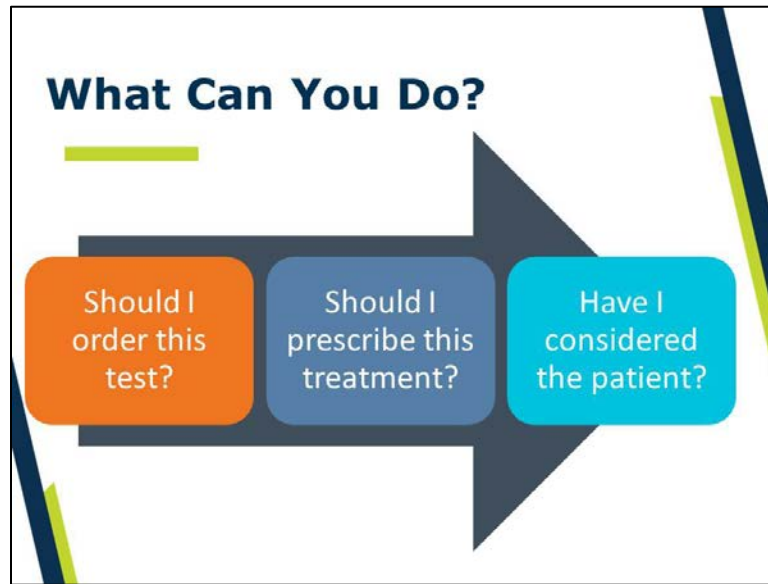
Only when all of these factors are considered is the care being delivered truly evidence-based and patient-centred<sup>1</sup>.

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<sup>1</sup>Masic I, M Miokovi and B Muhamedagi. 2008. Evidence Based Medicine – New Approaches and Challenges. *Acta Informatica Medica*. **16**(4): 219–225.



## Slide 30:



**Note to presenter:** At this point in the presentation, residents will often describe challenges in incorporating these three considerations into practice due to factors within the clinical learning environment. The hidden curriculum is a large barrier to incorporating resource stewardship and can be discussed next. You can use this slide to summarize the previous section and transition to a discussion about overcoming the hidden curriculum as it relates to resource stewardship.

## Slide 31:

**Overcoming the Hidden Curriculum**

**Hidden curriculum:**  
the deeply ingrained norms that are implicitly taught and that influence practice of those exposed

How might this impact your practice?

The hidden curriculum is a well-described concept of the deeply ingrained norms that are implicitly and non-verbally taught, and that influence the practice of those exposed. Medical trainees are susceptible to these influences from medical school onwards, and there are multiple ways that they impact their future practice. The hidden curriculum has implications that reach far beyond those restricted to the philosophies of resource stewardship (however, given the scope of this toolkit, the focus here is on its impact on resource stewardship alone).

The hidden curriculum concept plays a significant role in several of the previously mentioned resource stewardship barriers that trainees face, including “It’s how we’re taught”; the desire to impress the attending physician; and the belief that it is better to do something rather than nothing. Overcoming a culture change associated with the hidden curriculum is one of the largest barriers that trainees face when incorporating resource stewardship into their own practice.

**\*Note to presenter - Interactive Moment** - Before presenting examples of how the hidden curriculum impacts practice, trainees can be prompted to provide their own examples.

Examples of how the hidden curriculum impacts trainee practice may include:

- Over-ordering tests to demonstrate breadth of knowledge.
- Decision to order unnecessary tests or administer unnecessary treatment in order to do “something” rather than “nothing”.
- Discomfort questioning tests that are believed to be inappropriate.
- Over-dependence on specialist consultation for issues within a provider’s scope.
- Emulating the practice of previous teachers despite current evidence that runs contrary to this practice.
- “Blanket ordering” of tests based on a patient’s presenting issue (e.g. extensive work-up for delirium after clear precipitant identified).

There is increasing evidence in the literature supporting the impact of the hidden curriculum on physician practice and resource stewardship. It has been shown that internists trained at programs with overall lower resource utilization are more likely to recognize when conservative management is appropriate.<sup>1</sup> Additionally, there is an association between being trained in high-spending regions and subsequent higher per-capita spending as a practicing physician.<sup>2</sup> Similarly, surveys of residents have found the program of training to be the strongest factor in explaining variability in “practice intensity”, or degree of resource utilization.<sup>3</sup>

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<sup>1</sup>Sirovich BE, RS Lipner, M Johnston, ES Holmboe. 2014. The association between residency training and internists' ability to practice conservatively. *JAMA Internal Medicine*. **174**(10):1640-1648.

<sup>2</sup> Chen C, S Petterson, R Phillips, A Bazemore and F Mullan. 2014. Spending patterns in region of residency training and subsequent expenditures for care provided by practicing physicians for Medicare beneficiaries. *JAMA*. **312**(22):2385-2393.

<sup>3</sup> Dine CJ, LM Bellini, G Diemer, A Ferris, A Rana, G Simoncini, W Surkis, C Rothschild, DA Asch, JA Shea and AJ Epstein. 2015. Assessing Correlations of Physicians' Practice Intensity and Certainty During Residency Training. *Journal of Graduate Medical Education*. **7**(4):603-609.

## Slide 32:

### Overcoming the Hidden Curriculum

Choosing Wisely Canada

*Six things medical students and trainees should question:*

- 1** Don't suggest ordering the most invasive test or treatment before considering other less invasive options.
- 2** Don't suggest a test, treatment, or procedure that will not change the patient's clinical course
- 3** Don't miss the opportunity to initiate conversations with patients about whether a test, treatment or procedure is necessary.
- 4** Don't hesitate to ask for clarification on tests, treatments, or procedures that you believe are unnecessary.
- 5** Don't suggest ordering tests or performing procedures for the sole purpose of gaining personal clinical experience.
- 6** Don't suggest ordering tests or treatments pre-emptively for the sole purpose of anticipating what your supervisor would want.

*Choosing Wisely Canada, 2017<sup>1</sup>*

The Choosing Wisely Canada medical student list<sup>1</sup> indicates the commitment of Canadian medical students to resource stewardship and leadership of students around resource stewardship. This list of recommendations was developed in partnership with the Canadian Federation of Medical Students (CFMS) and Fédération Médicale Étudiante du Québec (FMEQ). The final list was decided upon following input from nearly 2,000 across Canada.

A discussion around each of the six recommendations follows below. Additional vignettes surrounding each of these recommendations can be found within the original article.<sup>2</sup>

1. There are often diagnostic approaches and treatment options that result in the same clinical outcome, but that are less invasive. Examples include the use of ultrasound instead of computed tomography (CT) scanning to diagnose acute appendicitis in children, or the use of an oral antibiotic that has similar oral bioavailability as its intravenous counterpart. Taking time to consider the diagnostic sensitivity and specificity of less invasive tests or the therapeutic effectiveness of less invasive treatments can minimize unnecessary patient exposure to the harmful side effects of more invasive tests or treatments. However, the provider must ensure that less invasive tests are equally effective as invasive counterparts. For instance, doing multiple imaging tests to avoid a more invasive tissue biopsy in a condition that, ultimately, requires biopsy, is an inappropriate use of imaging resources and delays time to biopsy, the latter which the patient needs.

2. When ordering tests, it is important to always consider diagnostic characteristics such as sensitivity, specificity and predictive value in the context of the patient's pre-test probability. Patients who are at very low baseline risk often do not require an additional test to rule out the diagnosis. Furthermore, evidence suggests that in such low-risk patients, diagnostic tests do not reassure patients, decrease their anxiety, or resolve their symptoms. Examples include the use of computed tomography (CT) scanning in low-risk patients to rule out pulmonary embolism, or pre-operative cardiac testing for patients prior to low risk surgery.

Evaluation of baseline risk and the use of decision tools wherever possible, along with a 'how will this change my management' approach, can help to avoid unnecessary 'rule out' testing in patients.

3. Patient requests sometimes drive overuse. For example, a parent might request antibiotics for his or her child who likely has viral sinusitis, or a patient might request magnetic resonance imaging (MRI) for low-back pain. Often patients are unaware of the benefits, side effects and risks of tests and treatments. Taking time to explore a patient's concerns, and counseling them about the relative benefits and risks of tests or treatments represents a patient-centered approach to ensuring the appropriate use of resources.

4. Unfortunately, in learning environments, a hierarchy exists between supervisors and students that makes it difficult for students to feel comfortable speaking up. As a result, students might observe unnecessary care, but avoid saying anything for fear of potential consequences. Supervisors need to encourage students to feel free to question whether tests or treatments are truly necessary without fear of repercussion. The clinical training environment should be one where students feel safe to ask questions.

5. The clinical training years in medical school represent an important opportunity for students to translate what was learned in the classroom to the bedside. This can be a challenging time of great uncertainty for students. Students may order tests excessively due to a lack of clinical experience, or recommend investigations in order to build upon their personal experience.

6. A "hidden curriculum" pervasive in the academic environment encourages medical students to search for "zebras" through extensive (and often unnecessary) diagnostic work-ups. Because restraint is often discouraged, students adopt the belief that faculty expect an exhaustive diagnostic approach, and feel that they need to demonstrate their knowledge, thoroughness and curiosity through test ordering. Students can overcome this practice by articulating why they chose not to order a specific test. This, combined with a shift towards 'celebrating restraint' by faculty can help to combat this pervasive practice in medical training.

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<sup>1</sup>Choosing Wisely Canada. *Six Things Medical Students and Trainees Should Question*. Last retrieved July 31, 2017 from <https://choosingwiselycanada.org/students/>

<sup>2</sup>Lakhani A, E Lass, WK Silverstein, KB Born, W Levinson and BM Wong. 2016. Choosing Wisely for Medical Education': Six Things Medical Students and Trainees Should Question. *Academic Medicine*. **91**(10): 1374-1378.

## Slide 33:

### Overcoming the Hidden Curriculum

Choosing Wisely Canada

**Five things residents and patients should question:**

- 1** Don't order investigations that will not change your patient's management plan.
- 2** Don't order repeat laboratory investigations on inpatients who are clinically stable.
- 3** Don't order intravenous (IV) when an oral (PO) option is appropriate and tolerated.
- 4** Don't order non-urgent investigations or procedures that will delay discharge of hospital inpatients.
- 5** Don't order invasive studies if less invasive options are available and as effective

Choosing Wisely Canada, 2017<sup>1</sup>

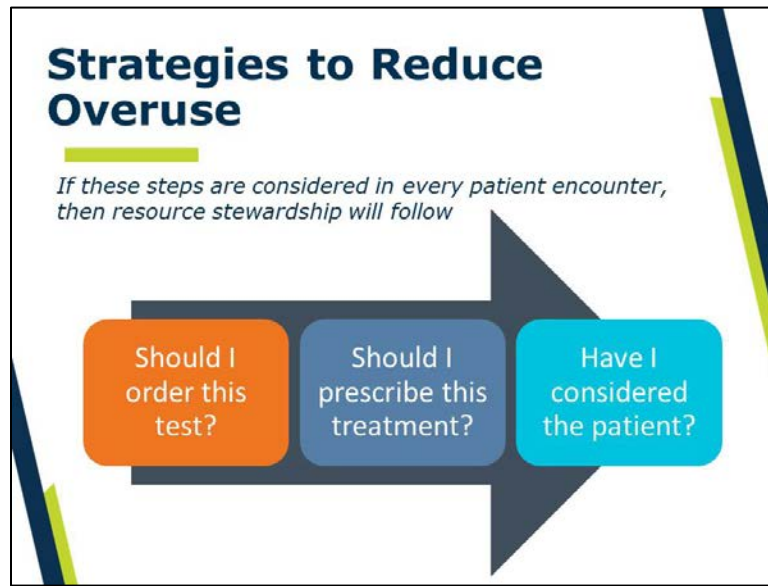
The Choosing Wisely Canada – Resident Doctors of Canada list<sup>1</sup> represents concrete actions that residents can take to practice resource stewardship on an ongoing basis.

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<sup>1</sup>Choosing Wisely Canada. *Five Things Residents and Patients Should Question*. Last retrieved July 31, 2017 from <https://choosingwiselycanada.org/wp-content/uploads/2017/06/Residents.pdf>



## Slide 34:



As we have shown, implementing resource stewardship into every day practice is not an overnight process. At a minimum, it requires acknowledging and understanding the barriers that affect each and every healthcare provider. Beyond that, it requires an in-depth awareness of the indications and limitations of investigations and treatments, and consideration of the patient's values and concerns. Clearly, this process requires an ongoing mindful approach, with the patient always remaining within focus. Reflecting back again on the initial case, it should now be apparent how asking these questions would enhance the "value" of the care provided for the patient.

## Slide 35:

### What Else Can Be Done?

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**Individual Resources:**

- Choosing Wisely Canada recommendations
- Do No Harm Project
- JAMA Teachable Moments

**System-Based Initiatives:**

- Optimize education of resource stewardship
- Describe the problem
- Audit and feedback
- Forced constraints

Trainees can refer to the following resources for help in identifying areas of waste and for inspiration around concepts of resource stewardship:

**Choosing Wisely Canada:** A campaign to help clinicians and patients engage in conversations about unnecessary tests and treatments and make smart and effective choices to ensure high-quality care. It offers lists of recommendations by medical specialty to identify tests and treatments that are commonly used, but not supported by evidence, or that could expose patients to unnecessary harm.

**Do No Harm Project:** A project developed by the University of Colorado School of Medicine, with the goal of using clinical vignettes to improve recognition of harms that may result from medical overuse, and to drive a culture change in the practice of medicine.

**JAMA Teachable Moments:** JAMA series designed to encourage trainees to submit articles that bring attention to harms that can result from medical overuse and from underuse of needed medical interventions.

As for system-based initiatives, there is expanding literature on the multitude of initiatives taking place to incorporate the concepts of resource stewardship into educational and clinical settings. These initiatives include those focusing on simplification and standardization (e.g. standardized order sets), EMR-based education (e.g. inclusion of cost of investigations into EMR systems), and clinical decision support systems (e.g. automated guideline-based alerts built into EMR systems). The next few slides will focus on more trainee-specific examples of some of these initiatives.

## Slide 36:

### What Else Can Be Done- Education?

Circumstances in which delivery of high-value, cost-conscious care is learned:

Knowledge Transmission	Reflective Practice	Supportive Learning Environment
Scientific evidence	Feedback on ordered tests and treatments	Macro-level support
Understanding patient preferences	Reflective questions	Clinical role models and teachers
Prices and health economics		Culture of inter-professional collaboration

*Adapted from Stammen LA et al. 2015. JAMA<sup>1</sup>*

The 2015 JAMA publication reviewed articles that evaluated circumstances conducive to learning how to deliver high-value, cost-conscious care. Three general areas were identified as aiding in successful learning. While several of these areas aren't necessarily trainee-specific, and some are more applicable to the US health delivery system, the general principles remain relevant.

This is a summary of the three areas assessed in the systematic review:

- **Knowledge transmission:**
  - Scientific evidence – refers to understanding the background evidence that underlies indications and guidelines related to medical decision-making
  - Understanding patient preferences – refers to involving patients in the decision-making process, and exploring their values and concerns
  - Prices and health economics – refers to understanding the prices of medical services and learning basic health economics, including the concepts of competitive market forces and the role of insurance companies in price setting
- **Reflective practice:**
  - Feedback on ordered tests and treatments – refers to feedback directed to individual physicians (including comparative feedback relative to their group) on volume of tests ordered, total costs of ordered tests, and appropriateness of ordered tests
  - Reflective questions – refers to reflection on medical decisions, quality of care, cost-effectiveness of care

- **Supportive learning environment:**
  - Macro-level support – refers to access to healthcare costs, incentives to modify practice, availability of resources
  - Clinical role models – refers to importance of clinical role models supporting and teaching high-value care
  - Culture of interprofessional collaboration – refers to creating culture among physicians and allied health to strive for practicing high-value care

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<sup>1</sup>Stammen LA, RS Stalmeijer, R Paternotte, A Oudkerk Pool, EW Driessen, F Scheele and LPS Stassen. 2015. Training Physicians to Provide High-Value, Cost-Conscious Care: A Systematic Review. *JAMA*. **314**(22):2384-2400.

## Slide 37:

**What Else Can Be Done-  
Projects?**

**Describe the Problem:**

Study assessed variability in MRI service provision and request variation within Canadian academic centres.

**Results:**

- High degree of variability across sites.
- Lack of standardization for prioritization scales.
- Few use referral guidelines to screen for appropriate ordering.

*Vanderby, S. al. 2017. Can Assoc Rad J<sup>1</sup>*

**Note to presenter:** You may wish to present this and the subsequent slides to encourage residents to take part in resource stewardship projects. The accompanying Projects Toolkit will assist supervisors and trainees in developing these projects. If you are presenting to a more junior audience you may wish to omit these examples.

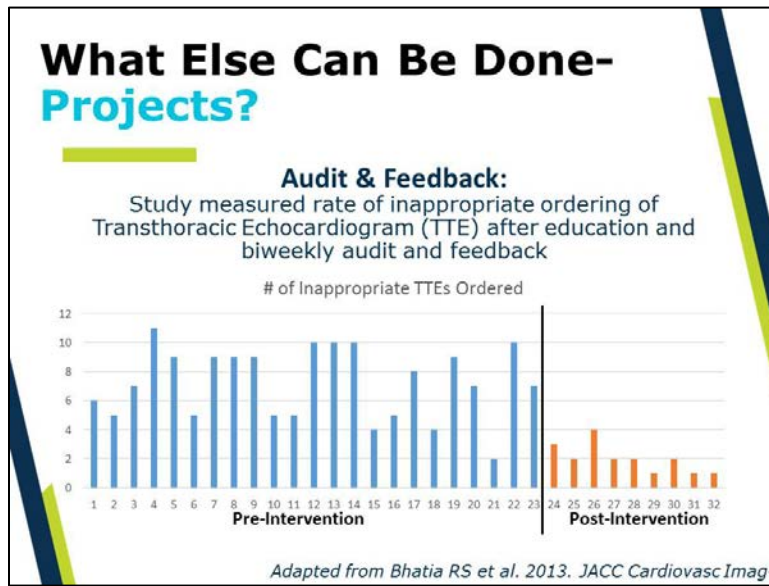
One of the first system-based methods necessary in the steps towards improving resource stewardship is to identify and describe the problem. These types of studies will help isolate specific issues that can be targeted by further initiatives to change the behaviours underlying these issues.

This trainee-led study<sup>1</sup> surveyed MRI programs across Canadian academic centres, with the goal of exploring variability in their imaging-request systems and manner of providing imaging. The study identified substantial variability across all sites, with specific opportunities identified surrounding standardization of request and screening processes, and identification of appropriate imaging criteria.

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<sup>1</sup>Vanderby S, A Badea, JN Peña Sánchez, N Kalra and P Babyn. 2017. Variations in Magnetic Resonance Imaging Provision and Processes Among Canadian Academic Centres. *Canadian Association of Radiologists Journal*. **68**(1):56-65.

## Slide 38:



Another method to attempt to alter physician behaviour involves an audit of provider ordering or prescribing practice, with the provision of subsequent feedback to the provider. There are many manners in which this method can be implemented in the educational setting. For instance, senior residents or attending physicians can review the ordering and prescribing practices of junior trainees in both inpatient and outpatient settings, and provide subsequent feedback (both positive and constructive) to enhance these practices.

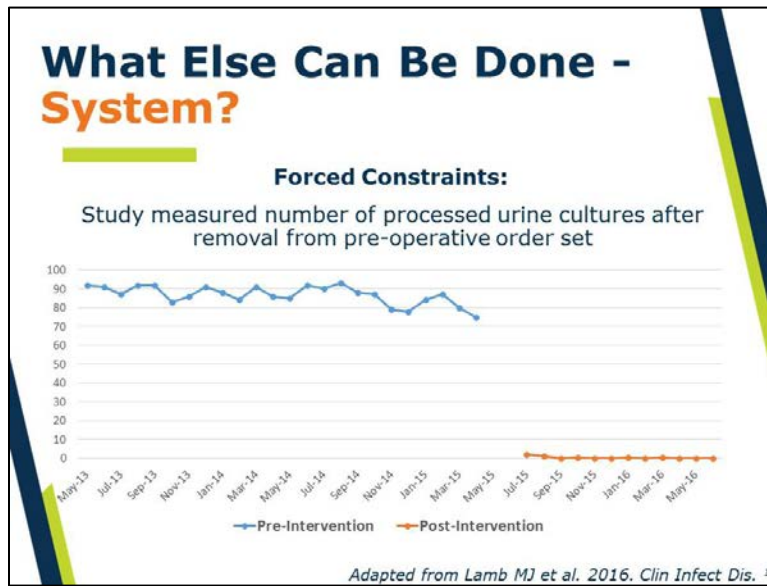
This study<sup>1</sup> assessed the rate of ordering “inappropriate” echocardiograms (based on guideline criteria) both before and after an intervention that included a lecture on appropriate-use criteria for ordering echocardiograms, provision of a pocket card with appropriate use criteria, and bi-weekly audit and feedback via email. Following the intervention, there was a 26 per cent reduction in overall echocardiograms ordered, with a significantly lower rate of inappropriate ordering, and significantly higher rate of appropriate ordering.

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<sup>1</sup>Bhatia RS, CE Milford, MH Picard and RB Weiner. 2013. An educational intervention reduces the rate of inappropriate echocardiograms on an inpatient medical service. *JACC: Cardiovascular Imaging*. **6**(5):545-55.



## Slide 39:



Another method to attempt to alter physician behaviour involves building forced constraints into the system, with the goal of reducing or eliminating practices that are not evidence-based, or potentially harmful.

This study addressed a pre-operative order set that included routine urine culture screening prior to elective joint arthroplasties (initially conducted due to observational studies suggesting an association between asymptomatic bacteriuria and periprosthetic joint infections). After measuring pre-intervention rates of urine culture orders, the option to do so was removed from the order set, and any urine specimen received by the microbiology laboratory required confirmation of UTI symptoms before proceeding with processing. The study found a drastic reduction in urine cultures ordered, with a significant reduction in antibiotic utilization, and no significant change in rates of periprosthetic joint infections.

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<sup>1</sup>Lamb MJ, L Baillie, D Pajak, J Flynn, V Bansal, A Simo, M Vearncombe, S Walker, S Clark, J Gollish and JA Leis. 2017. Elimination of Screening Urine Cultures Prior to Elective Joint Arthroplasty. *Clinical Infectious Diseases.* **15**;64(6):806-809.

## Slide 40:

### Identify Strategies to Overcome Resource Stewardship Barriers

- Think-pair-share
- For each vignette, identify barriers that make resource stewardship challenging and one strategy to overcome a barrier
- Be prepared to discuss with the large group



**Note to presenter:** Example vignettes will be presented in the next few slides. The presenter can choose to use vignette(s) relevant to their target audience, or may choose to broadly present all of the vignettes, as a general exercise in recognizing resource stewardship opportunities across all specialities.

The presenter is also encouraged to develop his/her own speciality-specific case vignettes. For ideas, the presenter can draw upon his or her own clinical experiences where unnecessary tests and procedures were undertaken, that did not benefit the patient and/or change clinical management, and may have even caused harm. The presenter is also encouraged to consult the Choosing Wisely Canada website for lists of recommendations<sup>1</sup> put forth by their speciality-specific Canadian national society.

Instructions for Think-Pair-Share:

**Step One: Think (give the students two to three minutes to do this on their own)**

Have students reflect on the vignette

**Step Two: Pair (give the students three to five minutes to do this in pairs)**

Have students pair up with one other student and share their responses.

**Step Three: Share (allocate three to five minutes for the large group discussion)**

When the larger group reconvenes, ask pairs to report back on their conversations or ask students to share what their partner said.

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<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website:

<https://choosingwiselycanada.org/recommendations/>

## Slide 41:

### Vignette: Anesthesia

You are an Anesthesia resident rotating through a hospital-based preoperative clinic. You notice that approximately 25 per cent of the referrals are for patients undergoing low risk cataract surgery. The patients arrive with baseline laboratory studies and an EKG completed, ready for your interpretation. You realize that your assessments do not alter their preoperative management, and ask your attending why these patients are being seen in the clinic.



### Barriers that make resource stewardship challenging:

- **Culture of medicine:**
  - Better to do “something” than to do “nothing”
  - Culture of “more is better”
- **Behavioural modeling:**
  - “It’s how we’re taught”
- **Physician-related factors:**
  - Established habit
  - Challenges applying evidence
  - Defensive medicine
  - Satisfying referring colleague’s requests
- **Health system structure:**
  - Time constraints
  - Ease of access to services
  - Volume-based reimbursement model / financial incentives

### Potential strategies to overcome these barriers:

- Understand that these assessments do not alter pre-operative management, and simultaneously increase the likelihood of identifying incidental findings that may delay a necessary procedure in order to pursue further investigations.
- Appreciate the patient-related costs associated with these assessments, including the need to take time off work, pay for parking, and the potential anxiety associated with identifying incidental findings.
- Be willing to challenge the “hidden curriculum” in an effort to change the status quo.

The specific Choosing Wisely Canada recommendation(s)<sup>1</sup> addressed by this vignette include:

*Canadian Anesthesiologists' Society*

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

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<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website:

<https://choosingwiselycanada.org/recommendations/>

## Slide 42:

### Vignette: Family Medicine

You are a resident working in a family medicine clinic. A 30 year old female has been experiencing frequent headaches for the past week. Her history is remarkable for migraine headaches, historically only occurring 1-2 times per year. Her neurological exam is normal. She is worried that she might have multiple sclerosis and is requesting an MRI.



### Barriers that make resource stewardship challenging:

- **Trainee-related factors:**
  - Lack of confidence in clinical assessment
  - Curiosity and/or desire to gain experience
- **Culture of medicine:**
  - Better to do “something” rather than “nothing”
  - Need to rule out “zebra”
- **Health system structure:**
  - Lack of time for discussion with patients and families
- **Patient-related factors:**
  - Patient requests and expectations

### Potential strategies to overcome these barriers:

- Recognize that the low pre-test probability of multiple sclerosis is sufficient enough to rule out the disease without the need for pursuing further tests.
- Elicit the patient’s concerns regarding a diagnosis of multiple sclerosis, and spend some time discussing with the patient your thought process for why the diagnosis would be unlikely.

### The specific Choosing Wisely Canada recommendation(s)<sup>1</sup> addressed by this vignette include:

*Canadian Association of Radiologists*

- **Don’t do imaging for uncomplicated headache unless red flags are present.**

*Canadian Headache Society*

- **Don’t order neuroimaging or sinus imaging in patients who have a normal clinical examination, who meet diagnostic criteria for migraine, and have no “red flags” for a secondary headache disorder.**



## Slide 43:

### Vignette: Emergency Medicine

An elderly patient from a long term care facility is sent to the ER after a fall. As part of the workup, a urinalysis is sent. The urinalysis is positive for leukocytes and nitrites. The patient denies any urinary symptoms. You are the resident and are working directly with the program director. You have worked with this supervising physician before and he always insists that you empirically treat with antibiotics when a urinalysis is abnormal.



#### Barriers that make resource stewardship challenging:

- **Behavioural modeling:**
  - “It’s how we’re taught”
  - Desire to impress supervisor
  - Lack of positive reinforcement for exercising restraint
- **Culture of medicine:**
  - Discomfort of “do nothing”
- **Physician-related factors:**
  - Establish habit
  - Defensive medicine
- **Health system structure:**
  - Lack of behavioural feedback

#### Potential strategies to overcome these barriers:

- Don’t hesitate to ask for clarifications on treatments that you believe are unnecessary. There is substantial evidence supporting the decision to avoid antibiotics in the context of asymptomatic bacteriuria.
- Be willing to challenge the “hidden curriculum” in an effort to change the status quo.

#### The specific Choosing Wisely Canada recommendation(s)<sup>1</sup> addressed by this vignette include:

*Long Term Care Medical Directors Association of Canada*

- **Don’t do a urine dip or urine culture unless there are clear signs and symptoms of a urinary tract infection (UTI).**

*Association of Medical Microbiology and Infectious Diseases Canada*

- **Don’t collect urine specimens for culture from adults who lack symptoms localizing to the urinary tract or fever unless they are pregnant or undergoing genitourinary instrumentation where mucosal bleeding is expected.**



## Treatment of asymptomatic bacteriuria

*Canadian Geriatrics Society*

- **Don't use antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present.**

*Canadian Society of Hospital Medicine*

- **Don't prescribe antibiotics for asymptomatic bacteriuria (ASB) in non-pregnant patients.**

*Canadian Nurses Association*

- **Don't recommend antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present.**

*Canadian Urological Association*

- **Don't use antimicrobials to treat asymptomatic bacteriuria in the elderly.**

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<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website:

<https://choosingwiselycanada.org/recommendations/>

## Slide 44:

### Vignette: Hematology

You are a hematology resident and are seeing a patient with chronic anemia in your longitudinal clinic. You are certain based on the history and physical examination that the patient has anemia of chronic disease in the context of multiple comorbidities, including chronic kidney disease. However, the referral from the Family MD indicates that they are requesting a bone marrow biopsy.



### Barriers that make resource stewardship challenging:

- **Trainee-related factors:**
  - Lack of confidence in clinical assessment
- **Culture of medicine:**
  - Better to do “something” than to do “nothing”
  - Culture of “more is better”
- **Physician-related factors:**
  - Established habit
  - Satisfying referring colleague’s requests
- **Health system structure:**
  - Lack of behavioural feedback
  - Ease of access to services
  - Financial incentives

### Potential strategies to overcome these barriers:

- Understand that a bone marrow biopsy will most likely not lead to any change in management (assuming that there are no other concerning conditions on the differential diagnosis with a sufficiently high pretest probability that require ruling out).
- Don’t hesitate to contact the referring provider to discuss his/her concerns around a request for a bone marrow biopsy. Similar to a patient’s request and expectations, the provider’s concerns may stem from prior experiences or a misunderstanding of the test. Be willing to take the time to reach out and have a conversation around the case.
- Be confident in your assessment. If in doubt, have a discussion with your attending physician.

This is an example of a case for which there is **no current Choosing Wisely Canada recommendation**<sup>1</sup>, however, this is a plausible case referral that a hematologist (or internist) may receive. It is important to have discussions about resource stewardship

opportunities beyond what is recommended in the Choosing Wisely lists. Sometimes, a seemingly appropriate investigation or treatment may actually be unnecessary, after considering patients' goals and preferences.

Remember back to the three questions to ask within each patient encounter:

- 1. Should I order this test?**
- 2. Should I prescribe this treatment?**
- 3. Have I considered the patient?**

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<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website:

<https://choosingwiselycanada.org/recommendations/>

## Slide 45:

### Vignette: Orthopedic Surgery

You are an Orthopedic Surgery resident assessing a 72 year old male (BMI 32), referred for an 8-month history of worsening knee pain. His symptoms are aggravated by activity and has interfered with his previously active lifestyle. The patient had been initiated on glucosamine and chondroitin with minimal relief. Examination of the knees reveals tenderness in the medial joint line, normal range of motion, crepitus, and no effusion. The referring physician is requesting consideration of arthroscopic lavage to manage this patient's osteoarthritis.



#### Barriers that make resource stewardship challenging:

- **Culture of medicine:**
  - Better to do “something” than to do “nothing”
  - Culture of “more is better”
- **Physician-related factors:**
  - Established habit
  - Satisfying referring colleague’s requests
- **Health system structure:**
  - Lack of behavioural feedback
  - Healthcare payment model / financial incentives
- **Industry influences:**
  - New technologies
  - Marketing to physicians

#### Potential strategies to overcome these barriers:

- Understand the evidence behind the proposed treatment(s). Taking the time to develop your knowledge around the relevant literature will allow you to have a constructive conversation with the patient about any potential intervention, and will further support your recommendation that you communicate to the referring provider.
- Instead of simply declining to pursue a low-value intervention (i.e. arthroscopic lavage), take the time to discuss with the patient interventions with supporting evidence (i.e. weight loss, structured exercise programs).

**The specific Choosing Wisely Canada recommendation(s)<sup>1</sup> addressed by this vignette include:**

*Canadian Orthopedic Association*

- **Don't use needle lavage to treat symptomatic osteoarthritis of the knee for long-term relief.**

The use of needle lavage in patients with symptomatic osteoarthritis of the knee does not lead to measurable improvements in pain, function, 50-foot walking time, stiffness, tenderness or swelling.

- **Don't use glucosamine and chondroitin to treat symptomatic osteoarthritis of the knee.**

Both glucosamine and chondroitin sulfate do not provide relief for patients with symptomatic osteoarthritis of the knee.

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<sup>1</sup>Choosing Wisely Canada. *Recommendations and Resources, by Specialty*. Last retrieved July 31, 2017, from Choosing Wisely Canada's website:

<https://choosingwiselycanada.org/recommendations/>

## Slide 46:

### Conclusion

- Resource stewardship is a professional and ethical obligation.
- Overuse is common in clinical learning environments and can harm patients.
- Individual and system factors contribute to overuse.
- Residents are uniquely positioned to decrease overuse and demonstrate resource stewardship.



**Note to presenter:** This slide contains generic concluding points. We encourage you to develop your own conclusion slide based on the expected depth and breadth of your presentation.

For reference, here are the objectives for this session:

- Define common terminology in resource stewardship
- Differentiate between rationing and resource stewardship
- Discuss ethical aspects of resource stewardship
- Recognize the harm associated with overuse
- Identify drivers of overuse
- Discuss strategies to improve resource stewardship
- Identify examples of overuse in their specialty and opportunities for improved resource stewardship



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