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CONFRONTING UNNECESSARY CARE: CHOOSING WISELY CANADA

Approximately 30% of treatments or diagnostic interventions confer no meaningful benefit on patients.

Eliminating such care represents enhanced quality and better stewardship of resources. This module reviews the issue of unnecessary care in Canada and describes the practice resources available through Choosing Wisely Canada — a physician-initiated campaign that encourages physicians and patients to have evidence-informed conversations about the necessity of medical tests and treatments.

Go to www.MDcme.ca and register for FREE.

ACCREDITATION

This program meets the accreditation criteria of the College of Family Physicians of Canada and has been approved by Memorial University of Newfoundland for up to 1 Mainpro-M1 credit.

This program is an Accredited Group Learning Activity eligible for up to one (1) Section 1 credit as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada.

Funds in support of this CPD activity were provided as an educational grant to Memorial University of Newfoundland by the Canadian Medical Association.
Choosing Wisely Canada: conversations about low-value care

It has been estimated by the Institute of Medicine that as much as 30% of health care in the United States confers no clinical benefit to the patients who receive it. There are many reasons why such care is provided, including outdated physician habits, provider fear of litigation, patient demand and lack of clear guidance in some clinical situations. Whatever the cause, in 2012, the ABIM (American Board of Internal Medicine) Foundation launched the Choosing Wisely campaign — an initiative intended to help physicians and patients engage in evidence-informed conversations to reduce unnecessary tests, treatments and procedures.

This physician-initiated campaign has rapidly become international, with Choosing Wisely Canada created by the University of Toronto and the Canadian Medical Association (CMA) in 2014. During the first year of operation, 102 recommendations crafted by 21 specialty societies (below) were released; 2015 will see as many as 24 additional specialties produce evidence-based guidance on low-value clinical activities that are best avoided. The ultimate goal of this work is to improve the quality of health care by adding value and preventing harm.

With support from Health Canada, during 2014–15, the Canadian Medical Association Journal published practice articles and online true–false questions based on Choosing Wisely Canada recommendations. These are gathered here as both a ready reference for practitioners and a teaching resource for academic clinicians and trainees.

The CMA is proud to collaborate with patient organizations, national specialty societies, provincial and territorial medical associations, and many others in the important work of Choosing Wisely Canada.

Chris Simpson MD FRCPC
President, Canadian Medical Association

Wendy Levinson MD
Chair, Choosing Wisely Canada

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Engaging physicians and patients in conversations about unnecessary tests and procedures: Choosing Wisely Canada

Wendy Levinson MD, Tai Huynh MBA

Every industrialized country in the world is concerned about the rising costs of health care. Canada spends almost $200 billion each year — about 12% of its gross domestic product — on health care. Despite the enormous cost, evidence shows that substantial gaps exist in the quality of care provided in Canada, and that compared with other countries, Canada does not perform well on many key indicators of health outcomes. Physicians determine the use of health care resources through daily decisions about when to see patients, whether to admit them to hospital, and which tests and procedures to order. Yet, often physicians order tests, treatments and procedures despite strong evidence that they may not help, and may even harm, patients. Almost every medication, medical test and procedure carries, to varying degrees, risks and benefits. Currently, no evidence directly links unwarranted medical procedures and harm. However, evidence exists of inappropriate imaging being performed in Canada, and a study involving patients in Quebec shows that lifetime exposure to low-dose ionizing radiation from medical procedures is associated with an increased risk of cancer.

Currently, Canada is preparing to follow in the footsteps of the popular US campaign Choosing Wisely. Choosing Wisely Canada (www.choosingwiselycanada.org/) is designed to help physicians and patients engage in conversations about unnecessary tests, treatments and procedures, and supports physician efforts to help patients make smart and effective choices to ensure high-quality care. The Canadian Medical Association (CMA) is working with the campaign to engage Canadian medical societies. In addition, the Canadian campaign focuses on educating medical students, residents and faculty members of academic medical centres. The underlying premise is that physicians must lead the conversation, because they determine the appropriate or inappropriate use of resources.

The American Board of Internal Medicine Foundation launched Choosing Wisely in the United States in February 2012. Partnerships with specialty medical societies led to the creation of lists of “Five Things Physicians and Patients Should Question” based on evidence of overuse, waste and potential harm to patients. Each of the “five things” is written as a declarative statement beginning with the word “Don’t” or “Avoid.” For example, the American Academy of Family Physicians’ first point states, “Don’t do imaging for low back pain within the first six weeks, unless red flags are present.”

In February 2012, nine specialty societies in the US released their lists. Now, 60 societies are participating, and many have released lists that are publicly available. These societies are disseminating their lists through publications, national and regional continuing education meetings, and their websites.

Choosing Wisely Canada is presently working with 24 Canadian specialist societies, 8 of which (Box 1) will release their lists of “things physicians and patients should question” in April 2014. Other societies will release their lists in subsequent waves. Physician leaders have strongly supported the campaign, which has officially been endorsed by specialty societies, the CMA, the provincial and territorial medical associations, the Royal College of Physicians and Surgeons of Canada, the College of Family Physicians Canada and the Canadian Association of Professors of Medicine. The Canadian campaign will also emphasize patient and public education to help individuals and their physicians make informed choices, and to support a broader dialogue on the issue of unnecessary tests and treatments.

Engaging patients in the conversation is important, because they have expectations about

**KEY POINTS**

- Reducing unnecessary tests and procedures has important implications for the quality of patient care and for the sustainability of the health care system.
- Physicians are ideally positioned to play a leadership role.
- Choosing Wisely Canada is a campaign designed to help physicians and patients engage in conversations about unnecessary tests, treatments and procedures, and supports physician efforts to help patients make smart and effective choices to ensure high-quality care.
what tests and procedures physicians should order on their behalf. As part of the campaign, patient education materials are being developed that will describe why a test or procedure might not be needed. Given that the health care system in Canada is publicly funded, patient engagement is imperative to avoid the potential perception that this is purely a cost-cutting initiative. In fact, given the nature of how the health care system is funded in Canada, Choosing Wisely Canada may not necessarily reduce overall health care cost. However, the campaign has the potential to improve the value of available resources by ensuring that they are used more effectively.

Choosing Wisely Canada is engaging medical schools as well. Because medical schools shape the practice of future physicians, embedding the understanding of overuse of resources is critical in undergraduate and postgraduate education. Evidence shows that practice patterns learned in training can endure.8 Many learners lean toward ordering unnecessary tests because they wish to show thoroughness in making a differential diagnosis. Furthermore, trainees may be rewarded in academic centres for ordering extra tests, either to rule out disease or for academic learning. The academic environment rarely discourages ordering tests or procedures. This culture needs to change9 and is changing.10 An informal network of students is evolving through social media, and programs are emerging at the Open School Institute for Health-care Improvement in Cambridge, Massachusetts, and through websites such as teachingvalue.org.

Questioning the impact of Choosing Wisely is logical, especially when considering rolling it out in Canada. We do not yet know the impact of the campaign in the US, although we do know that it has been widely and enthusiastically embraced by societies — including those whose physician members might stand to gain financially by ordering tests or performing procedures. Choosing Wisely Canada plans to evaluate the success of the campaign (initially in Ontario) to understand its impact on clinical practice. However, accrual of data takes time, and appropriate measures of the impact of the campaign on physician and patient attitudes and on physician ordering practices are yet to be defined.

The Institute of Medicine in the US reports that 30% of health care spending is wasteful and does not add value to the care of patients.11 Physicians must lead the effort to ensure that precious health care resources are used wisely. Every test, treatment and procedure physicians order must be evidence-based, have potential to add value and minimize potential harm to patients. For many years, both physicians and patients have had a “more is better” attitude. It is time to adopt a “think twice” attitude and to avoid unnecessary and potentially harmful tests, procedures and treatments.

References

Affiliations: Choosing Wisely Canada (Levinson, Huynh); Department of Medicine (Levinson), University of Toronto, Toronto, Ont.; Centre for Innovation in Complex Care (Huynh), University Health Network, Toronto, Ont.

Contributors: Both authors contributed substantially to the creation and revision of the manuscript, approved the final version submitted for publication and agreed to act as guarantor of the work.

Box 1: Choosing Wisely Canada wave 1 specialty societies
• Canadian Association of General Surgeons
• Canadian Association of Radiologists
• Canadian Cardiovascular Society
• Canadian Geriatrics Society
• Canadian Medical Association Forum on General and Family Practice Issues
• Canadian Orthopaedic Association
• Canadian Rheumatology Association
• Canadian Society of Internal Medicine
A 55-year-old man describes first feeling a painful lump on the left side of his groin while playing soccer. He says it does not interfere with his work as a carpenter, although he has stopped helping coworkers lift heavy objects. He smokes eight cigarettes per day. On examination, a tender inguinal hernia the size of a hen’s egg is found on the left side above the inguinal ligament. The hernia reduces spontaneously when the patient lies down. He worries about how an operation might affect his sexual function.

Should the patient undergo testing to confirm the diagnosis or characterize the hernia?
No investigations are needed. Experts agree that when physical examination shows a diagnosis of inguinal hernia, ultrasonography or other diagnostic imaging is unnecessary. Guidelines advise against imaging a clinically evident hernia. A systematic review concluded that, although ultrasonography can confirm an obvious groin hernia, it is unnecessary in that setting and is an inefficient use of resources.

If a primary care provider suspects a groin hernia but is uncertain, ultrasonography lacks sufficient accuracy to rule out a hernia with enough confidence to avoid referral to a surgeon. In such cases, a surgeon will usually diagnose or rule out a hernia on the basis of history and examination and will order imaging tests only if the patient has a convincing history and equivocal findings. The surgeon can determine at operation if the hernia is direct (medial inguinal floor defect) or indirect (more lateral defect, with peritoneal sac) and does not need to make that distinction in advance to plan treatment.

Should the patient be referred to a surgeon?
The patient should be referred to a surgeon to discuss treatment options. Repair is indicated for symptom relief and to prevent intestinal obstruction and strangulation. Where access to elective repair is limited, emergency surgery is more frequent and disabilities from untreated hernias have adverse economic consequences. Although two large, prospective, randomized trials showed that minimally symptomatic hernias could be managed initially without operation, about two-thirds of the patients in the watchful-waiting arm in those studies eventually chose to have their hernias repaired, most commonly for pain relief.

Even a patient with a minimally symptomatic inguinal hernia should be assessed by a surgeon to discuss treatment options, which may include watchful waiting for up to two years (Box 1).

How urgent should the referral be?
The degree of urgency depends on how much the hernia affects the patient and the extent to which a treatment delay increases the risk of complications. Our patient should be offered a timely, nonurgent referral because his symptoms affect his work capacity and his inguinal hernia reduces easily.

A review of data from multiple studies involving more than 200,000 patients showed that the rate of death associated with emergency hernia repair for intestinal complications was about 20-fold higher than the rate associated with elective surgery (4% v. 0.2%). Although unnecessary delay should be avoided, the risk of a bad outcome while awaiting hernia repair is low among patients with minimal symptoms, who require emergency surgery at a frequency of less than 0.5% annually. Less is known about symptom-
atic hernias, which are usually repaired, which precludes their inclusion in long-term follow-up studies. A useful retrospective analysis pointed out challenges estimating such risks and identified femoral and scrotal hernias among factors associated with the need for emergency repair.9

Femoral hernia, which may present acutely with intestinal obstruction, or less dramatically as a lump or swelling inferior to the inguinal ligament, accounts for a small (1%) subset of groin hernias among men and 22% of groin hernias among women, according to a Swedish hernia registry study involving more than 100,000 patients.10 Femoral hernias are associated with higher rates of hernia complications, intestinal resection and death after emergency repair compared with other groin hernias, but not higher mortality when repaired electively.10,11

What should the patient be told while waiting for the referral appointment?
The patient should be instructed to seek emergency medical help if symptoms and signs of intestinal obstruction or strangulation develop. He can expect that surgery will fix his hernia, with less than 5% risk of hernia recurrence, infection or severe chronic pain, although wide variations in these adverse outcomes have been reported in the literature.8 He can improve his chances for success by stopping smoking. Smoking increases the risk of postoperative infection and hernia recurrence.12

Open and laparoscopic repairs produce similarly good results and usually do not require an overnight stay in hospital. Open repairs can be performed often under local anesthesia. Depending on the circumstances, return to work in two weeks and resumption of heavy exertion in three weeks are reasonable expectations.1 Surgical repair should not impair the patient’s sexual function, which improves often after repair of large hernias.13

Case revisited
The patient stopped smoking, assisted by medication prescribed by his primary care provider. After elective hernia repair under local anesthesia and sedation, he resumed work two weeks later and full activity, including soccer and heavy lifting, three weeks after surgery.

References

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CMAJ is collaborating with Choosing Wisely Canada, with support from Health Canada, to publish a series of articles describing how to apply the Choosing Wisely Canada recommendations in clinical practice.
A 67-year-old woman with knee pain

Alistair R. Demcoe MD, Eric R. Bohm MSc MD

What is the likely diagnosis?
The most likely diagnosis for this patient is osteoarthritis of the knees. The differential diagnosis includes pes anserine bursitis, spontaneous osteonecrosis of the knee and inflammatory arthropathy. Osteoarthritis is more common in women and older people; in addition, obesity puts this patient at increased risk for knee osteoarthritis.1,2 Brief morning stiffness, persistent knee pain, a decrease in function, crepitus, restricted movement and bony enlargement are clinical features and findings on physical examination that comprise the European League Against Rheumatism (EULAR) criteria for the diagnosis of osteoarthritis.2

Are any investigations necessary?
Plain radiography is the first-line imaging modality for the assessment of knee pain in this patient population. The EULAR group considers plain radiography (standing anteroposterior, standing semi-flexed posteroanterior, Merchant [skyline] and lateral views) the current gold standard for structural assessment of knee osteoarthritis.2 Magnetic resonance imaging is not required to make the diagnosis of osteoarthritis,2 nor is it helpful in making decisions about currently available interventions.1 Inappropriate use of magnetic resonance imaging is costly and can result in the detection and treatment of incidental meniscal tears. Degenerative meniscal tears are very common in patients with osteoarthritis and do not require operative treatment.1

What initial treatment should be recommended?
Several evidence-based clinical practice guidelines recommend the following initial interventions for the management of knee osteoarthritis: participation in a self-management program, strengthening exercises, low-impact exercises (aquatic or land-based), neuromuscular education and weight management.3–6

The Arthritis Self-Management Program was developed at Stanford University and is supported by The Arthritis Society. This widely used program is designed to help patients better understand their diagnosis and to encourage patients to take an active role in managing their arthritis and chronic pain. Meta-analyses and systematic reviews have shown that generalized strength training for the lower limbs and specific strength training for the quadriceps reduce pain effectively and improve physical function in osteoarthritis.4,5 A guideline from the American Academy of Orthopaedic Surgeons (AAOS) recommends neuromuscular education on the basis of several studies showing positive effects with kinesthesia, balance and proprioception training programs in patients with knee osteoarthritis.3

A guideline from the Osteoarthritis Research Society International (OARSI) recommends that a weight loss of 5% should be achieved within a 20-week period, a rate of 0.25% per week, to be efficacious.4 A recent randomized controlled trial (RCT) stressed the importance of both diet and exercise in achieving weight loss and in managing knee osteoarthritis.7

Patients randomly assigned to diet and exercise achieved more weight loss and had better physical health–related quality-of-life scores than patients assigned to exercise alone. Additionally, these patients had superior pain and function scores than patients assigned to either diet or exercise alone.7 The OARSI guideline also recommends use of a cane to help alleviate pain and improve function.4

Does the patient require medication?
When nonpharmacological intervention proves unsatisfactory, multiple guidelines recommend
acetaminophen as a first-line agent for mild to moderate arthritis. Because of reports of gastrointestinal adverse events, elevated hepatic enzymes and overdose, the OARSI guideline recommends conservative dosing and treatment duration of acetaminophen. Although the OARSI guideline does not give exact parameters on this recommendation, the AAOS guideline indicates it may be prudent to restrict the over-the-counter dose of acetaminophen to 3000 mg per day and reserve the 4000 mg per day dose for prescriptions. Second-line agents include oral and topical non-steroidal anti-inflammatory drugs (NSAIDs), selective cyclooxygenase-2 inhibitors and topical capsaicin. Use of oral and topical NSAIDs received a strong recommendation in the AAOS guideline.

For patients with osteoarthritis localized to one or both knees, the OARSI guideline recommends the use of local medications, including topical NSAIDs and corticosteroid injections (see below). This was especially emphasized in patients with coexisting medical comorbidities, which are very common in this patient population. Each medication carries unique safety and adverse-effect profiles, and therapies should be specific to each patient’s individual risk factors and medical comorbidities.

If initial treatment fails, what other options may be considered?
Several options may be considered when initial treatment does not result in satisfactory symptom control. These include systemic medications (e.g., tramadol, duloxetine, opioids), intra-articular corticosteroid injections, medial compartment–unloading braces, physical modalities and manual therapy.

For refractory symptoms, guidelines recommend tramadol and duloxetine. The AAOS recommendation for the use of tramadol is on the basis of five RCTs that showed outcomes in favour of the treatment group. Duloxetine is recommended by OARSI on the basis of a systematic review and an RCT that showed that the drug is efficacious and well tolerated for chronic pain associated with knee osteoarthritis. Whereas the use of intra-articular corticosteroid injections was deemed inconclusive in the AAOS guideline, the OARSI guideline supports their use because of two systematic reviews showing significant short-term decreases in pain.

The use of physical modalities (e.g., transcutaneous electrical nerve stimulation, ultrasound, therapeutic application of musically modulated electromagnetic fields) and manual therapy all received an inconclusive recommendation from the AAOS work group. These recommendations are supported by several other guidelines.

Although some older systematic reviews suggested minor benefits for the use of physical modalities or were inconclusive, more recent randomized trials showed no additional benefits to the use of these modalities. Manual therapy received an inconclusive rating in the AAOS guideline based on a lack of adequate studies evaluating joint mobilization, joint manipulation, chiropractic therapy, patellar mobilization or myofascial release.

In a Cochrane review, use of opioids for hip and knee arthritis was found to be effective for pain control and improvement in physical function; however, because of a high rate of adverse events, the authors did not recommend the routine use of opioids for the treatment of osteoarthritis. Most articles in this review combined data on hip and knee osteoarthritis. The AAOS group found no studies on opioids or pain patches for the treatment of knee osteoarthritis that met its inclusion criteria, and the group was unable to recommend for or against opioid use. Other guideline groups were also unable to make a recommendation regarding opioid use.

Medial compartment–unloading braces received an inconclusive recommendation from the AAOS; however, this intervention was supported by OARSI. The evidence for their use appears to be inconsistent. The AAOS recommendation was based on inconsistent findings from three moderate- to high-quality RCTs, with improvement in pain scores not always reaching statistical significance.

With inconclusive or uncertain recommendations, both the AAOS and OARSI guidelines stress that clinical judgment and patient preference should have a substantial influencing role when deciding to use these treatment modalities for the management of knee osteoarthritis.

What treatments shouldn’t be offered?
There are many other treatments that have been used for osteoarthritis, including needle lavage for joints, lateral wedge insoles, acupuncture, glucosamine, chondroitin, intra-articular injections of hyaluronic acid, and arthroscopy. However, studies of these treatments have not consistently shown statistically significant or clinically important improvements, and their use is not routinely recommended in guidelines.

Needle lavage for joints was assessed in a 2010 Cochrane review, and the authors found no benefit in terms of pain relief or improvement in physical function. Neither the EULAR nor the AAOS guidelines recommend using lateral wedge insoles because of lack of efficacy in comparison to neutral insoles and reports of adverse events. A recent meta-analysis investigating the
use of lateral wedge insoles for treatment of medial knee osteoarthritis failed to show a statistically significant or clinically important improvement in pain scores using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) when compared with a neutral insole.\(^4\) The Canadian Orthopaedic Association, as part of the Choosing Wisely Canada campaign, does not recommend the use of either joint lavage or lateral wedge insoles for the treatment of knee arthritis\(^11\) (Box 1).

The AAOS guideline recommends against the use of acupuncture, glucosamine, chondroitin and hyaluronic acid injections for the management of osteoarthritis of the knee.\(^3\) Other guidelines, including the 2014 OARSI guideline, are less critical of these modalities; however, they also do not recommend their use.\(^4,6\)

Acupuncture is not recommended by the AAOS based on 10 studies (five high strength and five moderate strength), most of which did not show statistically significant improvement, and if they did show improvement, it was not clinically significant.\(^3\) The uncertain recommendation in the OARSI guideline on acupuncture was based on a meta-analysis that found statistically significant, but not clinically significant, benefit in sham-controlled trials.\(^4\)

Like the AAOS, the Canadian Orthopaedic Association, as part of the Choosing Wisely Canada campaign, recommends against the use of glucosamine or chondroitin in patients with symptomatic osteoarthritis of the knee (Box 1). The AAOS group based its recommendation on the analysis of 5 high-quality, 1 low-quality and 15 moderate-quality studies, which failed to show improvement in pain and function scores using WOMAC and pain scores using a visual analogue scale.\(^3\) The OARSI guideline was less critical than the AAOS guideline, but more specific. The OARSI guideline indicates that glucosamine and chondroitin are not appropriate for use in knee osteoarthritis as disease-modifying agents and, partly because of inconsistencies in results between industry-sponsored and independent trials, was uncertain about their role in pain relief.\(^7\) An older Cochrane review on the use of glucosamine in osteoarthritis showed that its use, when restricted to analysis of studies with adequate allocation concealment and not using a specific brand, failed to show a benefit in WOMAC pain or function scores.\(^12\)

The AAOS group based its recommendation on intra-articular hyaluronic acid injections on 14 studies (3 high-strength and 11 moderate-strength studies). Meta-analyses of pain, function and stiffness scores using WOMAC subscales all found statistically significant treatment effects with use of hyaluronic acid injections; however, none of the improvements met the AAOS group’s threshold for minimal clinically important improvement.\(^3\) The OARSI’s uncertain recommendation was based on two systematic reviews and an RCT that provided inconsistent conclusions and conflicting results.\(^4\)

Over the past decade, there has been increasing evidence against the use of arthroscopy in the management of knee osteoarthritis. The current AAOS guideline reflects this and strongly recommends against the use of arthroscopy in the management of knee osteoarthritis.\(^3\) This recommendation was based on three RCTs (two with moderate strength and one with strong strength) that failed to show any clinical benefit, as well as on the risk associated with surgical intervention.\(^3\) This recommendation did not apply to patients with a primary diagnosis of meniscal tear and concomitant knee osteoarthritis. In this patient population, the AAOS found insufficient evidence to recommend for or against arthroscopic partial meniscectomy and rendered an inconclusive recommendation.\(^3\)

**The case**

Plain radiography confirmed the diagnosis of moderate osteoarthritis of the knees. The patient was referred to a self-management program through The Arthritis Society (www.arthritis.ca/asmp) for control of her knee osteoarthritis. As an initial management plan, a low-impact exercise program, a weight-loss plan that included both diet and exercise, and an acetaminophen dose of 500 mg every 6 hours as required was recommended. Should the initial management plan fail to provide sufficient symptomatic relief, a topical NSAID would be a safe and generally effective addition, taking into consideration that the patient

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**Box 1: Choosing Wisely Canada recommendations**

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.

Don’t use lateral wedge insoles to treat symptomatic medial compartment osteoarthritis of the knee.

- In patients with symptomatic osteoarthritis of the knee, the use of lateral wedge or neutral insoles does not improve pain or functional outcomes. In addition, the possibility exists that those who do not use them may experience fewer symptoms from osteoarthritis of the knee.

has isolated knee osteoarthritis and comorbidities of hypertension and diabetes. Orthopedic referral will be initiated for consideration of knee replacement in the future if her pain and resultant functional limitations are inadequately controlled with comprehensive nonoperative management and she is willing to consider surgery.

References

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Contributors: Alistair Demcoe selected the reference material, and drafted and revised the article. Eric Bohm conceptualized and revised the article. Both authors approved the final submission.

CMAJ is collaborating with Choosing Wisely Canada, with support from Health Canada, to publish a series of articles describing how to apply the Choosing Wisely Canada recommendations in clinical practice.
Practice

Decisions

Imaging in a 35-year-old woman with progressive headache

Santanu Chakraborty MD, William D. Miller MD

A 35-year-old woman presents with a one-month history of progressive global headaches, which last from hours to a day. The headaches are associated with visual blurring and paresthesia involving the left side of her face. She sometimes experiences nausea and vomiting with the headaches. On a few occasions, her headaches have been associated with sexual intercourse. Her headaches are now affecting her ability to work. She has a history of occasional headaches. A distant relative on the maternal side of her family died from subarachnoid hemorrhage associated with a cerebral aneurysm. On examination, the patient is slightly overweight and there is possibly some blurring of the optic disc margins bilaterally. Neurological examination is otherwise unremarkable.

What diagnoses should be considered?
The differential diagnosis includes primary headache (e.g., migraine, tension headache) and idiopathic intracranial hypertension. Secondary headache associated with aneurysm or intracranial masses should also be considered.

Based on the patient’s symptoms and examination, should she be sent for imaging of her head?

This patient may benefit from imaging because she has progressive headaches and findings that suggest the possibility of underlying pathology.

The frequency of headache complaints and the low yield of positive results create a substantial challenge in use of imaging. A study by You and colleagues\(^1\) assessed indications for and results of nearly 12,000 requests for outpatient computed tomography (CT) in 20 Ontario hospitals. In this study, the head was the most requested body part for CT (35%), with 26% of these scans requested for headache. Less than 2% of these were positive for an abnormality that could explain the headache. A systematic review performed for a guideline on headache by the American College of Radiology\(^2\) found that there is a very low yield of positive results for imaging in patients presenting with isolated headache; the incidence of abnormalities was as low as 0.4%, and not all of these were clinically significant. There are potential risks with neuroimaging, including false-positive results that may worry the patient and lead to additional procedures.\(^3\)

Headaches associated with “red flags” merit imaging (Box 1).\(^4\) These include those associated with thunderclap onset (i.e., instantly peaking pain), new onset in pregnancy, suspected meningitis, immunosuppression, ongoing or suspected recurrence of malignancy, or ipsilateral Horner syndrome with suspected arterial dissection.\(^4–6\)

As per the recommendations of the Choosing Wisely and Choosing Wisely Canada campaigns,\(^4,6\) neuroimaging studies are not required in patients with stable headaches that meet the criteria for migraine. A similar recommendation holds for typical cluster headaches.\(^3\) The likelihood of positive findings on imaging is not increased when headaches are accompanied by symptoms such as numbness and visual blurring without any abnormal neurologic findings. A normal neurologic examination reduces the odds of headache being caused by an underlying pathology (Box 1).\(^4\)

Competing interests: William Miller is vice-president of the Canadian Association of Radiologists. No competing interests were declared by Santanu Chakraborty.

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Box 1: Choosing Wisely recommendations on imaging for headache

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

- Red flags include recent onset, rapidly increasing frequency and severity of headache; headache causing the patient to wake from sleep; associated dizziness, lack of coordination, tingling or numbness, new neurologic deficit; and new onset of a headache in a patient with a history of cancer or immunodeficiency.

Source: Canadian Association of Radiologists. Five things physicians and patients should question. Choosing Wisely Canada.\(^5\)
of finding an abnormality by 30% (likelihood ratio 0.7). In contrast, an abnormal neurologic examination increases the likelihood of finding important intracranial pathology (likelihood ratio 3.0). Guidelines and clinical decision rules are helpful in determining the need for imaging in headache. For example, inclusion of thunderclap onset (i.e., a red flag) and limited neck flexion (i.e., abnormal neurologic examination) resulted in 100% sensitivity when incorporated into the Ottawa Subarachnoid Hemorrhage Rule; specificity was 15.3%. In a patient with these findings, imaging would be indicated, with CT preferred to exclude acute hemorrhage and rapidly available at most sites (Box 2).

Neuroimaging studies may be requested for fear of missing a diagnosis, or because of medical concerns or patient expectation. A negative study can provide reassurance for both the patient and the referring physician, but this reassurance is difficult to quantify. As such, diagnostic scans for headache may be considered on an individual basis. A frank discussion with the patient stating the lack of impact of neuroimaging in the management of most headaches, the associated risk related to radiation exposure and the risks (both physical and psychological) related to false-positive results may be helpful.

When nonemergent imaging is indicated, magnetic resonance imaging is preferred over CT, for higher sensitivity and to avoid radiation exposure. In general, CT is preferred in emergency situations and when acute hemorrhage is suspected (Box 2).

**Box 2: Recommendations for imaging for headache**

<table>
<thead>
<tr>
<th>Red flags</th>
<th>Suggested tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>New onset of a headache in a patient with a history of cancer or immunodeficiency</td>
<td>Enhanced MRI or contrast-enhanced CT</td>
</tr>
<tr>
<td>New neurologic deficit</td>
<td>Noncontrast CT</td>
</tr>
<tr>
<td>Rapidly increasing frequency and severity of headache; thunderclap onset; headache causing the patient to wake from sleep</td>
<td>Noncontrast CT; consider CT angiogram in cases of thunderclap onset to rule out aneurysm</td>
</tr>
<tr>
<td>First-degree relative with known aneurysm or subarachnoid hemorrhage</td>
<td>Consider CT or MR angiogram to rule out aneurysm</td>
</tr>
<tr>
<td>Associated dizziness, lack of coordination, tingling or numbness</td>
<td>Consider CT or MRI including angiogram to rule out dissection or vascular insufficiency</td>
</tr>
<tr>
<td>Headache associated with sexual activity, orgasmic type with thunderclap onset (nonacute)</td>
<td>Consider CT or MRI including angiogram to rule out aneurysm or dissection</td>
</tr>
</tbody>
</table>

Note: CT = computed tomography, MRI = magnetic resonance imaging.

With the patient’s family history, does she require screening for cerebral aneurysm?

With a family history of one distant relative with cerebral aneurysm, the patient does not meet the criteria of screening recommendations.

The incidence of familial aneurysms among patients with subarachnoid hemorrhage is up to 20%. Screening of first-degree relatives is generally recommended in families that have two or more individuals with aneurysms. However, the latest guideline by the American Heart Association and American Stroke Association finds it reasonable to offer noninvasive screening to families with one first-degree relative with subarachnoid hemorrhage. The interval at which the screening should be repeated is controversial, but most cost-effectiveness models suggest an interval of five to seven years. Technically, CT angiogram has a slightly better resolution than magnetic resonance angiogram. However, magnetic resonance angiogram does not require contrast and is radiation-free, making it the preferred investigation for screening for cerebral aneurysms.

Does this patient require screening for aneurysm, given that she had headache with sexual activity?

The patient’s history of headaches that are only occasionally associated with sexual intercourse makes it unlikely that these headaches are associated with aneurysm.

Headache associated with sexual activity is not common. However, one estimate suggests that 4%–11% of subarachnoid hemorrhages occur during sexual intercourse (about four per million people per year). Headache associated with sexual activity is more common in men (3:1) and is frequently bilateral. This type of headache mostly represents a benign primary disorder and is often associated with migraine (25%), exertional headache (29%) or tension-type headache (45%). However, headache with sexual activity can occasionally be caused by important pathology. It is prudent to differentiate between dull, aching pain that occurs during preorgasm (found in 25% of headaches associated with sexual activity) and sudden explosive onset of headache that occurs during orgasm (75%). The latter is more likely to be associated with subarachnoid hemorrhage or arterial dissection; brain and vascular imaging would be helpful in this situation.

Case revisited

Because there is evidence of possible papilledema on examination, imaging to exclude idiopathic intracranial hypertension or tumour is reasonable. Magnetic resonance imaging, preferably...
with a magnetic resonance venogram, would be preferred over CT. Lumbar puncture with measurement of opening pressure may be diagnostic for idiopathic intracranial hypertension, the most likely diagnosis in this case. If, however, this patient did not have findings of papilledema, imaging would not be indicated.

References

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**Contributors:** Both authors contributed substantially to the conception of the article, drafted and revised the article, gave final approval of the version to be published and agree to act as guarantors of the work.
A 62-year-old woman with syncope

Christine Soong MD MSc, Benjamin H. Chen MD, Brian M. Wong MD

Competing interests: Christine Soong reports receiving fees as an invited speaker at the 12th Annual Conference of the Canadian Society of Hospital Medicine in 2014. Christine Soong and Brian Wong are cochairs of the Canadian Society of Internal Medicine’s Choosing Wisely Canada committee. No other competing interests were declared.

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A 62-year-old woman living independently presents to the emergency department after briefly losing consciousness while straining on the toilet. The patient felt well shortly before and immediately after the event; no associated trauma or confusion occurred. The patient had experienced a similar episode of syncope six months earlier, which had been investigated with an echocardiogram with a normal result. She has a known history of stroke affecting the posterior circulation and receives appropriate secondary prevention treatment (acetylsalicylic acid [81 mg/d], perindopril [4 mg/d], and atorvastatin [20 mg/d]). An initial assessment of the patient’s condition shows normal vital signs, no signs of volume depletion, and normal results on cardiovascular and neurologic examination.

What diagnoses should be considered? Syncope is a common symptom, occurring in at least 30% of the adult population.1 The differential diagnoses in this patient’s case include micturition and vasovagal syncope (neurally mediated mechanisms associated with autonomic impairment), arrhythmias, valvular disease, outflow obstruction and orthostatic hypotension.2,3 Neurologic causes of syncope, such as transient ischemic attack (TIA), stroke or seizure, are almost always associated with features suggestive of the underlying cause (e.g., asymmetric motor weakness, and deficits in speech, vision and sensation in TIA or stroke; aura, tonic posturing and postural confusion in seizure) and account for less than 5% of all cases of syncope.1,4

Are there any “red flags” on history or physical examination? The initial history and physical examination should focus on distinguishing relatively benign causes of syncope (e.g., reflex syncope, such as vasovagal or situational syncope; orthostatic hypotension) from high-risk causes (e.g., cardiac disorders). Features suggestive of benign causes include situational precipitants such as emotional stress or activity (e.g., micturition, defecation, coughing) with an associated prodrome (e.g., nausea, sweating or dizziness), or orthostatic hypotension.1,5 High-risk features, or “red flags,” suggestive of a cardiac cause include syncope during exertion, palpitations at the time of syncope, evidence of cardiovascular disease or a family history of sudden cardiac death (Box 1).

What initial investigations are necessary? Guidelines from the American College of Emergency Physicians and from cardiovascular societies in Canada, the United States and Europe, support a structured approach to the evaluation of syncope.1,4–7 If a detailed history, physical examination and normal electrocardiography (ECG) suggest reflex or orthostatic syncope, further testing is usually not required.

Other cases of undiagnosed syncope are further stratified into low, intermediate and high cardiovascular risk using features on history and physical examination, with the latter two categories warranting further tests, such as echocardiography, rhythm monitoring (i.e., using Holter, event or loop recorders) and stress tests.1,5–7 Laboratory investigations may be considered if underlying causes, such as anemia, or metabolic disturbances, such as hypoglycemia or hypercapnia, are suspected.4,8,9 Further cardiac investigations or admission to hospital for observation should be guided by the presence of red flags (Box 1).1–3

Should the patient undergo neuroimaging? If patients presenting with simple syncope have a normal neurologic examination, neuroimaging studies are not necessary. Observational studies involving patients presenting to the emergency department with syncope found the diagnostic yield of neuroimaging (computed tomography [CT] and magnetic resonance imaging [MRI] of the brain, and ultrasonography of the carotid artery) to be less than 5%, with head CT and ultrasonography of the carotid causing a change in management in less than 2% of cases.10 These studies have led to recommendations from Choosing Wisely Canada (Box 2), which advise limited use of neuroimaging studies in the evaluation of simple syncope.11
Case revisited
Because this patient’s presentation is most consistent with an uncomplicated episode of syncope without important risk factors or new neurologic deficits, the most likely cause is vasovagal syncope. A 12-lead ECG did not show any concerning features of arrhythmia or ischemia. In addition, the patient already had known cerebrovascular disease and was taking appropriate secondary prevention treatments. Neuroimaging studies at this juncture would be of low diagnostic yield, be unlikely to alter management and expose the patient to unnecessary radiation; therefore, none were pursued. Instead, physicians reassured the patient, and she was discharged from the emergency department with follow-up with her family physician the following week.

References

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Contributors: All of the authors contributed substantially to the conception and design of the article; to the acquisition, analysis and interpretation of data; and to writing or revising the article for important intellectual content. All of the authors approved the final version to be published and agreed to act as guarantor of the work.

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Box 1: Red flags requiring further evaluation in patients with syncope1-6
- History or sign of cardiovascular disease (i.e., severe aortic stenosis, outflow obstruction, heart failure, myocardial infarction)
- Syncope during exertion
- Lack of prodrome
- Palpitations at the time of syncope
- Family history of sudden cardiac death
- Risk factors on electrocardiography, such as:
  - Bifascicular, Mobitz I second-degree, or complete (third-degree) heart block
  - Ischemic changes (T-wave inversion, ST-depression, Q waves)
  - Brugada syndrome (right bundle branch block with ST-elevation in leads V1–V3
  - Prolonged QT interval
- New neurologic deficits
- Seizure (aura, witnessed tonic-clonic activity with postictal state)

Box 2: Choosing Wisely Canada recommendation11
Do not routinely obtain neuroimaging studies (computed tomography [CT], magnetic resonance imaging or ultrasonography of the carotid artery) in the evaluation of simple syncope in patients with a normal neurologic examination.

- Although a neurologic cause is uncommon in syncope, providers must consider one in any patient who presents with transient loss of consciousness. In the absence of signs or symptoms concerning for neurologic causes (such as, but not limited to, focal neurologic deficits), neuroimaging studies are of limited benefit. Despite a lack of evidence for the diagnostic utility of neuroimaging in patients presenting with true syncope, providers continue to use CT imaging of the brain. Inappropriate use of diagnostic imaging carries high costs and subjects patients to the risks of radiation exposure.

CMAJ is collaborating with Choosing Wisely Canada (www.choosingwiselycanada.org), with support from Health Canada, to publish a series of articles describing how to apply the Choosing Wisely Canada recommendations in clinical practice.
A 24-year-old man presents to his primary care physician with a six-month history of low back pain. He has no history of trauma, fever or weight loss, and his pain has not responded to nonsteroidal anti-inflammatory drugs (NSAIDs). The patient has joint stiffness for an hour each morning and says that he feels better with movement and worse with rest. On further inquiry, the patient has no other joint pain, eye symptoms, rash or change in bowel habits. There is no known family history of inflammatory arthritis or other autoimmune conditions. The result of a straight leg raising test is negative, and the patient’s reflexes, gait, power and sensation in his extremities are normal. He has normal forward flexion of the back, but with pain.

**What is the likely diagnosis?**

The most common causes of back pain are lumbar strain, osteoarthritis of the spine and a herniated disc. Red flags such as weight loss, fever and neurologic symptoms suggesting medical causes for back pain, such as cancer and infection, should be ruled out. However, this patient’s young age, the chronic and inflammatory nature of his back pain (i.e., morning stiffness, symptoms better with movement and worse with rest) suggest the possibility of inflammatory back arthritis or sacroiliitis. Inflammatory back arthritis, also known as axial spondyloarthritis or ankylosing spondylitis, should be considered in a patient less than 45 years of age with back pain lasting more than three months. Inflammatory back pain in axial spondyloarthritis is characterized by insidious onset of back or buttock pain, morning stiffness lasting more than one hour, and pain that improves with activity but worsens with rest. Patients will often describe the pain waking them up at night after a few hours of sleep and relieved by getting up to walk around or stretch. They may have other spondyloarthritic features, including peripheral arthritis of small or large joints, pain that responds to NSAIDs, enthesitis of any tendon, dactylitis or swollen “sausage” digits, psoriasis, uveitis, inflammatory bowel disease, a positive family history (the probability of ankylosing spondylitis developing in children with one affected parent is 10%), elevated C-reactive protein and presence of human leukocyte antigen B27 (HLA-B27) (Box 1).

**Does the patient require imaging?**

As per the Choosing Wisely Canada recommendations, imaging should not be ordered in cases of low back pain that does not have red flags. However, in this patient’s case, the chronic inflammatory nature of the symptoms, their duration of more than three months, and the patient’s young age (< 45 yr) makes axial spondyloarthritis a possible diagnosis. A radiograph of the sacroiliac joints should be ordered. If the images are negative, and if the pretest probability is high, magnetic resonance imaging (MRI) of the sacroiliac joints with short T1 inversion recovery sequences can be ordered; gadolinium contrast is not required.

Findings consistent with axial spondyloarthris-
tis on imaging include sacroiliitis on radiography or bone marrow edema along the sacroiliac joints on MRI. Lesions consistent with bone marrow edema on MRI are highly suspicious for axial spondyloarthritis. With a patient history of inflammatory back pain, laboratory evidence of inflammation (e.g., elevated C-reactive protein) and findings on imaging, the probability of spondyloarthritis increases to 90%.6

Should HLA-B27 testing be ordered at this appointment?
HLA-B27 testing is not useful as a single diagnostic test in a patient with low back pain without further signs or symptoms suggesting spondyloarthritis (Box 1). This is one of the Canadian Rheumatology Association’s Choosing Wisely recommendations (Box 2). A positive result in this setting will not classify the person as having spondyloarthritis. In a patient with chronic low back pain, positive HLA-B27, and no other features of spondylitis, the post-test probability of inflammatory back disease would not exceed 30%. Between 5% and 10% of healthy people have positive test results for HLA-B27, varying with ethnicity, and inflammatory back arthritis will develop in only 2%–5% of those with a positive test result.6,7

If imaging shows evidence of sacroiliitis in a young patient with chronic inflammatory back pain, there is no additional requirement of HLA-B27 testing for diagnosis. However, if imaging is negative in this situation, the HLA-B27 test can be helpful. For a diagnosis of axial spondylitis in a patient with a positive HLA-B27 test result and negative imaging, criteria from the Assessment of SpondyloArthritis International Society state that at least two other spondyloarthritis features must be present (Box 1). These criteria have a sensitivity of 83% and a specificity of 84%. About 85% of patients with ankylosing spondylitis have a positive result on HLA-B27 testing.6,7

When would you refer this patient to a rheumatologist?
A patient with inflammatory back pain, sacroiliitis on radiography or a positive HLA-B27 test result should be referred to a rheumatologist for further assessment. The rheumatologist can evaluate for features of spondyloarthritis and order further imaging or testing if appropriate.

**Box 2: Choosing Wisely Canada recommendation on HLA-B27 testing**

Do not order an HLA-B27 test unless spondyloarthritis is suspected based on specific signs or symptoms.

- HLA-B27 testing is not useful as a single diagnostic test in a patient with low back pain without further signs or symptoms of spondyloarthritis (e.g., inflammatory back pain more than three months in duration with age of onset less than 45 years, peripheral synovitis, enthesitis, dactylitis, psoriasis or uveitis), because the diagnosis of spondyloarthritis in these patients is of low probability. If HLA-B27 testing is used, at least two signs or symptoms of spondyloarthritis, or the presence of positive imaging results, need to be present to classify a patient as having axial spondyloarthritis. There is no clinical use in ordering an HLA-B27 test in the absence of positive imaging or the minimally required signs or symptoms of spondyloarthritis.

**Case revisited**
The physician ordered a C-reactive protein level and radiographs of the sacroiliac joints. The radiology report was equivocal, but the patient had elevated C-reactive protein. The physician ordered MRI of the sacroiliac joints with short T1 inversion recovery sequences, which showed bone marrow edema. Given these results, the physician referred the patient to a rheumatologist for assessment without ordering HLA-B27 testing. With positive imaging and elevated C-reactive protein (a feature of spondyloarthritis), further testing by the primary care physician was not required.

**References**

**Affiliation:** Department of Medicine, University of Toronto, Toronto, Ont.

**Contributors:** Both of the authors contributed to the conception, writing and revising of the manuscript, approved the final version submitted for publication and agreed to act as guarantors of the work.
During a rugby tournament, a 15-year-old girl was tackled and her head struck her opponent’s knee. She was slow to get up, and appeared unsteady and dazed. After using the Pocket Concussion Recognition Tool\(^1\) to assess the player’s condition, her coach suspected that she had a concussion and removed her from the game. Her symptoms began to improve over the next few hours, and she was brought to her family doctor the same day for evaluation, with reports of mild headache, difficulty concentrating and feeling “foggy,” all worsened by loud noises and bright lights.

What should be included on history-taking and physical examination?

There are tools available to help clinicians assess athletes with possible concussion. The Sport Concussion Assessment Tool, 3rd edition (SCAT3) can be used for athletes 13 years of age or older, and a children’s version exists for those aged 5 to 12 years.\(^1,2\) SCAT3 requires about 15 minutes to complete and includes the following items: Glasgow Coma Scale; modified Maddocks questions (a memory assessment); review of subjective symptoms; Standardized Assessment of Concussion (a cognitive assessment); and examination of the neck, balance and coordination; as well as background information and mechanism of injury.\(^2\) Although SCAT3 was recently published in 2013 and has not been formally assessed for reliability and validity in large studies, the Standardized Assessment of Concussion element of SCAT3 has been studied with a sensitivity of 80%–94% and a specificity of 76%–91%.\(^3\)

Does the patient require computed tomography of her head?

Computed tomography (CT) of the head is appropriate in the acute setting when a clinically important intracranial injury, such as an epidural...
or subdural hematoma, is suspected. Imaging is not required in minor head trauma if there are no red flags (Box 1).

The Pediatric Emergency Care Applied Research Network (PECARN) prediction rule may help guide the decisions of health care providers about the need for CT. The prediction rule was derived from a large pediatric cohort study showed that increased cognitive activity was associated with longer recovery from concussion. Patients that increased cognitive activity was associated with a longer recovery from concussion. 

Finally, a single-centre prospective cohort study showed that increased cognitive activity was associated with longer recovery from concussion. Patients that increased cognitive activity was associated with a longer recovery from concussion.

What treatments should be offered to the patient?
The mainstay of concussion treatment is to prescribe both physical and cognitive rest, which includes an initial rest period of 24–48 hours. A single-centre prospective cohort study showed that increased cognitive activity was associated with longer recovery from concussion. Patients and parents/caregivers should monitor symptoms every 24 hours. Combined with clinical judgment, it is safe for this adolescent to be observed at home if the following conditions are met: normal mental status with improving symptoms; no risk factors indicating need for CT or normal CT if already done; and no indications for prolonged observation, such as worsening symptoms, bleeding disorders or multisystem injuries.

What instructions should the patient and family receive at the end of the visit?
Families should be informed of the expected course of recovery and timelines for expected return to normal activities, including lifestyle strategies, expectations, anticipatory guidance, and verbal reassurance through both verbal information and written handouts. Whereas most children fully recover within two weeks, some children may require months to recover. The Ontario Neurotrauma Foundation’s guideline on concussion suggests information that physicians should discuss with patients and their families at the end of the visit (Box 2).

What follow-up should be arranged?
The patient should be followed weekly by phone or in person to monitor symptom progression using a validated symptom inventory (e.g., Post-Concussion Symptom Inventory for Children). After the patient’s acute symptoms have improved, a stepwise plan to return to normal activities (including school) should be developed. Although there is evidence from cohort studies supporting the need for physical and cognitive rest, there is still ambiguity as to the ideal duration of rest; therefore, the treating physician may choose a standard approach (e.g., the Acute Concussion Evaluation Post-Concussion Gradual Return to School tool) or a more conservative approach (e.g., CanChild Return to School Guidelines for Children and Youth).

When is it safe to allow the patient to return to sport?
A return-to-play program should be developed only after the teen has started her program for returning to normal activities (including school). Similar to cognitive rest, there is still ambiguity in the literature as to the ideal duration of physi-

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**Box 2: Advice for patients with concussion and their families at the initial assessment**

- Avoid high-speed and contact activities that may increase the patient’s risk of sustaining another concussion, especially during the recovery period.
- Manage sleep by maintaining the same bed and wake times every day throughout the year, by turning off all electronic devices at least 30 minutes before bed, and by limiting naps to in bed and once a day.
- Manage headaches by beginning with nonsteroidal anti-inflammatory drugs and acetaminophen (recommended usage < 15 d/mo).
- Keep a diary to identify triggers for fatigue, and be aware that it may come on suddenly or without exertion.
- Maintain social networks and interactions, because reducing the risk of mental health issues and social isolation may promote recovery.
- Avoid alcohol and other recreational drugs to prevent self-medication and prolongation of recovery, and to prevent risky behaviour associated with impaired judgment.
- Avoid driving during recovery, because this complex process requires cognition, attention, vision, balance, reaction time and judgment (all of which may be affected).
- Follow up with primary care physician regularly; if symptoms persist after one month, referral to specialized care may be initiated.

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**Box 3: Summary of key steps for initial management of suspected concussion in children and adolescents**

- Assess and treat any physical, cognitive and neurological deficits.
- Determine the need for CT.
- Consider hospital observation if the patient shows red-flag symptoms.
- Prescribe physical and cognitive rest.
- Discharge the patient for observation at home under certain conditions (i.e., satisfactory mental status, no abnormal CT scan, no indication for prolonged observation).
- Provide verbal information and written handouts to the patient and parents and/or caregivers.
- Inform on the expected course of recovery and return to learning and play.
- Advise on sequelae, sleep, headaches, fatigue, social activity, alcohol and drugs, driving and follow-up.

CT = computed tomography.
A conservative stepwise plan (CanChild Return to School) 

An adolescent who has sustained multiple concussions should be referred to an expert in pediatric sport concussion (e.g., sport medicine doctor, brain injury clinic, neurologist) to further assist with return-to-play decisions or retirement from contact sports. Box 3 summarizes key steps in the management of concussion from sports in children and teens.1

The case revisited

The patient was assessed using the SCAT3 tool, which showed a Glasgow Coma Scale score of 15, a total of five symptoms with a severity score of 15, cognitive assessment only significant for 1/5 on concentration, and unremarkable neck, balance and coordination examination. No head CT was ordered, because there were no worrisome signs or symptoms suggesting a more serious head injury according to the PECARN rule.1 She was prescribed both physical and cognitive rest using conservative stepwise plans (CanChild Return to Activity and CanChild Return to School).1 A template letter of accommodation was sent to her school outlining her plan.1

The patient monitored her own progress every 24 hours and communicated the current status of her Post-Concussion Symptom Inventory weekly with her doctor.1 By three weeks, her progression in her return-to-play plan permitted her to begin rugby drills with her team without contact. Four weeks after her concussion, she returned to full game play after being cleared by her family physician.

References


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Contributors: Hoang Pham drafted the manuscript, which both authors revised. Both authors approved the final version submitted for publication and agreed to act as guarantors of the work.


Additional resources

The Ontario Neurotrauma Foundation’s Guidelines for Diagnosing and Managing Pediatric Concussion, patient handouts and the clinical tools mentioned in this article are available at http://onf.org/system/attachments/265/original/GUIDELINES_for_Diagnosing_and_Managing_Pediatric_Concussion_Full_v1.1.pdf

CMAJ is collaborating with Choosing Wisely Canada (www.choosingwiselycanada.org), with support from Health Canada, to publish a series of articles describing how to apply the Choosing Wisely Canada recommendations in clinical practice.
The periodic health examination in adults

David Ponka MDCM MSc (Int Prim Care)

Traditionally, the periodic health examination has comprised an annual visit to a doctor for screening and preventive purposes

The origins of the periodic health examination (PHE) date back to at least the industrial revolution, when employers paid for annual check-ups to keep their labour forces healthy. Today, the practice is subsumed into the work of primary care physicians and is still widespread throughout Canada. It is referred to by different terms (e.g., annual health examination, periodic health visit) and is not an insured service in all provinces.

The value of the PHE in adults is unclear

Some countries, such as the United Kingdom and Germany, encourage PHEs for otherwise healthy adults aged 40–75 years, arguing that these groups have an increasing burden of lifestyle and chronic diseases that may be amenable to intervention. In Canada, however, the ongoing variability in practice, with a trend toward reducing or eliminating the use of PHEs in adults, may be confusing to patients.

The PHE has not been shown to reduce morbidity and mortality

A Cochrane systematic review found no evidence of an impact on patient outcomes. Furthermore, PHEs may lead to too many blood tests, chest radiographs and electrocardiograms, exposing patients to the risks of investigation, such as false-positive results and overdiagnosis (Box 1). Population-based preventive efforts may be more effective at reducing morbidity and mortality.

Potential advantages of the PHE include performance of preventive manoeuvres

The PHE is an opportunity to perform evidence-based preventive manoeuvres, to counsel patients on lifestyle issues, update vaccinations and, importantly, to identify risk factors and diagnoses through updating the cumulative patient profile (i.e., patient history). However, this may not be necessary annually in patients at low risk. For resources on preventive manoeuvres, see Appendix 1 (available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.141125/-/DC1).

The value of a regular (not necessarily annual) PHE may lie in other factors

The PHE may serve as a mechanism to assist marginalized groups who would otherwise not attend regularly. It may also facilitate efforts around management of chronic disease and deprescribing. The patient–doctor relationship itself is increasingly being shown to affect health outcomes. However, sustained, relationship-based care may be possible only by reducing other, unnecessary, visits.

Box 1: Choosing Wisely Canada recommendations on periodic health examinations

- Don’t do annual screening blood tests unless directly indicated by the risk profile of the patient.
- Don’t order screening chest radiographs and electrocardiograms for asymptomatic or low-risk outpatients.


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CMAJ is collaborating with Choosing Wisely Canada (choosingwiselycanada.org), with support from Health Canada, to publish a series of articles describing how to apply the Choosing Wisely Canada recommendations in clinical practice.
Nutrition in dementia

Robert E. Lam MD MS, Peter J. Lam MD

Eating difficulties are a part of the natural progression of advanced dementia

A large prospective cohort study showed that 85% of patients with advanced dementia (Mini-Mental State Examination score ≤ 5.1) had eating difficulties.1 The six-month mortality for such patients was almost 40%.1

Feeding tubes do not enhance survival or quality of life

Examining the evidence from observational controlled studies involving nasogastric tubes, percutaneous endoscopic gastrostomy tubes or a combination of types of feeding tubes, a Cochrane review found insufficient evidence that feeding tubes enhance survival or quality of life, or that they reduce pneumonia or pressure ulcers.2 Feeding tubes may increase the need for restraints, thereby possibly worsening pressure ulceration (Box 1).2

Competing interests: Robert Lam is the secretary-treasurer of the Canadian Geriatrics Society, which supports the Choosing Wisely Canada campaign; he has received a grant from Pfizer Canada to develop a continuing medical education course for physicians. No other competing interests were declared.

This article has been peer reviewed.

Before recommending tube-feeding, physicians should clarify the presence and severity of underlying dementia

Most feeding tubes (68%) are given to residents of nursing homes during an admission to hospital for acute care,6 a situation in which the extent of the patient’s underlying dementia may be unclear to staff. Feeding tubes should not be recommended for patients with advanced dementia.5 Once a feeding tube is inserted, deciding on its removal can be difficult for a substitute decision-maker.

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Careful hand-feeding may be preferable to tube-feeding

Although a direct comparison is not available, evidence suggests that careful hand-feeding is as good as tube-feeding in terms of complications and survival (Box 1).3 Hand-feeding may be best received by patients with advanced dementia if small quantities are given frequently to minimize choking. Patients at the end of life may feel only transient hunger and thirst.4 Although it can be time-consuming, hand-feeding provides caregivers a way to express care and allows the patient to enjoy the sensation of eating.5


Competing interests: Robert Lam is the secretary-treasurer of the Canadian Geriatrics Society, which supports the Choosing Wisely Canada campaign; he has received a grant from Pfizer Canada to develop a continuing medical education course for physicians. No other competing interests were declared.

This article has been peer reviewed.

Feeding decisions are best discussed with the patient or substitute decision-maker well before an admission to hospital

A randomized controlled trial showed that substitute decision-makers had more knowledge and less decisional angst after watching a video about feeding options (http://decisionaid.ohri.ca/tools.html#feedingoptions).7 A decision aid of this type may enhance the quality of subsequent discussions.


Box 1: Choosing Wisely Canada recommendation

Do not recommend percutaneous feeding tubes for patients with advanced dementia; instead, offer oral feeding.

- Careful hand-feeding for patients with severe dementia is at least as good as tube-feeding for the outcomes of death, aspiration pneumonia, functional status and patient comfort. Food is the preferred nutrient, but nutritional supplements may be beneficial. Tube-feeding is associated with agitation, increased use of restraints and worsening pressure ulcers.

Five things to know about …

Screening with the Pap test

David Ponka MDCM MSc, James Dickinson MBBS PhD

Deaths from invasive cervical cancer occur mostly among women who do not undergo regular screening

The rate of death from cervical cancer is reduced by more than 80% among women who have regular Papanicolaou (Pap) screening. Women of lower socioeconomic status and those who are older, First Nations or immigrants are less likely to be screened regularly. Screening intervals shorter than three years increase the risk of finding and investigating abnormalities that mostly resolve spontaneously. Recommended intervals vary by jurisdiction, but longer intervals require organized screening and recall programs to maintain high participation rates.

Some women do not require Pap screening

Ages at which Pap screening should start vary by jurisdiction, but most guidelines agree that harm from false-positive results outweighs potential benefits of Pap screening in young women. Women who have had a total hysterectomy for a benign disorder and women over 70 years of age who have had three normal test results within 10 years do not require Pap screening.

Women vaccinated against HPV infection still require Pap screening

HPV types 16 and 18 are present in about 70% of cervical cancers worldwide and are targeted in HPV vaccines. However, over 40 other types also colonize the genital tract, some of which are associated with cancer. Because most cervical cancers occur in women over 35 years of age, longer follow-up of HPV vaccine trials are required to measure their effectiveness.

Adding bimanual pelvic examination to Pap screening does not reduce the risk of disease

Routine screening with bimanual pelvic examination does not reduce the risk of disease, whether cervical, uterine or ovarian. This examination is uncomfortable for many women and makes Pap screening less acceptable.

Competing interests: James Dickinson is a member of the Canadian Task Force on Preventive Health Care, which is a voluntary, unpaid position supported by a grant that provides reimbursement of expenses for meetings. No competing interests were declared by David Ponka.

This article has been peer reviewed.

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CMAJ is collaborating with Choosing Wisely Canada (www.choosingwiselycanada.org), with support from Health Canada, to publish a series of articles describing how to apply the Choosing Wisely Canada recommendations in clinical practice.
Delirium

Shirley H. Bush MBBS, Peter G. Lawlor MB MMedSc

Delirium is often missed

Although delirium is common (prevalence 18%–50% in hospital, up to 88% in palliative care), the diagnosis, particularly hypoactive delirium, is often missed owing to symptom fluctuation and transient lucidity, as well as clinical features that overlap those of dementia and depression. The diagnosis is clinical, but nursing observational and cognitive screening tools or brief tests of attention may improve detection. A collateral history of an acute change in mental status should prompt use of the Confusion Assessment Method.

Delirium is usually multifactorial

Delirium arises from the interplay of predisposing (e.g., advanced age, dementia) and acute precipitating factors. Superimposed precipitants include infection, medications (e.g., psychoactive and anticholinergic drugs), drug withdrawal, metabolic abnormalities and other medical conditions. Delirium’s reversal hinges on the identification of treatable precipitants.

Benzodiazepines should be avoided as first-line agents in the pharmacologic management of delirium

Benzodiazepines can exacerbate delirium; first-line use is limited to the management of alcohol or sedative-hypnotic withdrawal (Box 1). Limited evidence suggests short-term use of antipsychotic agents (e.g., haloperidol, olanzapine) in the lowest clinically effective doses for the management of severe hyperactive (agitated) delirium. Anti-psychotic agents should be used cautiously in Parkinson disease or Lewy body dementia, because of the risk of extrapyramidal adverse effects.

Box 1: Choosing Wisely Canada recommendation

Do not use benzodiazepines or other sedative-hypnotic agents as first-line treatment in older adults with insomnia, agitation or delirium.

- Large-scale studies consistently show that the risk of motor vehicle collisions, falls and hip fractures leading to hospital admission and death can more than double in older adults taking benzodiazepines and other sedative-hypnotic agents. The number needed to treat with a sedative-hypnotic for improved sleep is 13, whereas the number needed to harm is only 6. Older patients, their caregivers and their health care providers should recognize these potential harms when considering treatment strategies for insomnia, agitation or delirium.

Delirium has a poor prognosis

Delirium is associated with increased mortality and morbidity; cognitive and functional decline are common, as is placement in long-term care. Symptoms usually persist, and recovery rates are poor in older patients. Delirium may worsen pre-existing and increase the risk of new-onset dementia. Patients may feel threatened and anxious. Family members should be provided with education and support.

About one-third of all delirium episodes in older adults in hospital can be prevented

Multicomponent nonpharmacological interventions are effective for preventing and treating delirium in many patients. The Hospital Elder Life Program targets risk factors with a focus on orienting activities, hydration, sleep, mobility and avoidance of sensory deprivation. Unnecessary use of catheters should be avoided. Other strategies include comprehensive geriatric assessment perioperatively, use of designated delirium rooms and comprehensive medication review.

Competing interests: None declared.

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In screening for primary hypothyroidism, only serum thyroid-stimulating hormone is required as a first-line test.1,3

In the general adult population (excluding pregnant women and older people), a normal thyroid-stimulating hormone (TSH) level is defined as the 95% laboratory-specific reference interval (about 0.45–4.50 mIU/L).1,3 In adults (other than in pregnancy), TSH values greater than 10 mIU/L or TSH elevations with low free thyroxine values are generally considered indications for levothyroxine treatment1,4 (Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.141596/-/DC1).

About a third of patients receiving treatment for hypothyroidism have TSH values outside the target range.1,3

Annual TSH monitoring, with more frequent monitoring in special circumstances (e.g., pregnancy, major weight change or addition of potentially interacting medications), may facilitate appropriate dose adjustment.3,4 If needed, the levothyroxine dose may be titrated with changes of about 12.5–25 µg, measuring TSH about four to eight weeks later.3,4

Coingestion of levothyroxine with food may cause impaired absorption and should be avoided.3,4

Ideally, levothyroxine should be taken only with water at a consistent time, either one hour before breakfast or at bedtime more than three hours after the final meal of the day.3,4 If an alternative schedule is chosen, it should be consistently maintained.

Competing interests: Anna Sawka is a member and Jacqueline Jonklaas is chair of the American Thyroid Association Thyroid Replacement Task Force (unpaid). Jacqueline Jonklaas holds an R01 research grant from the National Institutes of Health for hypothyroidism treatment in aging and thyroid cancer.

References
5. Canadian Society of Endocrinology and Metabolism. Five things physicians and patients should know about primary hypothyroidism (Box 1).5 age-specific target TSH levels have been recommended.1,4 Higher upper limits of TSH targets are acceptable for older people (e.g., up to 6 mIU/L in patients aged 65 yr, with consideration of comorbidities).2,3

Box 1: Choosing Wisely Canada recommendation on hypothyroidism

• Don’t use free thyroxine or triiodothyronine to screen for hypothyroidism, or to monitor and adjust levothyroxine (thyroxine) dose in patients with known primary hypothyroidism.5

Coingestion of levothyroxine with medications or dietary supplements that may interfere with its absorption should be avoided.2,3

Some medications (e.g., bile acid sequestrants, phosphate binders, aluminum-containing antacids) and dietary supplements (e.g., calcium, iron) may interfere with levothyroxine absorption. Ideally, a four-hour separation from taking levothyroxine is advised.2,3 Lists of drugs that interfere are available.1,3

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Five things to know about ...

Dyspepsia

Daniel C. Sadowski MD, Sander Veldhuyzen van Zanten MD PhD

A directed history can guide management of dyspepsia

Dyspepsia refers to symptoms of epigastric pain, burning, post-prandial fullness or early satiety, sometimes with heartburn.¹ The most common endoscopic findings for new cases are reflux esophagitis (40%), and gastric and duodenal ulcers (10%).² Alarm symptoms (Box 1)³ should prompt referral for upper endoscopy.⁴

Endoscopy is the preferred diagnostic modality if alarm symptoms are present

Patients with alarm symptoms undergoing endoscopy were found to have clinically significant peptic ulcer disease and gastric cancer in 13% and 4% of cases, respectively.⁵ Because the prevalence of serious abnormalities increases with age, an endoscopy should be considered for those aged 55 years or older with new-onset symptoms.³,⁴ Upper gastrointestinal barium studies are less accurate than gastroscopy and should not be used if alarm symptoms are present (Box 1).³

Use of NSAIDs is common in people with dyspepsia

Up to 30% of patients with dyspepsia in a Canadian population were found to be taking nonsteroidal anti-inflammatory drugs (NSAIDS) (including acetylsalicylic acid).² Eliminating the use of NSAIDs or dose reduction is often effective for dyspepsia.⁶

An eight-week trial of once-daily PPI therapy can be considered in patients with reflux-like dyspepsia⁷

Those requiring continuous acid-suppressive therapy for symptom control should use the lowest effective dose and try stopping the treatment at least once per year (Box 1) because of potential adverse effects of long-term proton pump inhibitor (PPI) use.³ Absence of symptom benefit makes it unlikely that symptoms are acid-related, and the PPI should be discontinued.³ There is little evidence that prokinetic agents (e.g., domperidone) are efficacious in dyspepsia, either alone or with a PPI.⁸ For non-responders, gastroscopy should be considered.

Patients with new-onset dyspepsia should be tested for Helicobacter pylori infection

The overall seroprevalence of H. pylori infection in Canada is about 30%, but declining in younger Canadians. Much higher rates are seen in immigrant and First Nations populations.⁸ The urea breath test is the preferred diagnostic test. Although serologic tests are available, they cannot be used to document cure. For patients testing positive for H. pylori, the newer sequential therapy (Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.141606/-/DC1) should be used rather than the older PPI-based triple therapy with clarithromycin and amoxicillin.¹⁰


Competing interests: Sander Veldhuyzen van Zanten has received an honorarium from Takeda, which makes proton pump inhibitors. No competing interests were declared by Daniel Sadowski.

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TRUE OR FALSE?


Whole-body diagnostic computed tomography scanning should be used routinely in patients with single-system trauma to avoid missing injuries.

**FALSE** Avoid the routine use of whole-body diagnostic computed tomography (CT) scanning in patients with minor or single-system trauma.

Aggressive use of whole-body CT scanning improves early diagnosis of injury and may even positively affect survival in patients with polytrauma. However, the significance of radiation exposure must be considered, especially in patients with low-energy mechanisms of injury and without findings on physical examination consistent with major trauma. — Canadian Association of General Surgeons

Percentage who answered correctly: 80%

Bibliography

Patients with back pain of less than six weeks’ duration do not require imaging unless red flags are present.

**TRUE** Do not do imaging for low back pain unless red flags are present.

Red flags include suspected epidural abscess or hematoma that may present with acute pain but no neurologic symptoms (requiring urgent imaging); suspected cancer; suspected infection; cauda equina syndrome; severe/progressive neurologic deficit; and suspected compression fracture. In patients with suspected, uncomplicated herniated disc or spinal stenosis, imaging is indicated only after at least a six-week trial of conservative management and when symptoms are severe enough that surgery is being considered. Imaging of the lower spine before six weeks does not improve outcomes. — Canadian Association of Radiologists, College of Family Physicians of Canada, Canadian Medical Association’s Forum on General and Family Practice Issues

Percentage who answered correctly: 88%

Bibliography

Hemoglobin levels should be assessed annually in all adults to avoid missing anemia or other important diagnoses.

**FALSE** Annual screening blood tests should not be done unless directly indicated by the patient’s risk profile.

There is little evidence to suggest that there is value in performing routine blood tests in patients with no symptoms. This practice is more likely to produce false-positive results that could lead to unnecessary testing. The decision to perform screening tests and the selection of tests should be done with careful consideration of the patient’s age, sex and possible risk factors. — College of Family Physicians of Canada, Canadian Medical Association’s Forum on General and Family Practice Issues

Percentage who answered correctly: 72%

Bibliography
Preoperative chest radiography is not necessary in ambulatory patients with an unremarkable history and a normal physical examination.

**TRUE** Avoid chest radiography on admission or before surgery in ambulatory patients with unremarkable history and normal results on physical examination. Preoperative testing (such as radiography, echocardiography or cardiac stress tests) should not be routinely ordered for patients undergoing low-risk surgeries.

Chest radiography on admission or before surgery is not recommended for ambulatory patients without specific reasons suggested by either their history or findings on physical examination. Only 2% of such images result in a change in case management. Chest radiography is reasonable if acute pulmonary disease is suspected, or if the patient has a history of chronic stable cardiopulmonary disease, is more than 70 years of age and has not undergone chest radiography in the previous 6 months. — Canadian Association of General Surgeons

Routine tests before low-risk surgeries can result in unnecessary delays, potential distress to patients and substantial costs to the health care system. Several studies and guidelines outline a lack of evidence for benefit in routine preoperative testing (e.g., chest radiography, echocardiography) in patients with low risk. Economic analyses suggest substantial potential cost savings from the implementation of such guidelines. — Canadian Society of Internal Medicine

Percentage who answered correctly: 83%

**Bibliography**

Patients with even mild, asymptomatic valvular disease should undergo annual echocardiography to monitor for valve deterioration.

**FALSE** Echocardiography should not be routinely ordered in follow-up for mild, asymptomatic, native valve disease in adult patients with no change in signs or symptoms.

Patients with native valve disease are usually symptom-free for years before the onset of valve deterioration. An annual echocardiogram is not recommended unless there is a change in the patient’s clinical status. — Canadian Cardiovascular Society

Percentage who answered correctly: 58%

**Bibliography**

Low doses of antipsychotic drugs are a good first choice to treat behavioural symptoms of dementia.

**FALSE** Do not use antipsychotic agents as a first choice in treating the behavioural and psychological symptoms of dementia.

People with dementia often exhibit aggression, resistance to care and other challenging or disruptive behaviours. Antipsychotic agents are often prescribed in such instances, but they provide limited benefit and can cause serious harm, including premature death. Use of these drugs should be limited to cases in which nonpharmacologic measures have failed and patients pose an imminent threat to themselves or to others. Identifying and addressing causes of behaviour change can make drug treatment unnecessary. — Canadian Geriatrics Society

Percentage who answered correctly: 60%

**Bibliography**
Patients with low risk and no symptoms of coronary artery disease do not need to undergo annual screening with electrocardiography.

**TRUE** Do not order electrocardiography or any other cardiac screening for patients with low risk and no symptoms.

In asymptomatic patients at low risk for coronary artery disease (10-year risk < 10%), screening with electrocardiography does not improve patient outcomes. — Canadian Cardiovascular Society

Percentage who answered correctly: 81%

**Bibliography**

Intense glycemic control improves outcomes for almost all older adults with type 2 diabetes.

**FALSE** Avoid using medications known to cause hypoglycemia to achieve glycated hemoglobin levels of less than 7.5% in many adults aged 65 years and older; moderate control is better.

There is no evidence that using medications to achieve intense glycemic control in older adults with type 2 diabetes is beneficial (glycated hemoglobin < 7.0%). Among adults not in this age group, with the exception of long-term reductions in mortality and rates of myocardial infarction with metformin, the use of medications to achieve glycated hemoglobin levels lower than 6% is associated with harms, including increased mortality. Intense control has been consistently shown to produce increased rates of hypoglycemia in older adults. Given the long timeframe (about 8 yr) to achieve theorized benefits of intense control, glycemic targets should reflect patient goals, health status and life expectancy. Reasonable glycemic targets would be 7.0%–7.5% in healthy older adults with long life expectancy, 7.5%–8.0% in those with moderate comorbidity and a life expectancy of less than 10 years, and 8.0%–8.5% in those with multiple comorbidities and shorter life expectancy. — Canadian Geriatrics Society

Percentage who answered correctly: 63%

**Bibliography**

All children with head trauma require imaging to rule out fracture and brain injuries.

**TRUE** Do not do imaging for minor head trauma unless “red flags” are present.

Red flags include a Glasgow Coma Scale score of less than 13 (or < 15 at 2 hr postinjury), age less than 16 years or 65 years and older, an obvious or suspected open skull fracture, a suspected depressed skull fracture, any sign of basilar skull fracture (e.g., hemotympanum, raccoon eyes, Battle sign, cerebrospinal fluid otorrhea or rhinorrhea), retrograde amnesia to the event of 30 minutes or more, dangerous mechanism of injury (e.g., a pedestrian struck by motor vehicle, an occupant ejected from vehicle, or a fall from higher than 3 feet or down more than 5 stairs) and use of warfarin or a bleeding disorder. — Canadian Association of Radiologists

Percentage who answered correctly: 30%

**Bibliography**
Patients who have had elective hip arthroscopy require routine postoperative ultrasonography to rule out deep venous thrombosis.

**FALSE** Avoid postoperative ultrasonography to screen for deep vein thrombosis in patients who undergo elective hip or knee arthroplasty.

Because ultrasound is not effective in diagnosing unsuspected deep vein thrombosis and appropriate alternative screening tests do not exist, routine postoperative screening for deep vein thrombosis after hip or knee arthroplasty does not change outcomes or clinical management if there is no change in the patient’s clinical status. — Canadian Orthopaedic Association

Percentage who answered correctly: 75%

**Bibliography**

Antinuclear antibody testing is a good screening test for systemic lupus erythematosus in patients with nonspecific symptoms.

**FALSE** Do not order antinuclear antibody as a screening test in patients without specific signs or symptoms of systemic lupus erythematosus or another connective tissue disease.

Antinuclear antibody (ANA) testing should not be used for screening in patients who do not have specific symptoms (e.g., photosensitivity, malar rash, symmetrical polyarthritis) or who do not have a clinical evaluation that may lead to a presumptive diagnosis of systemic lupus erythematosus or other connective tissue disease. Antinuclear antibody reactivity is present in many nonrheumatic conditions, and in up to 20% of healthy people. In a patient with low pretest probability for ANA-associated rheumatic disease, positive test results can be misleading and may precipitate further unnecessary testing, erroneous diagnosis or inappropriate therapy. — Canadian Rheumatology Association

Percentage who answered correctly: 65%

**Bibliography**

The clinical utility of whole-body bone scans to diagnose axial and peripheral arthritis in adults is limited.

**TRUE** Do not perform whole-body bone scans (e.g., scintigraphy) for diagnostic screening for peripheral and axial arthritis in adult patients.

The diagnosis of peripheral and axial inflammatory arthritis can usually be made on the basis of an appropriate history, physical examination and basic investigations. Whole-body bone scans, such as Technetium-99m medronic acid scintigraphy, lack specificity to diagnose inflammatory polyarthritis and spondyloarthritis and have limited clinical utility. The equivalent of radiation exposure of a whole-body bone scan is reported to be more than that of 40 chest radiographs, thus posing risk. — Canadian Rheumatology Association

Percentage who answered correctly: 83%

**Bibliography**