



Unnecessary Care in Canada

April 2017

**Choosing
Wisely
Canada**



Canadian Institute
for Health Information
Institut canadien
d'information sur la santé

Production of this document is made possible by financial contributions from Health Canada and provincial and territorial governments. The views expressed herein do not necessarily represent the views of Health Canada or any provincial or territorial government.

All rights reserved.

The contents of this publication may be reproduced unaltered, in whole or in part and by any means, solely for non-commercial purposes, provided that the Canadian Institute for Health Information is properly and fully acknowledged as the copyright owner. Any reproduction or use of this publication or its contents for any commercial purpose requires the prior written authorization of the Canadian Institute for Health Information. Reproduction or use that suggests endorsement by, or affiliation with, the Canadian Institute for Health Information is prohibited.

For permission or information, please contact CIHI:

Canadian Institute for Health Information
495 Richmond Road, Suite 600
Ottawa, Ontario K2A 4H6

Phone: 613-241-7860

Fax: 613-241-8120

www.cihi.ca

copyright@cihi.ca

ISBN 978-1-77109-569-3 (PDF)

© 2017 Canadian Institute for Health Information

How to cite this document:

Canadian Institute for Health Information. *Unnecessary Care in Canada*. Ottawa, ON: CIHI; 2017.

Cette publication est aussi disponible en français sous le titre *Les soins non nécessaires au Canada*.

ISBN 978-1-77109-570-9 (PDF)

Table of contents

Acknowledgements	5
Foreword	6
Executive summary	8
Key findings	9
What's the take-away?	10
Introduction	11
Highlight: Public awareness of and attitudes toward the CWC campaign	12
About this report	13
Choosing Wisely: A growing international campaign	14
Highlight: OECD addresses wasteful spending	15
Choosing Wisely Canada from coast to coast	16
Primary Care	19
Don't do imaging for lower-back pain unless red flags are present	20
Don't use atypical antipsychotics as a first-line intervention for insomnia in children and youth	24
Don't use benzodiazepines and/or other sedative–hypnotics in older adults as the first choice for insomnia, agitation or delirium	28
Highlight: Canada Health Infoway	32
Don't routinely do screening mammography for average-risk women age 40 to 49	34
Specialist Care	38
Don't perform preoperative testing before low-risk surgeries	39
Highlight: Health Quality Ontario	44
Highlight: Canadian Partnership Against Cancer	45
Emergency Care	48
Don't do imaging for minor head trauma unless red flags ⁱⁱ are present	49
Don't order CT head scans in adults and children who have suffered minor head injuries	49
Highlight: Choosing Wisely Alberta	53

Hospital Care	56
Don't routinely obtain head CT scans in hospitalized patients with delirium in the absence of risk factors	57
Highlight: Patient engagement	60
Don't transfuse red blood cells for arbitrary hemoglobin or hematocrit thresholds in the absence of symptoms, active coronary disease, heart failure or stroke	62
Conclusion	66
Appendix A: Technical details.	67
Appendix B: Text alternatives for figures.	70
References	74

Acknowledgements

The Canadian Institute for Health Information (CIHI) in collaboration with Choosing Wisely Canada (CWC) wishes to acknowledge and thank the many individuals and partner organizations whose work contributed to the development of this report.

Thank you to the following partner organizations:



Please note that the analyses and conclusions in this report do not necessarily reflect the opinions of the affiliated individuals.

This report represents a collaborative effort across much of CIHI. We would like to thank the CIHI Choosing Wisely Canada project team, who contributed their expertise and time in various capacities.

Foreword

Choosing Wisely Canada

Choosing Wisely Canada is a national, clinician-led campaign committed to helping patients and clinicians engage in conversations about unnecessary care. These conversations are supported by the growing body of national medical society specialty-specific recommendations. It is our goal at Choosing Wisely Canada that these conversations are aimed at reducing unnecessary care and associated harm for Canadian patients. We are proud to partner with the Canadian Institute for Health Information on this report, which provides a snapshot of data from sectors of the health system across the country related to Choosing Wisely recommendations.

At Choosing Wisely Canada, we are committed to working with partners across Canada to develop robust data, measurement and evaluation. This report helps our understanding of unnecessary care in Canada, the impact of the campaign, and the many regional, local and individual efforts to reduce unnecessary care.



Dr. Wendy Levinson

Chair, Choosing Wisely Canada
Professor of Medicine, University of Toronto



Canadian Institute for Health Information

Partnerships are one of the keys to CIHI's achievements, and we are proud to partner with Choosing Wisely Canada on its campaign to reduce unnecessary care by identifying tests, treatments and procedures that offer limited clinical value to patients. Our work on this report will help provide better data to support better decisions on the reduction of unnecessary care for both clinicians and patients, ultimately leading to healthier Canadians.

Collaborating with valuable partners like Choosing Wisely Canada helps strengthen health care reporting and performance across Canada. CIHI looks forward to continuing to contribute to the dialogue of unnecessary care not only with our partners, but also among patients, clinicians, researchers and decision-makers.



David O'Toole

President and CEO, Canadian Institute for Health Information



Executive summary

Choosing Wisely Canada (CWC) is a campaign to help clinicians and patients engage in conversations about unnecessary tests and treatments and make smart and effective choices to ensure high-quality care.

In health care, more doesn't necessarily mean better. Unnecessary tests and treatments are not helpful and they potentially expose patients to harm, more testing to investigate false positives and anxiety. Unnecessary care also wastes system resources and contributes to longer wait times.

This report estimates the degree of potentially unnecessary, and sometimes harmful, tests and procedures across Canada for 8 selected campaign recommendations. The report also identifies factors that might help reduce unnecessary care.

The report found that up to 30% of the tests, treatments and procedures associated with the 8 selected CWC recommendations are potentially unnecessary.



Substantial variation exists among regions and facilities in terms of the number of unnecessary tests and procedures performed. This points to an opportunity to improve.



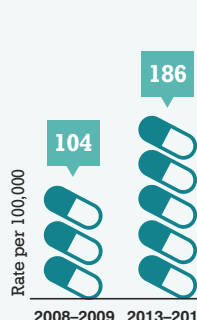
Key findings



In Alberta,
30%

of patients with lower-back pain without red flags

had at least one unnecessary X-ray, CT or MRI.



In Manitoba, Saskatchewan and B.C., **rates of low-dose quetiapine** (commonly used to treat insomnia) increased among children and young adults age 5 to 24, even though this is not recommended by experts.



1 in 10 seniors in Canada uses a benzodiazepine (sedative-hypnotic) on a regular basis, even though this is not recommended by experts.



In Ontario, Saskatchewan and Alberta,

18% to 35%

of patients who had a low-risk procedure **had a preoperative test.**



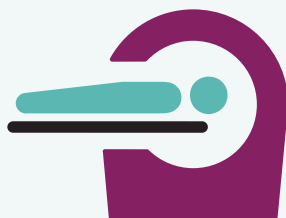
30%

of emergency department patients in Ontario and Alberta with low-risk minor head trauma **received a CT head scan.**



22%

of Canadian women age 40 to 49 **received a screening mammogram,** despite being of average risk.



In Ontario,
23% of inpatients with delirium **had a potentially unnecessary head CT scan.**



Red blood cell transfusions for elective hip (12%) and knee (8%) replacements **have decreased but continue to be done across Canada,** even though blood is a precious resource.



What's the take-away?



Many Canadians experience care that, according to Choosing Wisely Canada recommendations, has been identified as potentially unnecessary. Unnecessary care does not improve outcomes, may be harmful to patients and creates additional costs for the system.



Jurisdictional, regional and facility variations show room for improvement and peer learning.



Organization-wide efforts to reduce unnecessary care are needed. Decision support tools to avoid low-value care at the facility level can lead to improvement.



Clinicians may be influenced by access to resources, their training, peer culture and patient expectations.



Eligibility for programs (e.g., screening programs) by jurisdiction may contribute to variation in testing rates.



Alternatives to treatments, tests or procedures need to be considered — from assessment tools to pharmaceuticals.



Patient expectations and preferences may influence care practices. Helping patients and clinicians to engage in informed conversations and shared decision-making can reduce unnecessary care.

Introduction

Choosing Wisely Canada (CWC) is a national, clinician-led campaign to identify tests, treatments and procedures that are unnecessary and that offer no clinical value to patients. The American Board of Internal Medicine (ABIM) Foundation launched Choosing Wisely in the United States in 2012 and pioneered the approach of national medical specialty societies developing lists titled “Things Clinicians and Patients Should Question.” CWC launched in 2014 and to date has released more than 200 recommendations. CWC has engaged more than 90% of all national medical specialty societies to develop lists and has published recommendations in partnership with them. These recommendations are readily available both to front-line clinicians (through a mobile app and on CWC’s website) and to patients in order to increase communication and patient awareness. The recommendations also provide a basis for regional and local quality improvement and implementation efforts. CWC is part of a global movement of clinicians who are emphasizing their professional obligations to be responsible stewards of health care resources and to reduce harm to patients by identifying unnecessary tests, treatments and procedures. CWC works in partnership with many national, provincial and regional organizations to fulfill its mandate.

The Canadian Institute for Health Information (CIHI) is an important partner in fulfilling the measurement and evaluation objectives of the campaign. Reducing unnecessary care for all Canadians means reducing harm to patients and improving the quality of health care in Canada. This information is also vital to Canadian clinicians who seek to implement Choosing Wisely recommendations in their own practice. The information in this report provides better data to support better decisions for both clinicians and patients, ultimately leading to healthier Canadians.

Public awareness of and attitudes toward the CWC campaign

The Choosing Wisely Canada campaign marks a point where physicians, patients and government all agree on unnecessary care.

A 2015 Ipsos Reid survey asked Canadians about their awareness of the Choosing Wisely campaign and general attitudes toward unnecessary care.



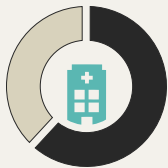
About 1 in 4 Canadians

were recommended a test or treatment by a doctor that they did not feel was necessary for their health.



Nearly 1 in 10 Canadians

said that they were aware of the Choosing Wisely campaign.



62% of Canadians

agreed that there is a significant amount of unnecessary health care in the system.



72% of Canadians agreed that primary responsibility for decreasing inappropriate use of services rests with physicians.



More than 90% of respondents

said that patients need more support and/or tools to make decisions surrounding necessary health care.



67% of participants

believed patient demand is more responsible for unnecessary care than decisions by physicians.



42% of participants

said they expect a prescription or a test when they visit the doctor, when asked about personal expectations.



For more information

www.cma.ca

 @CMA_Docs

 @CanadianMedicalAssociation

About this report

This report looks at 8 recommendations released by Choosing Wisely Canada, which are developed by Canadian national medical specialty societies. If more than one specialty society has made similar recommendations, we have worked to address the overarching message of these recommendations.

The recommendations selected for this report have provincial interest and value, align with international interest and span several areas of the health care system: primary care, specialist care, emergency department care and hospital care. For each recommendation, we highlight why it is important, the key message, CIHI's findings, and improvement efforts of partner organizations across the country.

Where possible, we look at multiple jurisdictions. Our analyses use administrative data from acute care hospitalizations and emergency departments, physician billing data, and drug use and community health data.



Specifics on data and methodology for this report can be found in the companion [technical report](#).

The main goal of this report is to generally identify the size of the opportunity for change rather than to achieve precision.

Choosing Wisely: A growing international campaign

CWC is part of a global movement to reduce unnecessary care. These campaigns are led by clinicians who are emphasizing their professional obligation to be stewards of limited health care resources and to avoid harm to patients by identifying unnecessary tests, treatments and procedures.

Choosing Wisely campaigns have launched in nearly 20 countries to date. All campaigns have committed to following a set of 5 common principles:¹

Physician-led

The campaign must be physician-led (as opposed to payer-/government-led). This is important to building and sustaining the trust of clinicians and patients. It emphasizes that campaigns are focused on quality of care and harm reduction, rather than cost reduction.

Patient-centred

The campaign must be patient-focused and involve efforts to engage patients in the development and implementation process. Communication between clinicians and patients is central to Choosing Wisely.

Multiprofessional

Where possible, the campaign should include physicians, nurses, pharmacists and other health care professionals.

Evidence-based

The recommendations issued by the campaign must be evidence-based and must be reviewed on an ongoing basis to ensure credibility.

Transparent

Processes used to create the recommendations must be public, and any conflicts of interest must be declared.

CWC helps to organize an international consortium that meets regularly so leaders from countries with campaigns can come together to discuss shared learnings and opportunities for collaboration. To date, this work has focused on collaboration around research and evaluation, implementation and public engagement. Membership in this consortium includes the Organisation for Economic Co-operation and Development (OECD). The OECD is working with the international Choosing Wisely consortium to develop 3 internationally comparable indicators of inappropriate care: imaging for lower-back pain, use of benzodiazepines in patients older than 65 and use of antibiotics for viral infection.

OECD addresses wasteful spending

 **Highlight**

Tackling Wasteful Spending on Health, released in January 2017, discusses unnecessary spending on health, including preventable errors and low-value care, building on the principles of the Choosing Wisely campaign.



- Intensive dialogue between patients and providers on appropriate testing and treatment is necessary to tackle wasteful care.
- High variation between providers in services deemed low value by Choosing Wisely signals that inappropriate care is taking place.
- A systematic review of strategies put in place by countries to limit ineffective spending and waste sheds light on how to improve.
- The OECD is working with the Choosing Wisely campaign to develop 3 internationally comparable indicators of inappropriate care: antibiotic use for upper respiratory tract infection, prescribing sedatives for the elderly and imaging for lower-back pain.
- In addition, the report discusses preventable errors, reviews strategies to obtain lower prices for medical goods and how to better target the use of expensive inputs. Data is key.



For more information

<http://www.oecd.org/health/health-systems/health-at-a-glance-19991312.htm>



@OECD



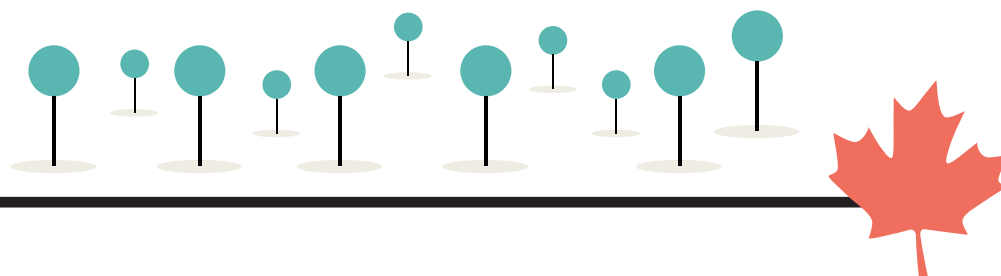
@theOECD



Choosing Wisely Canada from coast to coast

In addition to the national campaign, a number of provinces and territories have established their own campaigns. These campaigns, supported by CWC, bring together stakeholders in the respective province or territory to help accelerate the pace of change through locally relevant and led strategies.

These provincial and territorial affiliates bring together stakeholders, including health care delivery organizations, medical societies, clinical leaders, relevant measurement and research groups, medical schools and educators, policy groups and patient groups. Together, the stakeholders identify priority areas for improvement based on the CWC recommendations that are relevant to their province or territory.



Here are highlights of activities in the provinces and territories:

● Newfoundland and Labrador

Choosing Wisely Newfoundland and Labrador (CWNL) is coordinated by the Translational and Personalized Medicine Initiative at Memorial University and officially launched in October 2016. The CWNL campaign is multipronged and aimed at both patients and clinicians, including a public engagement and advertising campaign. Areas of focus include reduction in the unnecessary use of antibiotics, antipsychotics in nursing homes, laboratory tests and imaging procedures.

● Prince Edward Island

Choosing Wisely Prince Edward Island is coordinated by the Medical Society of Prince Edward Island (MSPEI). Physicians are already aware of CWC, so going forward in 2017, local stakeholders will be coming together to identify regional priorities and develop a plan for implementation.

● **Nova Scotia**

Doctors Nova Scotia endorsed CWC in 2014 and included it in its 2014–2015 business plan as a strategic priority. Examples of local implementation efforts are targeting unnecessary tests in emergency departments, appropriate use of urinary catheters for hospital inpatients and a continuing professional development program. Dalhousie University and Doctors Nova Scotia are partnering to lead provincial initiatives and will formally become a regional affiliate in early 2017 by developing a regional implementation plan, along with research and evaluation mechanisms to measure progress.

● **New Brunswick**

The New Brunswick Medical Society (NBMS) actively promotes CWC to physicians and patients through public advertising. NBMS is the lead organization in the province for CWC and will be working with its stakeholders to develop a regional plan in 2017.

● **Quebec**

The regional affiliate is coordinated by the Québec Medical Association (QMA), which is a leading campaign partner. QMA developed the French campaign, Choisir avec soin, and supports the campaign's deployment in Quebec. The main objective of Choisir avec soin is to equip health care professionals, decision-makers and the general population to make informed decisions about unnecessary care.

● **Ontario**

CWC has partnered with Health Quality Ontario (HQO) and the Ontario College of Family Physicians to support regional efforts. Within the province, there are a number of local initiatives across different sectors, including reducing unnecessary preoperative testing, transfusion, urinary catheter use and sedative–hypnotic prescribing in hospitals; reducing unnecessary prescribing of proton pump inhibitors in primary care; and encouraging appropriate prescribing in the long-term care setting.

● **Manitoba**

Diagnostic Services Manitoba and the George and Fay Yee Centre for Healthcare Innovation partnered in 2014 to establish Choosing Wisely Manitoba. Their work started with proof-of-concept projects, followed by physician engagement and now public engagement. Areas of focus include improving appropriateness of preoperative testing and implementing a new province-wide process to ensure appropriate testing of vitamin D levels. Regarding the latter, early data shows successful reduction of vitamin D tests by more than 85%, with no negative feedback from physicians, their patients or the public.

● **Saskatchewan**

The Saskatchewan Health Quality Council (HQC) is coordinating regional Choosing Wisely efforts through collaboration with the provincial Appropriateness of Care Program and the Appropriateness of Care Network. HQC will develop the Choosing Wisely Saskatchewan plan in early 2017, with the intention of aligning current provincial initiatives related to CWC implementation efforts that are already ongoing or have potential to show progress.

● **Alberta**

Choosing Wisely Alberta (CWA) is led by a steering committee of key health stakeholder organizations and patients, coordinated by the Alberta Medical Association. CWA has focused on using data to improve decision-making, as well as clinician, patient and public engagement. Priority areas include reducing unnecessary testing in primary care, unnecessary imaging for minor head trauma, inappropriate blood transfusions, imaging for lower-back pain, unnecessary preoperative testing, unnecessary vitamin D testing and inappropriate antipsychotic use.

● **British Columbia**

More than 70 individuals are working on various grassroots initiatives throughout the province. Enthusiasm and support for CWC is high among early adopters.

● **The territories**

Yukon, the Northwest Territories and Nunavut are each CWC regional affiliates in the process of identifying priorities and partners.

A photograph of a medical examination room. On the wall, there is a blood pressure monitor with a blue cuff and a black gauge, a white device with two black probes (possibly a reflex hammer or similar), and a white device with four black probes (possibly a reflex hammer or similar). A teal banner with the text "Primary Care" is overlaid on the image. Below the banner, there is a horizontal line with four colored circles (teal, yellow, grey, purple) and a teal circle with a white person icon containing a plus sign.

Primary Care



Don't do imaging for lower-back pain unless red flags are present

Red flags denoting that a scan might be necessary include suspected epidural abscess or hematoma presenting with acute pain, but no neurological symptoms (urgent imaging is required); suspected cancer; suspected infection; cauda equina syndrome; severe or progressive neurologic deficit; and suspected compression fracture.

Recommended by the College of Family Physicians of Canada/Canadian Medical Association and the Canadian Association of Radiologists



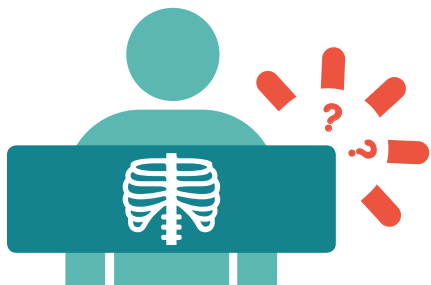
In Alberta,

30%

of patients with lower-back pain without red flags

had at least one unnecessary X-ray, CT or MRI.

Why is it important?



X-rays, computed tomography (CT) scans and magnetic resonance imaging (MRI) scans for lower-back pain rarely show the cause of the pain and can harm patients when there are no indications of serious underlying conditions.²



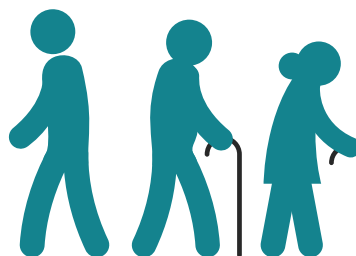
Apart from exposure to radiation, harm from unnecessary testing may include further avoidable tests and surgery.



Evidence shows that acute lower-back pain generally goes away within 4 weeks,³ with or without imaging.

Other findings

Among those who received potentially unnecessary scans for lower-back pain, 95% received X-rays and 15% received CT or MRI scans (10% of patients were given both CT/MRI and X-ray scans).

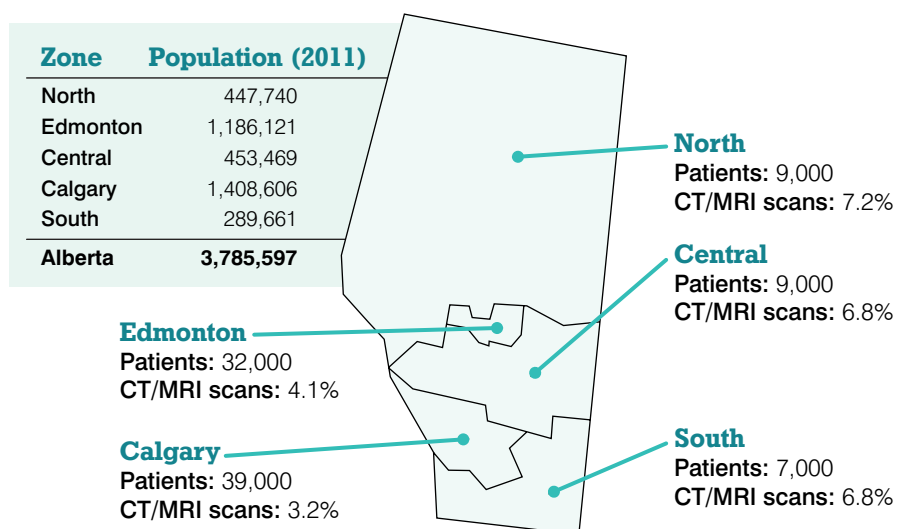


Males and older patients were more likely to receive scans.

Rural health zones in Alberta (North, Central and South) tended to have higher rates of CT/MRI scans than urban zones (Calgary and Edmonton); there were no regional differences for X-rays. Health zones with more CT/MRI machines per million population tended to have shorter wait times and higher CT/MRI scan rates overall, suggesting that there is an association between the availability of CT and MRI machines and imaging rates.

Physician experience may also play a role. Family physicians who saw fewer patients with lower-back pain were more likely to order scans.

Figure 1 CT/MRI scan rate within 6 months, by patient residence zone, Alberta



Notes

Only services provided with public funding are captured in the data. Administrative data does not capture a patient's full clinical history, and there may be misclassification of the presence of indications.

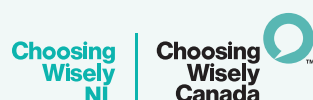
Sources

Discharge Abstract Database, National Ambulatory Care Reporting System and Patient-Level Physician Billing Data, 2010–2011 to 2012–2013, Canadian Institute for Health Information.

Partner results and efforts to reduce unnecessary lower-back pain imaging



A study led by University of Toronto medical students assessed patient attitudes toward imaging for lower-back pain after reading an educational pamphlet. The study found that the percentage of respondents who wanted an imaging test after having read the pamphlet dropped from 39% to 24%, and the percentage who expected one dropped from 37% to 22%. This suggests that education is critical in changing expectations and practice.³²



CWNL has an e-management tool to guide clinicians on appropriate imaging for lower-back pain.



In 2015, CWA launched a lower-back pain demonstration project using qualitative and quantitative research to better understand drivers of imaging. A digital Physician Bag was developed for key topics, such as lower-back pain, which included resources on lower-back pain screening, a new lumbar spine order form and care supports. Since implementation, the province has seen a reduction of 11% in both MRI (3,166) and CT (728) lumbar spine exams.



In collaboration with CWA, Alberta Health Services released a new Lumbar Spine Imaging Screening Form that requires physicians to identify red flags that indicate a need for imaging. This has led to a decrease in lumbar spine imaging.



The OECD has collaborated with CWC to develop measures for unnecessary tests and treatments, including imaging for lower-back pain. At the time of publication of the OECD's *Tackling Wasteful Spending on Health*, no countries were measuring the rates of CT and MRI scans to investigate uncomplicated lower-back pain; however, it would be a task worth undertaking, given that the College of Radiology in Belgium estimates that 81% of CT spine scans are not justified.



In 2015–2016, Saskatchewan's Appropriateness of Care Program piloted a checklist for lumbar spine MRI scans in Regina Qu'Appelle Health Region and Saskatoon Health Region; the checklist was implemented provincially as of May 2016. The Appropriateness of Care Program is currently working to improve appropriate ordering of lumbar spine CT scans to reduce duplicate testing using both MRI and CT, as well as to reduce unnecessary CT scans for lower-back pain. A checklist for lumbar spine CT scans is currently being developed by a team of clinical experts and patient advisors.



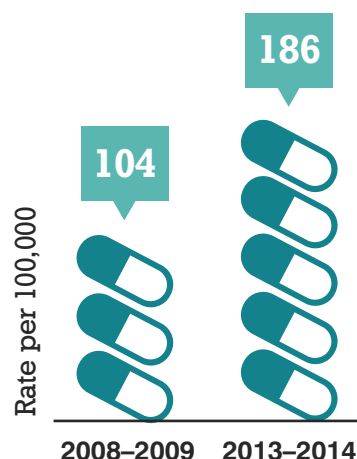
In 2014, Vancouver Coastal Health and Providence Health Care tackled physician practice variation for 5 medical imaging procedures, including for lower-back pain, using a multipronged strategy. Following the intervention, physician variation in the ordering of imaging was significantly reduced for lower-back pain (interquartile range from 17% to 11%).



Don't use atypical antipsychotics as a first-line intervention for insomnia in children and youth

Atypical antipsychotics, also referred to as second-generation antipsychotic drugs, are a group of medications used to treat psychiatric conditions (e.g., schizophrenia, bipolar disorder, autism). Atypical antipsychotics are less likely than typical antipsychotics (which are more widely used) to cause extrapyramidal effects in patients, including symptoms such as paranoia, anxiety and tremors.

Recommended by the Canadian Academy of Geriatric Psychiatry, the Canadian Academy of Child and Adolescent Psychiatry and the Canadian Psychiatric Association



In Manitoba, Saskatchewan and B.C.,
rates of low-dose quetiapine
(commonly used to treat insomnia)
increased among children and
young adults age 5 to 24,
even though this is not
recommended by experts.



Why is it important?



Atypical antipsychotics are increasingly being prescribed to children and youth, likely to treat insomnia.



Of most concern is the atypical antipsychotic quetiapine, which saw a 300% increase in dispensed prescriptions between 2005 and 2012, driven by a 10-fold increase in prescriptions for sleep disturbances.⁴

Zzz

Despite limited evidence that atypical antipsychotics improve sleep,⁵ 36% of Canadian child psychiatrists and developmental pediatricians surveyed in 2005–2006 had prescribed them.

Other options for treating insomnia should be attempted first, such as behavioural changes and ensuring good sleep hygiene (e.g., eliminating daytime napping, shutting off electronics an hour before bedtime). If these interventions are not successful, then physicians should consider short-term use of melatonin.



Quetiapine is not recommended for any use in children or youth in Canada.⁶

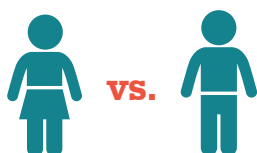


Atypical antipsychotics, such as quetiapine, have many side effects, including obesity, high blood sugar and high cholesterol, even at low doses.⁷

Other findings

The vast majority (88%) of youth who were prescribed quetiapine were taking low dosages — less than 400 mg a day — suggesting that they were being prescribed the drug to treat conditions other than schizophrenia and bipolar disorder.

Dosages below 150 mg a day are most likely prescribed as a sleep aid to treat insomnia. The rate of low-dose quetiapine use increased between 2008–2009 and 2013–2014 in Manitoba, Saskatchewan and British Columbia (the 3 provinces studied). In 2013–2014, the rate among children and youth age 5 to 24 varied from 179 per 100,000 in Saskatchewan to 204 per 100,000 in Manitoba.

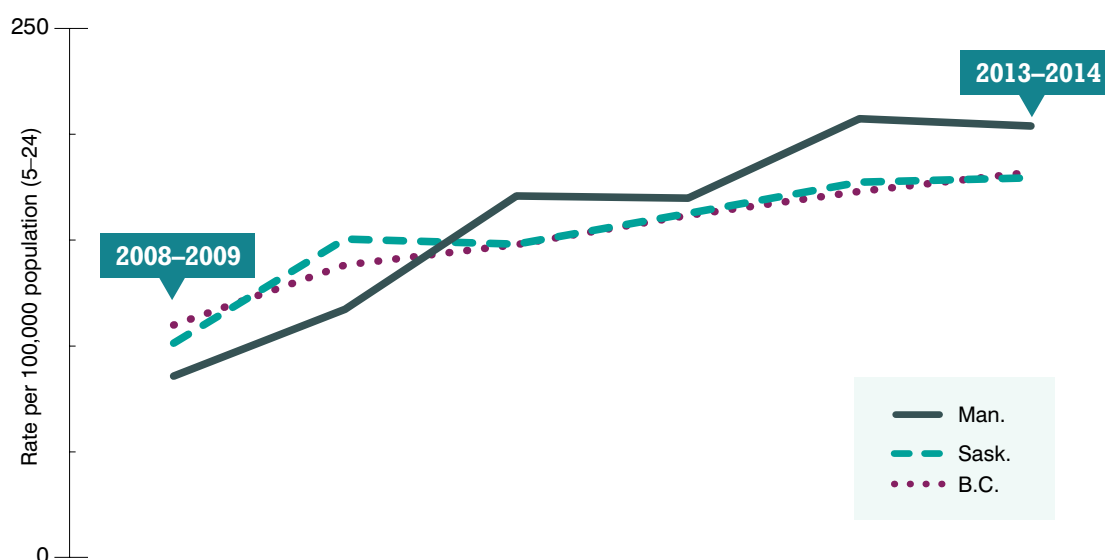


The rate was highest among females versus males and those age 15 to 24.



75% of prescriptions for quetiapine were at doses below 150 mg/day, suggesting potentially inappropriate use.

Figure 2 Rate of low-dose quetiapine use among children and youth, by province, 2008–2009 to 2013–2014



Notes

Children and youth are defined as those age 5 to 24 at the time of the index drug claim.
Low-dose quetiapine is used as a proxy for the use of quetiapine to treat insomnia.

Source

National Prescription Drug Utilization Information System Database, 2008–2009 to 2013–2014,
Canadian Institute for Health Information.

Partner results and efforts to reduce unnecessary quetiapine use



In 2014, Alberta Health Services found that quetiapine was the most frequently dispensed antipsychotic, accounting for nearly 42% of all antipsychotics dispensed (across all age groups). Overall use of quetiapine (regardless of diagnosis or dose) ranged from 16 per 1,000 population in South Zone to 9 per 1,000 in Calgary Zone. Utilization was considerably higher among women than men across all zones. Age–sex-adjusted utilization was significantly higher than the provincial average in all zones except Calgary. Data demonstrates that males and females age 0 to 14 received similar numbers of prescriptions for low-dose quetiapine, but in all other age ranges, females received more prescriptions.

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

Recommended by the Canadian Geriatrics Society and the Canadian Society of Hospital Medicine

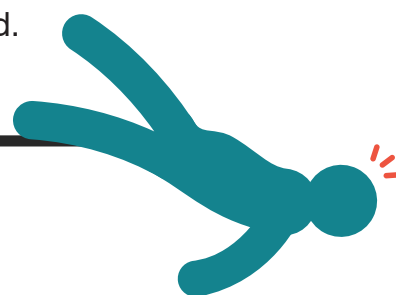


1 in 10 seniors in Canada uses a benzodiazepine (sedative–hypnotic) on a regular basis, even though this is not recommended by experts.

Why is it important?



Older adults who use benzodiazepines or other sedative-hypnotics are at an increased risk for motor vehicle accidents,⁸ falls and hip fractures⁹ and daytime fatigue. Thinking can also be affected.



Benzodiazepines effectively manage anxiety and insomnia but with age, people become more sensitive to their effects and are at risk of side effects that typically outweigh any potential benefit.¹⁰⁻¹²



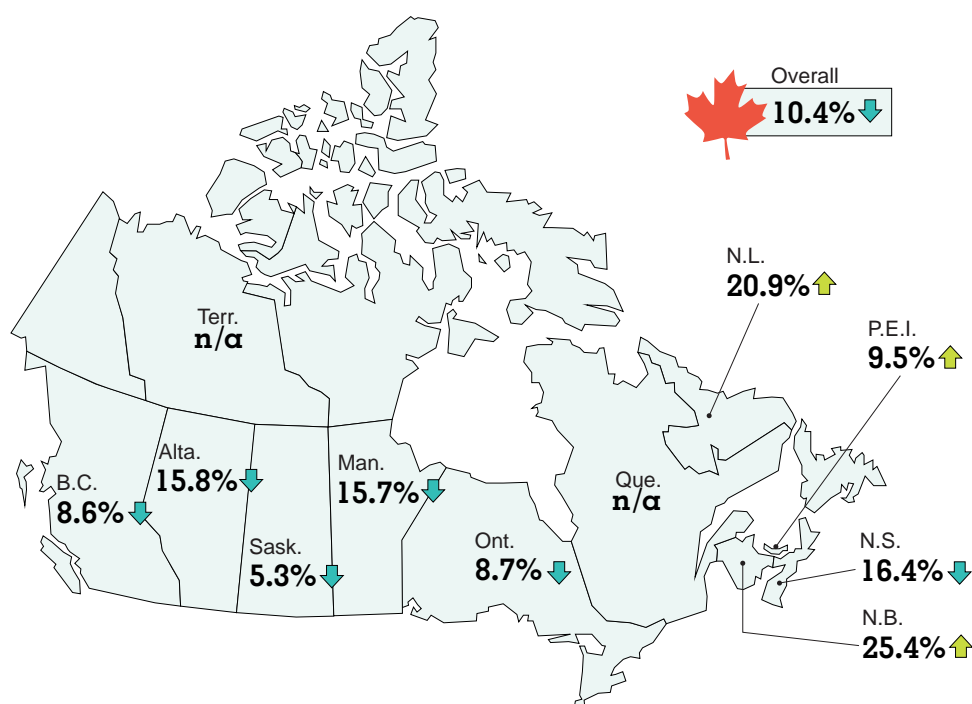
Chronic use of benzodiazepines is of particular concern because experts recommend only 2 to 4 weeks of continuous use by seniors.¹¹

Both prescription practice and the discontinuation of sedative-hypnotics while a patient is in hospital can have a substantial impact on long-term use. Non-pharmaceutical based therapy, such as behavioural therapy, or following a benzodiazepine withdrawal program has proven effective in discontinuing use.

Other findings

In 2014–2015, approximately 1 in 10 Canadian seniors were chronic usersⁱ of benzodiazepines. That year, the rate of chronic benzodiazepine use among seniors varied across the country from 5% in Saskatchewan to 25% in New Brunswick. In most provinces, the rate had fallen since 2011–2012; however, there were steady increases in 3 provinces: Newfoundland and Labrador, Prince Edward Island and New Brunswick. Variation across provinces may be due to several factors, such as public drug program design, physician prescribing practices and patient socio-demographic factors.

Figure 3 Rate of chronic benzodiazepine use among seniors on public drug programs, by province, 2014–2015 compared with 2011–2012



Notes

n/a: Not available.

Seniors are defined as those age 65 and older with at least one drug claim.

Benzodiazepine and related drug use was included and could not be limited to use for insomnia, agitation or delirium.

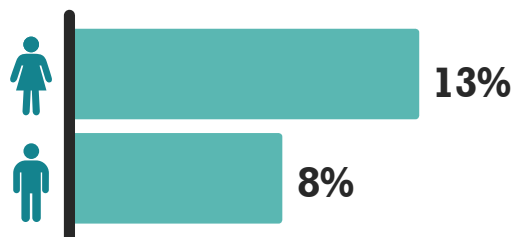
Source

National Prescription Drug Utilization Information System Database, 2011–2012 to 2014–2015, Canadian Institute for Health Information.

- i. A chronic benzodiazepine user is a person who had 1 or more claims for a benzodiazepine or other related drug in a given year, totalling at least 90 continuous supply days, without a gap for 30 days.

Chronic use increased with age among both men and women, and was higher in women generally.

More women (13%) chronically use a benzodiazepine than men (8%), likely due to their higher incidence of insomnia.¹³



Check out the toolkit

The toolkit [Less Sedatives for Your Older Relatives](#) is available on CWC's website.

Partner initiatives and efforts to reduce unnecessary sedative hypnotic use



In Canada Health Infoway's Data Impact Challenge, the question "what portion of adults 65+ has been prescribed benzodiazepines or other sedative-hypnotics for insomnia, agitation or delirium?" was identified as an important one to be answered. Research found that in Canadian long-term care and home care, benzodiazepines were given to 24% to 50% of seniors with those conditions.



The OECD and Choosing Wisely have identified measurement of benzodiazepine use in seniors as a priority. The OECD reports that, in France, there are set financial sanctions for doctors who are outliers in prescribing practices, and a pay-for-performance scheme in ambulatory care rewards appropriate prescribing of benzodiazepines.



Alberta Health Services has a strategy to encourage evidence-based prescribing, including decreasing use of benzodiazepines by seniors.

Canada Health Infoway

ImagineNation CHALLENGES



DÉFIS
ImagineNation

In spring 2015, seeking to inform policy decisions with evidence, Canada Health Infoway launched the Data Impact Challenge to source answers to important health care questions from authorized data users and existing data. A number of questions were related to CWC recommendations. The following are findings for questions that received submissions from 2 or more groups of researchers from across the country.



What portion of older adults (65+) has been prescribed antipsychotics to treat behavioural and psychological symptoms of dementia?

People with dementia can be aggressive and disruptive and can resist care. Some are given antipsychotic medications for this, which may provide limited benefit and can cause harm. Submissions to the challenge showed that 1 in 5 dementia patients (21%) were treated with antipsychotics. Rates of use were highest in long-term care settings.

Participating teams

- Alberta Health Data Geeks
- interRAI Canada
- Ontario Drug Policy Research Network
- Team ICES UofT



How frequently in the inpatient setting is repeat blood work and chemistry testing conducted?

Frequent blood testing can cause anemia and pain and wastes laboratory resources. One challenge submission looked at repeat testing within 24 hours, and found that blood counts were repeated in 70% to 77% of cases and chemistry tests were redone in 72% of cases. Another submission found that even stable patients had several types of tests repeated.

Participating teams

- Alberta Health Services Laboratory Utilization Office
- Lower Mainland Laboratory Services (LMLS)
- Ottawa Hospital Performance Management



For what portion of adults is a dual-energy X-ray absorptiometry (DEXA) scan repeated more often than every 2 years?

Bone mineral density, or DEXA, scans are an important tool for evaluating the risk of osteoporosis and are recommended for low-risk patients older than 65 and high-risk patients older than 50. Because the precision of the tests is limited, it takes a minimum of 2 years to measure any change in bone density. Some 17.5% of inpatients had the test repeated in less than 2 years. At a specialized centre for high-risk patients, the tests were repeated too soon in 29% of patients, and 61% of those had more than one repeat test in the 2-year period.

Participating teams

- Alberta Health Data Geeks
- St. Michael's Hospital Medical Imaging




For more information

www.infoway-inforoute.ca

www.imaginationchallenge.ca

 @Infoway

 @CanadaHealthInfoway



For what portion of adults is an annual physical exam conducted in any given year?

Periodic physical examinations have tremendous benefits, allowing physicians to check on patients while they remain healthy and develop a patient–physician relationship. However, ordering certain screening or diagnostic tests during these exams can cause more harm than good. While 22% to 35% of the general population has a physical exam in any given year, only a very small proportion (less than 1%) had them for 2 consecutive years (i.e., annually). Submissions showed that patients who had examinations annually were more likely to be women with more than one health problem who lived in higher-income neighbourhoods and who had fee-for-service doctors.

Participating teams

- Alberta Health Data Geeks
- Cape Horn
- Health Quality Innovation Collaborative
- Team NLCHI
- North York FHT–UTOPIAN Canadian Primary Care Sentinel Surveillance Network (CPCSSN)



Canada Inforoute
Health Santé
Infoway du Canada

Don't routinely do screening mammography for average-risk women age 40 to 49

Individual assessment of each woman's preferences and risk should guide the discussion and decision regarding mammography screening in this age group.

Recommended by the College of Family Physicians of Canada/
Canadian Medical Association



22%

of Canadian women age 40 to 49

received a screening mammogram,

despite being of average risk.

Why is it important?



Approximately 1 in 9 Canadian women are expected to develop breast cancer, and 1 in 30 will die of it.¹⁴ Screening mammography is a critical step in the early diagnosis of breast cancer, but among average-risk women age 40 to 49 there is the potential for screening to lead to more harm than benefit.

There are population-level harms associated with screening average-risk women age 40 to 49.

To save 1 woman from dying of breast cancer, 2,100 average-risk women age 40 to 49 would need to be screened every 2 years for 11 years. In that time, screening would lead to approximately



700 false-positive results;



75 unnecessary biopsies; and



10 unnecessary mastectomies or lumpectomies due to over-diagnosis.¹⁵



Aside from medical harm, patient anxiety may arise from unnecessary follow-up procedures and false-positive results.



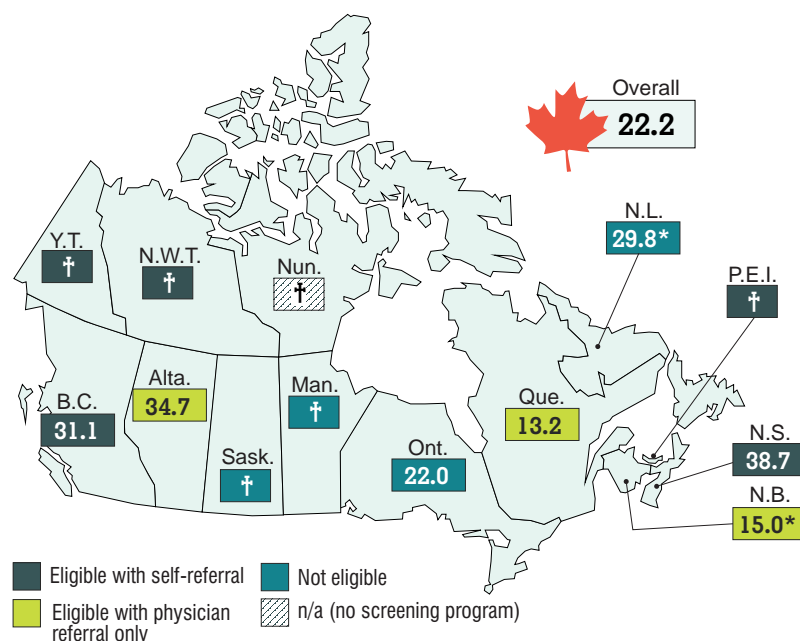
The 2011 recommendation from the Canadian Task Force on Preventive Health Care suggested that average-risk women wait until age 50 before initiating regular breast cancer screening.¹⁵

Other findings

In 2012, survey data showed that 22% of Canadian women age 40 to 49 reported having a screening mammogram in the previous 2 years, despite being of average risk for the development of breast cancer. In comparison, 55% of average-risk Canadian women age 50 to 69, who are considered eligible to receive a screening mammogram, reported having this test.

In 2012, eligibility rules for provincial screening programs varied across jurisdictions. Some provinces allowed average-risk women age 40 to 49 to participate in the screening program by self-referral. Others required a referral from a doctor. And some provincial screening programs did not accept any average-risk women age 40 to 49 in the screening program at all.¹⁶

Figure 4 Rate of screening mammogram for average-risk women age 40 to 49 in the past 2 years, by jurisdictional breast cancer screening program guidelines and eligibility criteria, Canada, 2012



Notes

* Interpret with caution due to a high coefficient of variation.

† Rates for Prince Edward Island, Manitoba, Saskatchewan and the territories have been suppressed (n of unweighted numerator <30 and/or coefficient of variation >33.3).

n/a: Not applicable.

Sources

Rates: [2012 Canadian Community Health Survey](#) Public Use Microdata File, Statistics Canada.

Screening guidelines: *Breast Cancer Screening Programs/Strategy Elements*, 2011, Canadian Partnership Against Cancer (validation with members of the Canadian Breast Cancer Screening Network).

Screening rates varied by jurisdiction, from a high of 38.7% in Nova Scotia, which had a self-referral program, to a low of 13.2% in Quebec, where a physician referral was required. However, the difference in eligibility may be only part of the explanation for the variation in rates. The observed variation may also be attributed to other factors, such as patient preferences and/or clinician practices. These factors along with the jurisdictional rates may help to identify which patient groups may be disproportionately receiving potentially unnecessary mammograms. The findings also support the importance of deliberate conversations between patients and clinicians on when screening mammography may potentially be unnecessary and when it is deemed appropriate care.

Partner initiatives and efforts to reduce unnecessary mammograms



The Canadian Partnership Against Cancer (CPAC) and CWC found that between 2008 and 2012, 21% of all screening mammograms performed were done in women age 40 to 49. Although these findings are similar to those above, it should be noted that there are differences in the way the rates were calculated.¹⁷



Specialist Care



Don't routinely perform preoperative testing (such as chest X-rays, echocardiograms or cardiac stress tests) for patients undergoing low-risk surgeries

Recommended by the Canadian Society of Internal Medicine

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

Recommended by the Canadian Anesthesiologists' Society

Don't perform stress cardiac imaging or advanced non-invasive imaging as a preoperative assessment in patients scheduled to undergo low-risk non-cardiac surgery

Recommended by the Canadian Cardiovascular Society



In Ontario, Saskatchewan and Alberta,

18% to 35%

of patients who had a low-risk procedure
had a preoperative test.

Why is it important?



Preoperative tests before low-risk surgery (such as endoscopy and cataract removal) do little to improve care, and results can distress patients and waste resources.¹⁸



These tests may expose patients to radiation; they also take time and sometimes delay surgery.

In addition, false positives or incidental findings can cause worry and often lead to further unnecessary tests as well as increased wait times for other patients who do need tests.¹⁹

Other findings

In Ontario, Saskatchewan and Alberta, 18% to 35% of patients who had a low-risk procedure had a preoperative test (see the table). For all 3 provinces, endoscopy and ophthalmology were the most common types of low-risk surgeries. In all 3 provinces, endoscopy patients had lower rates of pre-op tests than ophthalmology patients did; however, patients with other (less frequent) procedures had the highest rate of pre-op tests.

Table Preoperative test rates for Ontario, Saskatchewan and Alberta by type of low-risk surgery, 2012–2013

Province	Endoscopy	Ophthalmology	Other	Total
Ontario*	20%	30%	61%	35.5%
Saskatchewan	17%	22%	29%	21.8%
Alberta	9%	18%	26%	17.9%

Notes
* CWC provided aggregate data for Ontario.
Administrative data does not capture the reason for the test, but the assumption was made that these were preoperative tests.

Sources
Ontario: Choosing Wisely Canada.
Saskatchewan and Alberta: Discharge Abstract Database, National Ambulatory Care Reporting System and Patient-Level Physician Billing Data, 2012–2013, Canadian Institute for Health Information.

In a separate study in Alberta, from 2005 to 2007,²⁰ preoperative testing rates (for procedures excluding cancer, cardiac and trauma) were found to be 13% (ECG) to 23% (chest X-rays), with considerable variation among facilities. A study in Ontario found that 31% of patients with low-risk procedures had an ECG and 10.8% had a chest X-ray.²¹

CIHI’s analysis of facilities in Alberta and Saskatchewan found wide variation among providers, even within the same facility. While it is difficult to decouple the facility rate from the physician rate, we do see wide variation, with preoperative test rates ranging from 1% to 95%. Physicians who did fewer procedures tended to order more preoperative tests.

Electrocardiogram (ECG) was the most common type of preoperative test: 64% to 80% of patients undergoing low-risk procedures had at least one ECG.





Check out the toolkit

The toolkit [Drop the Pre-Op](#) is available on CWC's website.

Partner initiatives and efforts to reduce unnecessary preoperative tests



Preoperative testing before low-risk surgeries was selected as one of the provincial Appropriateness of Care projects for 2016–2017 in Saskatchewan. The province will focus on reducing inappropriate tests and variations across health regions by implementing best practice. In Saskatchewan, facility, physician and procedure factors accounted for 14% of variation in preoperative testing conducted in the province, according to a CIHI analysis. In Saskatchewan, work is under way in several regional health authorities to standardize preoperative testing.



North York General Hospital has decreased lab tests by 38% in its preoperative clinic since February 2015 by introducing CWC recommendations into order sets. (See page 55 for more details.)



Choosing
Wisely
Alberta

Choosing
Wisely
Canada

Alberta's Physician Learning Program studied more than 150,000 patients who underwent low-risk surgeries from July 1, 2014, to June 30, 2015. It found that preoperative lab tests were performed frequently despite recommendations to limit them. The percentage of patients younger than 19 ranged from 2% to 20% per specialty. The median percentage of low-risk patients undergoing preoperative lab tests was just more than 30%. The Physician Learning Program is now working with Alberta Health Services to implement an improvement project.



In 2010, a group of Manitoba physicians created a tool to guide ordering preoperative tests. Inappropriate testing decreased within 6 months, but use of the tool tapered off. In 2015, the Canadian Anesthesiologists' Society and CWC released a simpler version of the tool. Audits will determine whether it works better.



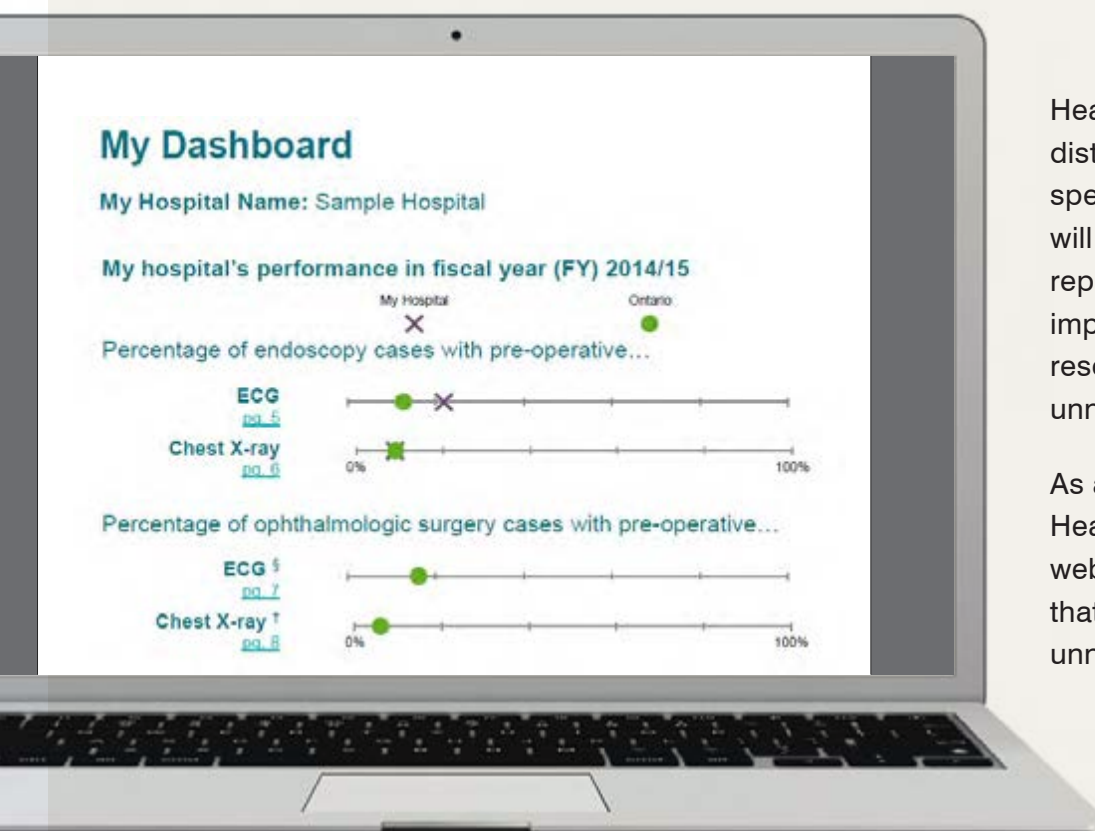
Women's College Hospital has changed its preoperative forms from a standard to an individualized format to make ordering tests less automatic.



ICES found a 30-fold difference in rates of preoperative tests among institutions in Ontario, indicating room for improvement.

Health Quality Ontario

Health Quality Ontario uses data and analysis to pinpoint important opportunities to improve health and outcomes for patients. Seeing a 30-fold difference in preoperative testing among low-risk patients across Ontario, Health Quality Ontario and CWC wanted to put data into the hands of every hospital CEO to enable informed decisions about preoperative care delivery.



Health Quality Ontario has distributed reports with hospital-specific and provincial data that will be updated regularly. These reports also include ideas for improvement and suggested resources to help reduce unnecessary testing.


As additional support to hospitals, Health Quality Ontario is offering webinars featuring organizations that have successfully reduced unnecessary preoperative tests.



For more information

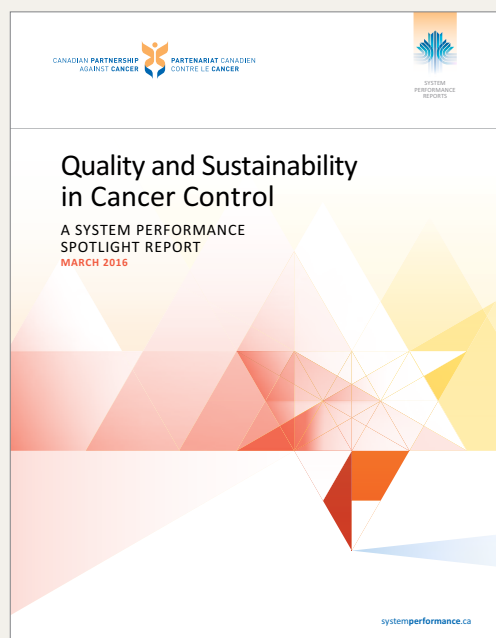
www.hqontario.ca/hospitalreport

 @HQOntario

 @HealthQualityOntario



Ontario
Health Quality Ontario



The Canadian Partnership Against Cancer's ***Quality and Sustainability in Cancer Control: A System Performance Spotlight Report*** measures how current cancer control practices compare with CWC recommendations related to cancer care.

A 15% reduction in the use of the cancer control practices measured in this report would mean



9,000

false positive results
could be avoided



3,000

treatments and
treatment-related
side effects could
be avoided



4,500

hours of linear
accelerator capacity
could be freed up



\$27 M

could be redirected
to other health care
services

Canadian Partnership Against Cancer

Don't initiate management in patients with low-risk prostate cancer without first discussing active surveillance

Recommended by the Canadian Association of Radiation Oncology, the Canadian Association of Medical Oncology, the Canadian Society of Surgical Oncology and the Canadian Partnership Against Cancer

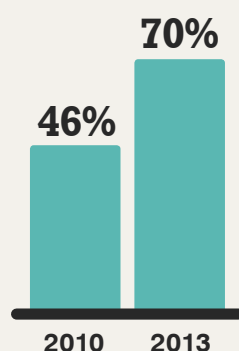
Sources

Provincial cancer agencies; and Canadian Partnership Against Cancer.

It is estimated that 1,500 men with low-risk prostate cancer receive treatment annually, some of which is unnecessary and may result in avoidable treatment-related complications and side effects.

If treatment were to be reduced by 15% each year and replaced by close monitoring,

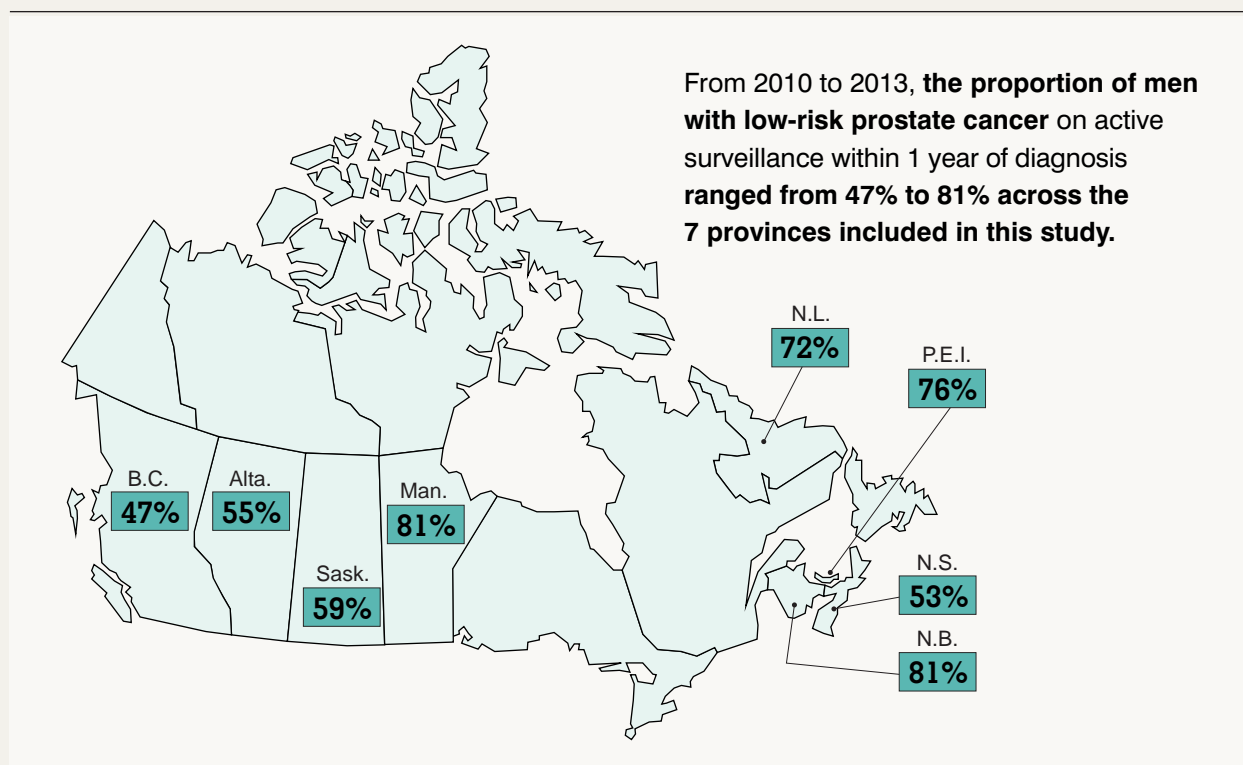
- ☒ Treatment-related complications could be reduced;
- ☒ Quality of life could be improved; and
- ☒ An estimated \$1.7 million in treatment costs could be redirected.



The proportion of men with low-risk prostate cancer and no record of surgical or radiation treatment rose to 70% in 2013, from 46% in 2010, for all provinces combined. This suggests an increase in the use of active surveillance over time, which is an important finding given that two-thirds of men newly diagnosed with prostate cancer qualify for active surveillance.

The provinces varied greatly with respect to men with no record of surgical or radiation treatment — a proxy for active surveillance.

Figure 5 Proportion of men with low-risk prostate cancer on active surveillance, 2010 to 2013



Notes

Active surveillance is inferred from the absence of a record of treatment (surgery or radiation) in the patient data. Provinces included are Newfoundland and Labrador (2011 and 2012 data), Prince Edward Island (2010 to 2013 data), Nova Scotia (2010 to 2013 data), New Brunswick (2011 to 2013 data), Manitoba (2010 to 2013 data), Saskatchewan (2010 to 2013 data), Alberta (2010 to 2013 data) and British Columbia (2010 data).


Sources


Provincial cancer agencies; and Canadian Partnership Against Cancer.



For more information

www.partnershipagainstcancer.ca

 @CancerStratCA

 @CanadianPartnershipAgainstCancer

CANADIAN PARTNERSHIP
AGAINST CANCER



PARTENARIAT CANADIEN
CONTRE LE CANCER

Emergency Care



Don't do imaging for minor head trauma unless red flagsⁱⁱ are present

Recommended by the Canadian Association of Radiologists

Don't order CT head scans in adults and children who have suffered minor head injuries

(unless positive for a validated head injury clinical decision rule)

Recommended by the Canadian Association of Emergency Physicians

EMERGENCY



30% of emergency

department patients in Ontario and Alberta with low-risk minor head trauma

received a CT head scan.

- ii. Red flags include Glasgow Coma Scale (GCS) less than 13, GCS less than 15 at 2 hours post-injury, a patient age 65 and older, obvious open skull fracture, suspected open or depressed skull fracture, any sign of basilar skull fracture (e.g., hemotympanum, raccoon eyes, Battle sign, cerebrospinal fluid otorrhorrhea), retrograde amnesia to the event lasting 30 minutes or longer after the event, dangerous mechanism (e.g., pedestrian struck by motor vehicle, occupant ejected from motor vehicle, fall from higher than 3 feet or down more than 5 stairs) and Coumadin-use or bleeding disorder.

Why is it important?



The majority of patients with minor head trauma do not suffer from serious brain injury, and scans will not improve their outcome.^{22, 23}



Unnecessary CT scans increase radiation exposure^{24, 25} and potentially increase patients' lifetime risk of cancer.



Unnecessary testing can increase wait times for patients who do need CT scans.



Tools to reduce overuse, such as the head injury clinical decision rule, are likely not used enough.¹

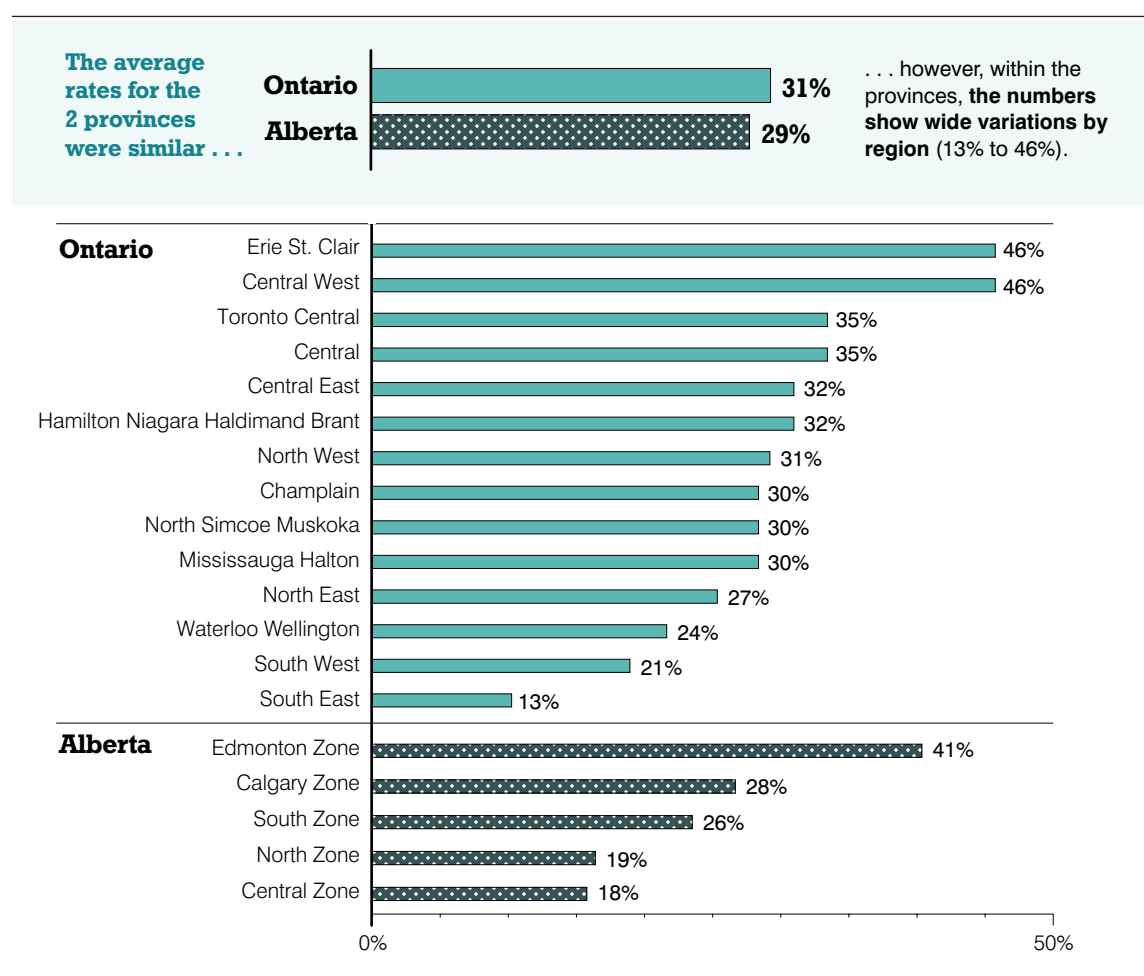
CT scans are resource intensive — from equipment to operators to care coordinators — and have a cost to provincial health care systems.²⁶



Other findings

Almost 50,000 patients age 18 to 64 visited emergency departments in Ontario and Alberta for minor head trauma (with no red flags) in 2015–2016 — roughly 75% of all reported head trauma cases in this age group. Almost 1 in 3 had a potentially unnecessary head scan, 98% of which were CT scans. This is the equivalent of more than 15,000 potentially unnecessary scans.

Figure 6 Rate of potentially unnecessary head scans, Ontario and Alberta, 2015–2016



Notes

There is no consensus on how to clearly distinguish minor from major head trauma in administrative databases. Administrative data does not capture a patient's full clinical history, and there may be misclassification of the presence of indications.

Sources

Discharge Abstract Database and National Ambulatory Care Reporting System, 2014–2015 to 2015–2016, Canadian Institute for Health Information.

Patients who were male, older or living in lower-income neighbourhoods were more likely to receive potentially unnecessary head scans.



The variation among facilities (0% to 68%) was even greater than the regional variation. Emergency departments with high trauma volumes (not only head trauma) had higher percentages of potentially unnecessary head scans. The higher volume of trauma cases may indicate that there are more diagnostic imaging machines available on site, which could contribute to physicians' decisions to order a scan. The decision to order a scan may be influenced by many factors, such as availability of diagnostic machines on site, physician training program and patient expectations. A better understanding of all these factors may facilitate collaboration among clinicians and health system leaders to ultimately reduce potentially unnecessary imaging.

Partner initiatives and efforts to reduce unnecessary head scans in emergency departments



Alberta Health Services has started a provincial initiative that aims to optimize the appropriateness of CT scans for mild traumatic brain injury to reduce practice variation. Hospitals are provided with reports that include information on site- and physician-level CT ordering for patients presenting to the emergency department with minor head trauma. The goals are to remind physicians about the Canadian CT Head Rule at the time of ordering, as well as to track data on CT scan practice variation.



In October 2015, Vancouver Coastal Health and Providence Health Care delivered an educational session to emergency department physicians at one of the facilities in the region concerning ordering CT scans for minor head trauma. In addition, an assessment and feedback process was implemented. Starting in 2017, assessments/reviews will be conducted annually on CT ordering for minor head trauma, uncomplicated headache and lower-back pain, and feedback will be delivered to emergency department physicians across the health authority.



The use of CT, for any indication, varies greatly among countries. For example, the rate of CT exams in Canada is nearly 5 times the rate in Finland (150 versus 32 per 1,000 population, respectively). Canada's rate is above the OECD average of 132 CT scans per 1,000 population.

Choosing Wisely Alberta



As part of the System Wide Efficiencies and Savings Consultation Agreement, the Alberta Medical Association, Alberta Health and Alberta Health Services, in collaboration with Choosing Wisely Alberta, work with a number of organizations to address unnecessary care in Alberta.

Physician Learning Program

The Physician Learning Program has developed an accredited educational workshop to teach physicians to identify gaps in practice, discuss barriers, facilitate change and highlight successful practice improvements.

The first phase of the program examined baseline practice data around 3 recommendations:

- 1** Over 4 years, there were 368,256 bone mineral density (DEXA) scans. Of these, 17% were done within 2 years of a previous scan, although the repeat is not recommended.
- 2** Potentially unnecessary diagnostic images (mainly MRI scans) for lower-back pain are ordered in large numbers, approximately 75% of them by family physicians.
- 3** Across Alberta, there is a higher-than-expected rate of Pap tests for women outside the recommended age range. In Alberta, between 2013 and 2016, approximately 8,009 Pap tests were performed on patients age 15 to 20, and 20,952 Pap smears were done on patients older than 69.

Preliminary results have shown that the program can help build capacity for physician participants to complete their own self-reflective evaluation using their clinic resources and electronic medical records.



For more information

www.albertaplp.ca

@AlbertaPLP



Physician
Learning
Program

Alberta Health Services

Choosing Wisely — Supporting Implementation of Psychiatry Recommendations is a strategy for phased implementation of recommendations for antipsychotics, benzodiazepines, antidepressants and psychostimulants. It also includes recommendations on ordering tests.


Research to date shows the following:

- 1** Calgary Zone had a very high rate of ordering potentially unnecessary statistical toxicology tests (STATs) for psychiatric patients, while Edmonton Zone had virtually no orders. A closer look at the variation revealed that the orders were automatic in Calgary. Now, getting the test takes additional approval and has resulted in an overall reduction in testing. Since implementing order set changes in August 2013, a 96% decrease in the use of STAT qualitative drug tests has occurred.
- 2** More than 91,000 people in Alberta filled a prescription for an antipsychotic medication in 2014, although only 19,273 of them were diagnosed with schizophrenia, which the drug is approved to treat. Use of antipsychotics and high-risk prescribing was significantly higher in Edmonton Zone and South Zone.
- 3** Alberta Health Services created the Appropriate Use of Antipsychotics toolkit in 2013–2014. Since its implementation in long-term care homes, a decrease from 25% to 18% of residents being prescribed an antipsychotic has occurred, giving Alberta the lowest rate in Canada (average of 23%).
- 4** In April 2015, Alberta Health Services' Laboratory Services found changes to order forms and increased education on vitamin D testing led to a 92% reduction in the first 9 months. With an estimated marginal cost per test of \$3 to \$5, this intervention is projected to result in a direct spending decrease of \$944,000 to \$1,573,000 per year in Alberta.



For more information

www.albertahealthservices.ca

 @ahs_behealthy

 AHSThannel



North York General Hospital — A facility-based approach to success

 **Highlight**

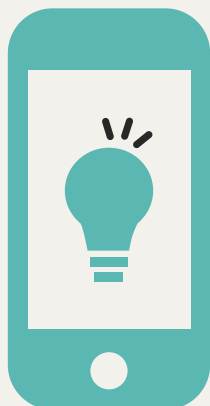
Background

North York General Hospital was quick to adopt the CWC campaign in June 2014. All the hospital's order sets have since been updated with other local clinical and CWC recommendations.

There was a 31% decline in the number of tests ordered after the program was implemented in the emergency department. Savings from 10 common lab tests totalled more than \$157,000 in 1 year and allowed investment in other patient care initiatives.

Approach

North York General Hospital's Choosing Wisely implementation campaign is all about getting people involved by engaging leadership, front-line staff and patients, along with fostering idea generation and evaluation.



Innovative approach: CWC mobile app

North York General Hospital's primary care group has promoted CWC's mobile app to help physicians and patients discuss unnecessary tests, treatments and procedures.



For more information

www.nygh.on.ca

 @NYGH_News

 @NorthYorkGeneralHospital



**NORTH
YORK
GENERAL**

*Making a World
of Difference*

A close-up photograph of a hospital gurney. The top part shows a patient's arm resting on a blue padded armrest. Below it, the metal frame of the gurney is visible, including the wheels and the side rails. A purple banner with the text "Hospital Care" is overlaid on the middle of the image. Below the banner, there is a horizontal line with four colored dots (teal, dark grey, yellow, and purple) and a purple circle containing a white hospital icon.

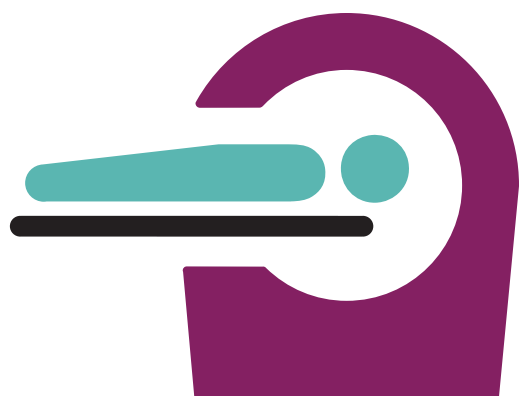
Hospital Care



Don't routinely obtain head CT scans in hospitalized patients with delirium in the absence of risk factors

Risk factors may include recent head trauma or fall, new focal neurological findings, and sudden or unexplained prolonged decreased level of consciousness.

Recommended by the Canadian Society of Hospital Medicine



In Ontario,
23% of inpatients with delirium
had a potentially unnecessary head CT scan.

Why is it important?



CT machines are in demand, and using them unnecessarily may delay scans for people who need them.



Unnecessary CT scans may expose patients to unnecessary radiation and can cause anxiety.²⁷



Guidelines suggest a step-wise approach

to the management of new delirium in hospitalized patients and consideration of head CT scans only in patients with selected risk factors.



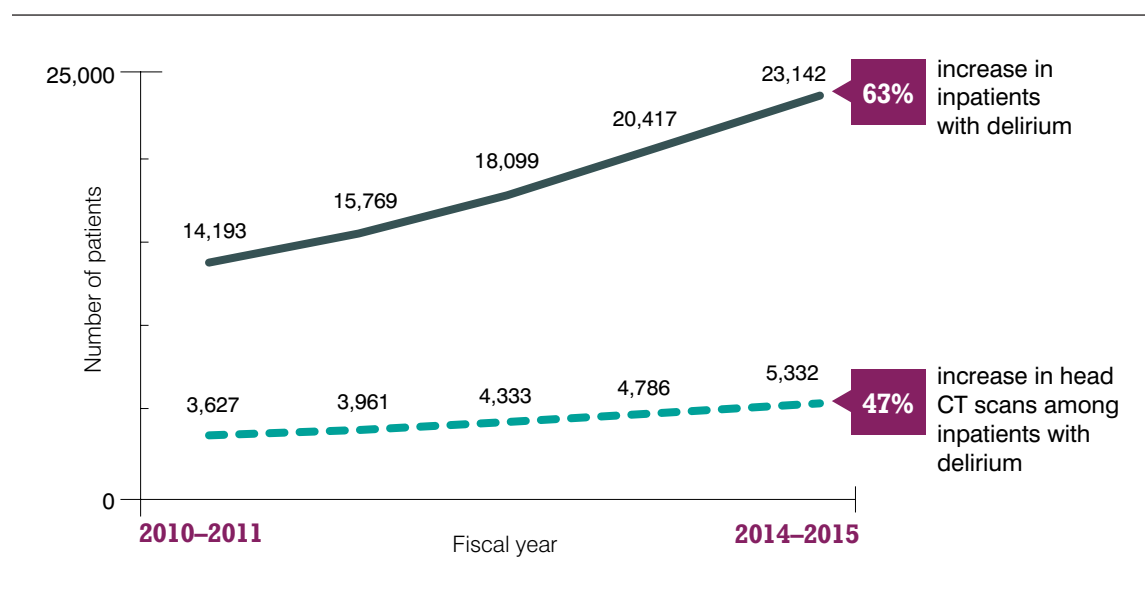
Delirium is a common problem among hospitalized patients — as many as 60% of elderly patients suffer from delirium when they are in hospital.^{28, 29}

Delirium is a sudden and severe change in brain function that causes a person to appear confused or have difficulties thinking clearly.

Other findings

In 2014–2015, almost 1 in 4 inpatients (23%) with delirium received a head CT scan in Ontario, despite not having any reported risk factors. Although the rate is down from 26% in 2010–2011, there are still an estimated 5,300 scans done annually that may have been avoidable. While the number of delirium patients is going up substantially, the number of scans has increased at a slower rate.

Figure 7 Number of inpatients with delirium and head CT scans, Ontario, 2010–2011 to 2014–2015



Notes

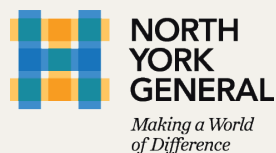
Analysis is restricted to Ontario, where it is mandatory to report CT scans for inpatients.

Administrative data does not capture a patient's full clinical history, and there may be misclassification of the presence of risk factors.

Source

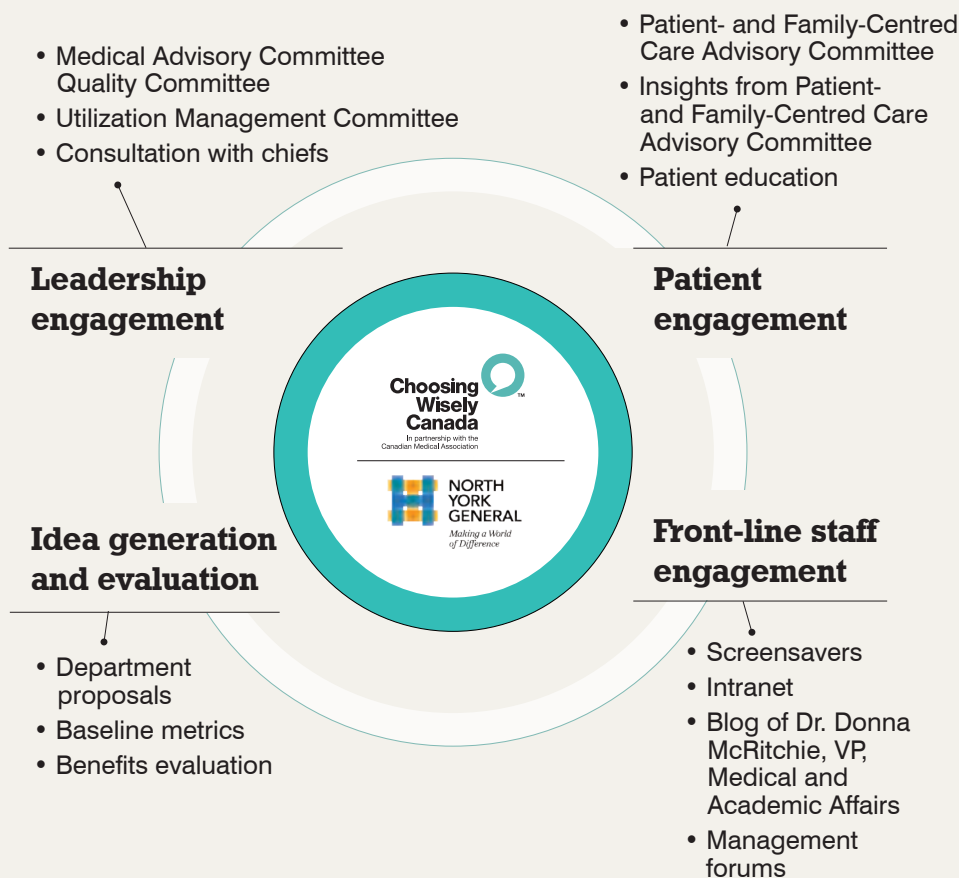
Discharge Abstract Database, 2010–2011 to 2014–2015, Canadian Institute for Health Information.

The use of CT scans for patients with delirium varied more at the facility and provider levels than across health regions (20% to 26%). Among facilities with at least 50 delirium cases without risk factors, the rate of head CT scans ranged from 10% to 41%. The rate also varied by provider service: nephrology and community medicine doctors had the highest rate of ordering CT scans for patients with delirium, while the largest volume of CT scans was ordered by internal medicine doctors and general practitioners.



North York General Hospital: Patient engagement advisory committee

The hospital's patient engagement strategy features a Patient- and Family-Centred Care (PFCC) Advisory Committee that has been involved throughout the Choosing Wisely campaign. There is a patient advisor on the hospital's Choosing Wisely Committee (formerly Utilization Management Committee), and patient advisors participate in conversations with the management team about Choosing Wisely.





Saskatchewan's Appropriateness of Care Program: Appropriateness of care framework

One of the main goals of Saskatchewan's framework is to create a collaborative partnership with patients and families in improving appropriateness of care.

The 4 key drivers of this initiative are to

1

Involve patients and families in governance and decision-making;

3

Involve patients and families in implementing the framework; and

2

Involve patients in treatment decisions (at the level they choose), so their values and treatment choices shape their treatment plan;

4

Increase patient and public awareness of potential harm from unnecessary diagnostic tests and treatments.

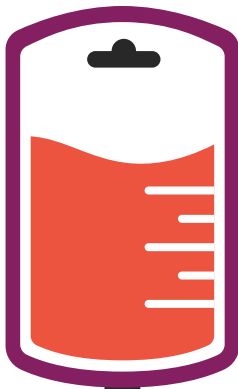


Prostate Cancer Control in Canada: A System Performance Spotlight Report

CPAC used focus groups and interviews with cancer patients, survivors and caregivers to complement traditional data and measurement, ensuring the results had a more human point of view in their report on prostate cancer control.

Don't transfuse red blood cells for arbitrary hemoglobin or hematocrit thresholds in the absence of symptoms, active coronary disease, heart failure or stroke

Recommended by the Canadian Society of Internal Medicine

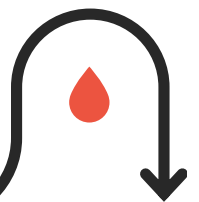


Red blood cell transfusions

for elective hip (12%) and knee (8%) replacements

have decreased but continue to be done across Canada,

even though blood is a precious resource.



Why is it important?



Blood is a vital and costly health care resource.

Red blood cell transfusions (RBCTs) without red flags^{iv} use this resource without improving patient outcomes.

RBCTs are associated with increased morbidity and mortality in high-risk hospitalized inpatients.³⁰



Adverse reactions to RBCTs range from mild to severe, including allergic reactions, acute hemolytic reactions, anaphylaxis and transfusion-associated circulatory overload, as well as sepsis.

RBCTs can help improve low blood count levels resulting from surgery, injury or disease when the body does not make enough blood.

No single test can predict the need for transfusion; it depends on clinical assessment and the condition being treated. However, evidence indicates there is little benefit or, in some cases, even harm to patients when RBCTs are done to achieve an arbitrary threshold.³¹

iv. Red flags for RBCTs depend on clinical assessment and are also guided by the etiology of the anemia.

Other findings

The rate of RBCTs varied across provinces, with higher variation among health regions and facilities. Saskatchewan had the lowest provincial rate of all hospitalized patients receiving RBCTs (6.3%). If all Canadian provinces had had this rate, more than 23,200 fewer RBCTs would have been performed.



In 2013–2014, less than 1 in 10 (7.4%) of all hospitalized patients received RBCTs in Canada, excluding British Columbia.

Patients with similar diseases and treatments had different rates of RBCTs across facilities, regions and provinces. For example, RBCT rates for hematology patients ranged from 12.7% to 57.3% across facilities.

CIHI focused its analysis on patients who were stable enough for an elective joint replacement and, as such, were unlikely to require an RBCT.

Over time, the proportion of hospitalizations involving at least one RBCT among elective hip and knee replacement patients has decreased. In 2006–2007, 22.1% and 15.0% of elective hip and knee replacement patients received transfusion, respectively, while in 2013–2014, these numbers dropped to 11.6% and 7.5%, respectively.

When comparing RBCT rates across provinces, experts suggested adjusting for patient-level risk factors such as age, gender, presence of comorbidities, etc. (for the full list of risk factors, see the [technical report](#)). In 2013–2014, risk-adjusted RBCT rates among elective hip replacement patients varied from 16.3% in Prince Edward Island and Alberta to 7.7% in Manitoba. The variation for elective knee replacement patients was from 11.5% in Alberta to 5.1% in Manitoba.

The variation in RBCT rates was greater across facilities than across geography. Among facilities with at least 100 elective hip and knee replacement patients, RBCT rates ranged from 2% to 33% and 0% to 27%, respectively. Providers who had 0% use of RBCTs still conducted 100 or more procedures. This might point to where improvements have been made and/or practices have been influenced by clinical guidelines.



Check out the toolkit

The toolkit [Why Give Two When One Will Do?](#) is available on the CWC's website.

Partner initiatives and efforts to reduce unnecessary transfusions



Capital Health in Halifax, Nova Scotia, rolled out a new policy “to transfuse one red cell unit and then reassess based on hemoglobin level/clinical symptoms.” Since 2012, the overall number of red cells units transfused has decreased by 16.4%.



At Sunnybrook Health Sciences Centre in Toronto, 78% of inpatient transfusions are a single unit, compared with 25% to 37% province-wide, as found in a recent provincial transfusion audit. Preprinted transfusion orders were implemented to remind prescribers of the guidelines to transfuse a single unit and then reassess at the time of the order. In addition, another recommendation was made to have transfusion medicine physicians available for further consultation and to provide education.

Conclusion

The data in this report illustrates the extent of unnecessary care in Canada and the many complex drivers of this problem. This report is an important step toward developing a deeper understanding of unnecessary care, as well as efforts toward improvement. Specifically, it illustrates the extent of variation around 8 CWC recommendations and opportunities for improvement. It also provides a snapshot of public attitudes. Canadians are aware of the problem of unnecessary care, and they are seeking more support and tools to make better decisions and have informed conversations with health care providers.

The report demonstrates where innovation in implementation and quality improvement efforts are reducing unnecessary care from coast to coast. Measurement is important to these efforts in order to understand local and regional variation, and to evaluate improvement strategies and their impact on patient outcomes and health care systems.

The data and case studies in this report are a start toward ongoing standardization of measures and improved data to identify gaps, find variation, track improvements and ultimately improve the quality of care for patients. A better understanding of the problem of unnecessary care is important for clinicians, patients and other health care stakeholders. At the centre of CWC is the goal of helping clinicians and patients engage in conversations about unnecessary care, to make smart and effective choices to achieve high-quality care. Better data can support these conversations at the individual, organizational, regional and national levels to improve the quality of care for Canadians.

Appendix A: Technical details

The major data sources were from CIHI and Statistics Canada.

CIHI

- Discharge Abstract Database
- National Ambulatory Care Reporting System
- Patient-Level Physician Billing
- National Prescription Drug Utilization Information System Database

Statistics Canada

- Canadian Community Health Survey Public Use Microdata File

In addition to CIHI data, we consulted with experts and used literature reviews about measuring low-value tests to develop this report. We used available data from all provinces and territories in Canada between the years 2006 and 2016 for the analysis.

We selected recommendations that could be measured (or approximated) with administrative and survey data, and we developed methodologies in consultation with clinical experts to ensure we were capturing potentially preventable tests, treatments and procedures. There are important limitations to note. Many times, administrative data doesn't capture the reasons for a specific test, treatment or procedure. We also don't know what conversation was had between the doctor and patient before these were ordered.

Further information on the methodology and limitations can be found in the [technical report](#).

Technical details

Don't do imaging for lower-back pain unless red flags are present

Data sources	Patient-Level Physician Billing Data, CIHI Discharge Abstract Database, CIHI National Ambulatory Care Reporting System, CIHI
Coverage	Alberta
Age group	Age 18+
Year	2011–2012

Don't use atypical antipsychotics as a first-line intervention for insomnia in children and youth

Data source	National Prescription Drug Utilization Information System Database, CIHI
Coverage	Manitoba, Saskatchewan, British Columbia
Age group	Age 5 to 24
Years	2008–2009 to 2013–2014

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

Data source	National Prescription Drug Utilization Information System Database, CIHI
Coverage	Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia
Age group	Age 65+
Years	2011–2012 to 2014–2015

Don't routinely do screening mammography for average-risk women age 40 to 49

Data source	2012 Canadian Community Health Survey Public Use Microdata File , Statistics Canada
Coverage	Canadian rate includes all provinces and territories Due to data suppression rules, results by jurisdiction include only Newfoundland and Labrador, Nova Scotia, New Brunswick, Quebec, Ontario, Alberta and British Columbia
Age group	Women age 40 to 49
Year	2012

Don't perform preoperative testing before low-risk surgeries (3 recommendations)

Data sources	Ontario: Choosing Wisely Canada (aggregate data) Saskatchewan and Alberta: Discharge Abstract Database, CIHI National Ambulatory Care Reporting System, CIHI Patient-Level Physician Billing Data, CIHI
Coverage	Ontario, Saskatchewan, Alberta
Age group	Age 18+
Year	2012–2013

Don't do imaging for minor head trauma unless red flags are present (2 recommendations)

Data sources	Discharge Abstract Database, CIHI National Ambulatory Care Reporting System, CIHI
Coverage	Ontario, Alberta
Age group	Age 18 to 64
Year	2015–2016

Don't routinely obtain head CT scans in hospitalized patients with delirium in the absence of risk factors

Data source	Discharge Abstract Database, CIHI
Coverage	Ontario
Age group	Age 18+
Years	2010–2011 to 2014–2015

Don't transfuse red blood cells for arbitrary hemoglobin or hematocrit thresholds in the absence of symptoms, active coronary disease, heart failure or stroke

Data sources	Discharge Abstract Database, CIHI Hospital Morbidity Database, CIHI
Coverage	Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Quebec,* Ontario, Manitoba, Saskatchewan, Alberta
Age group	Age 18+
Years	2006–2007 to 2013–2014

Note

* The government of Quebec has never supported and is not related to the Choosing Wisely campaign, since it has launched its own relevance project, including a series of actions that aim to increase the relevance of the use of certain services and technologies in the health sector to ensure the quality of care given to Quebecers and to promote better use of resources. However, since the issues of over-diagnosis and over-treatment are of interest to Quebec, and to benefit from comparative data in this area, the government of Quebec agreed to have its data included in this product.

Appendix B: Text alternatives for figures

Text alternative for Figure 1: CT/MRI scan rate within 6 months, by patient residence zone, Alberta

Health zone	Number of patients	CT/MRI scan rate
North	9,000	7.2%
Central	9,000	6.8%
South	7,000	6.8%
Edmonton	32,000	4.1%
Calgary	39,000	3.2%

Notes

Only services provided with public funding are captured in the data.

Administrative data does not capture a patient's full clinical history, and there may be misclassification of the presence of indications.

Sources

Discharge Abstract Database, National Ambulatory Care Reporting System and Patient-Level Physician Billing Data, 2010–2011 to 2012–2013, Canadian Institute for Health Information.

Text alternative for Figure 3: Rate of chronic benzodiazepine use among seniors on public drug programs, by province, 2014–2015 compared with 2011–2012

Province	Rate of benzodiazepine use	Comparison with 2011–2012
Newfoundland and Labrador	20.9%	Higher
Prince Edward Island	9.5%	Higher
Nova Scotia	16.4%	Lower
New Brunswick	25.4%	Higher
Ontario	8.7%	Lower
Manitoba	15.7%	Lower
Saskatchewan	5.3%	Lower
Alberta	15.8%	Lower
British Columbia	8.6%	Lower
Overall	10.4%	Lower

Notes

Seniors are defined as those age 65 and older with at least one drug claim.

Benzodiazepine and related drug use was included and could not be limited to use for insomnia, agitation or delirium.

Source

National Prescription Drug Utilization Information System Database, 2011–2012 to 2014–2015, Canadian Institute for Health Information.

Text alternative for Figure 4: Rate of screening mammogram for average-risk women age 40 to 49 in the past 2 years, by jurisdictional breast cancer screening program guidelines and eligibility criteria, Canada, 2012

Jurisdiction	Rate of screening mammogram	Program eligibility for average-risk women age 40 to 49
Newfoundland and Labrador	29.8%*	No
Prince Edward Island	Suppressed†	Yes, with self-referral
Nova Scotia	38.7%	Yes, with self-referral
New Brunswick	15.0%*	Yes, with physician referral
Quebec	13.2%	Yes, with physician referral
Ontario	22.0%	No
Manitoba	Suppressed†	No
Saskatchewan	Suppressed†	No
Alberta	34.7%	Yes, with physician referral
British Columbia	31.1%	Yes, with self-referral
Yukon	Suppressed†	Yes, with self-referral
Northwest Territories	Suppressed†	Yes, with self-referral
Nunavut	Suppressed†	n/a
Canada	22.2%	n/a

Notes

* Interpret with caution due to a high coefficient of variation.

† Rates for Prince Edward Island, Manitoba, Saskatchewan and the territories have been suppressed (n of unweighted numerator <30 and/or coefficient of variation >33.3).

n/a: Not applicable.

Sources

Rates: [2012 Canadian Community Health Survey](#) Public Use Microdata File, Statistics Canada.

Screening guidelines: *Breast Cancer Screening Programs/Strategy Elements*, 2011, Canadian Partnership Against Cancer (validation with members of the Canadian Breast Cancer Screening Network).

Text alternative for Figure 5: Proportion of men with low-risk prostate cancer on active surveillance, 2010 to 2013

Province	Proportion on active surveillance
Newfoundland and Labrador	72%
Prince Edward Island	76%
Nova Scotia	53%
New Brunswick	81%
Manitoba	81%
Saskatchewan	59%
Alberta	55%

Notes

Provinces included are Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan and Alberta.

New Brunswick radiation therapy data was available starting January 1, 2012.

Newfoundland and Labrador data was not available in 2013. Data was available for 2011 and 2012.

Sources

Provincial cancer agencies; and Canadian Partnership Against Cancer.

Text alternative for Figure 6: Rate of potentially unnecessary head scans, Ontario and Alberta, 2015–2016

Local health integration network/health region	Rate of potentially unnecessary head scans
Ontario	31%
Erie St. Clair	46%
Central West	46%
Toronto Central	35%
Central	35%
Central East	32%
Hamilton Niagara Haldimand Brant	32%
North West	31%
Champlain	30%
North Simcoe Muskoka	30%
Mississauga Halton	30%
North East	27%
Waterloo Wellington	24%
South West	21%
South East	13%

Local health integration network/health region	Rate of potentially unnecessary head scans
Alberta	29%
Edmonton Zone	41%
Calgary Zone	28%
South Zone	26%
North Zone	19%
Central Zone	18%

Notes

There is no consensus on how to clearly distinguish minor from major head trauma in administrative databases. Administrative data does not capture a patient's full clinical history, and there may be misclassification of the presence of indications.

Sources

Discharge Abstract Database and National Ambulatory Care Reporting System, 2014–2015 to 2015–2016, Canadian Institute for Health Information.

Text alternative for Figure 7: Number of inpatients with delirium and head CT scans, Ontario, 2010–2011 to 2014–2015

Fiscal year	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015
Delirium patients without risk factors	14,193	15,769	18,099	20,417	23,142
Head CT scans among delirium patients without risk factors	3,627	3,961	4,333	4,786	5,332

Notes

Analysis is restricted to Ontario, where it is mandatory to report CT scans for inpatients. Administrative data does not capture a patient's full clinical history, and there may be misclassification of the presence of risk factors.

Source

Discharge Abstract Database, 2010–2011 to 2014–2015, Canadian Institute for Health Information.

Text alternative for North York General Hospital patient engagement image

4 major efforts have guided North York General Hospital's Choosing Wisely implementation campaign. First is leadership engagement, which includes the Medical Advisory Committee (MAC) Quality Committee, the Utilization Management Committee and consultation with chiefs. Second is patient engagement, which includes the Patient- and Family-Centred Care (PFCC) Advisory Committee, insights from the PFCC Advisory Committee and patient education. Third is front-line staff engagement, which includes screensavers, the intranet, Donna's Blog and management forums. Fourth is idea generation and evaluation, which includes department proposals, baseline metrics and benefits evaluation.

References

1. Levinson W, Kallewaard M, Bhatia RS, Wolfson D, Shortt S, Kerr EA; Choosing Wisely International Working Group. [“Choosing Wisely”: A growing international campaign](#). *BMJ Quality and Safety*. 2015.
2. Chou R, Fu R, Carrino J, Deyo R. [Imaging strategies for low-back pain: Systematic review and meta-analysis](#). *The Lancet*. February 2009.
3. Pengel L, Herbert R, Maher C, Refshauge K. [Acute low back pain: Systematic review of its prognosis](#). *BMJ*. August 2003.
4. Pringsheim T, Gardner D. [Dispensed prescriptions for quetiapine and other second-generation antipsychotics in Canada from 2005 to 2012: A descriptive study](#). *CMAJ Open*. October 2014.
5. Thompson W, Quay T, Rojas-Fernandez C, Farrell B, Bjerre L. [Atypical antipsychotics for insomnia: A systematic review](#). *Sleep Medicine*. June 2016.
6. eMentalHealth.ca. [Quetiapine](#). Accessed December 1, 2016.
7. AstraZeneca Canada Inc. [Product Monograph: Seroquel](#). 2015.
8. Hemmelgarn B, Suissa S, Huang A, Boivin J, Pinard G. [Benzodiazepine use and the risk of motor vehicle crash in the elderly](#). *JAMA*. July 1997.
9. Neutel C, Perry S, Maxwell C. [Medication use and risk of falls](#). *Pharmacoepidemiology and Drug Safety*. March 2002.
10. Shader R, Greenblatt D. [Use of benzodiazepines in anxiety disorders](#). *New England Journal of Medicine*. 1993.
11. Gillin J, Byerley W. [Drug therapy: The diagnosis and management of insomnia](#). *New England Journal of Medicine*. January 1990.
12. Glass J, Lancot K, Herrmann N, Sproule B, Busto U. [Sedative hypnotics in older people with insomnia: Meta-analysis of risks and benefits](#). *BMJ*. November 2005.
13. Morin C, LeBlanc M, Bélanger L, Ivers H, Mérette C, Savard J. [Prevalence of insomnia and its treatment in Canada](#). *Canadian Journal of Psychiatry*. September 2011.
14. Canadian Cancer Society’s Advisory Committee on Cancer Statistics. [Canadian Cancer Statistics](#). 2016.

15. Canadian Task Force on Preventive Health Care. [Recommendations on screening for breast cancer in average-risk women aged 40–74 years](#). *CMAJ*. 2011.
16. Canadian Partnership Against Cancer. *Breast Cancer Screening Programs/Strategy Elements*. 2011.
17. Canadian Partnership Against Cancer. [Quality and Sustainability in Cancer Control: A System Performance Spotlight Report](#). 2016.
18. Chung F, Yuan H, Yin L, Vairavanathan S, Wong D. [Elimination of preoperative testing in ambulatory surgery](#). *Anesthesia & Analgesia*. February 2009.
19. Benarroch-Gampel J, Sheffield KM, Duncan CB, et al. [Preoperative laboratory testing in patients undergoing elective, low-risk ambulatory surgery](#). *Annals of Surgery*. September 2012.
20. Thanh NX, Rashid S, Jonsson E. [Routine preoperative electrocardiogram and chest X-ray prior to elective surgery in Alberta, Canada](#). *Canadian Journal of Anesthesia*. February 2010.
21. Kirkham K, Wijesundera D, Pendrith C, et al. [Preoperative testing before low-risk surgical procedures](#). *CMAJ*. August 2015.
22. Haydel M, Preston C, Mills T, Luber S, Blaudeau E, DeBlieux P. [Indications for computed tomography in patients with minor head injury](#). *New England Journal of Medicine*. July 2000.
23. Stiell I, Wells G, Vandemheen K, et al. [The Canadian CT Head Rule for patients with minor head injury](#). *The Lancet*. May 2001.
24. Brenner D, Hall E. [Computed tomography — An increasing source of radiation exposure](#). *New England Journal of Medicine*. November 2007.
25. Mathews J, Forsythe A, Brady Z, et al. [Cancer risk in 680,000 people exposed to computed tomography scans in childhood or adolescence: Data linkage study of 11 million Australians](#). *BMJ*. May 2013.
26. Smits M, Dippel D, Nederkoorn P, et al. [Minor head injury: CT-based strategies for management — A cost-effectiveness analysis](#). *Radiology*. February 2010.
27. Kalra M, Maher M, Rizzo S, Kanarek D, Shepard J. [Radiation exposure from chest CT: Issues and strategies](#). *Journal of Korean Medical Science*. April 2004.

28. Fong T, Tulebaev S, Inouye S. [Delirium in elderly adults: Diagnosis, prevention and treatment](#). *Nature Reviews Neurology*. April 2009.
29. Wongpakaran N, Wongpakaran T, Bookamana P, et al. [Diagnosing delirium in elderly Thai patients: Utilization of the CAM algorithm](#). *BMC Family Practice*. July 2011.
30. Marik P, Corwin H. [Efficacy of red blood cell transfusion in the critically ill: A systematic review of the literature](#). *Critical Care Medicine*. September 2008.
31. Shander A, Gross I, Hill S, Javidroozi M, Sledge S. [A new perspective on best transfusion practices](#). *Blood Transfusion*. April 2013.
32. Silverstein W, Lass E, Born K, Morinville A, Levinson W, Tannenbaum C. [A survey of primary care patients' readiness to engage in the de-adoption practices recommended by Choosing Wisely Canada](#). *BMC Research Notes*. 2016.



choosingwiselycanada.org
info@choosingwiselycanada.org



Canadian Institute
for Health Information
Institut canadien
d'information sur la santé

cihi.ca
media@cihi.ca