Frequency and variation of Choosing Wisely recommendations in primary care: a retrospective, population-based cohort study

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Funding: This study was supported by the Institute for Clinical Evaluative Sciences (ICES), which is funded in part by an annual grant from the Ontario Ministry of Health and Long-Term Care (MOHLTC). The funders had no role in the design and conduct of the study; the collection, management, analysis or interpretation of the data; the preparation, review or approval of the manuscript; or the decision to submit the manuscript for publication. The opinions, results and conclusions reported in this paper are those of the authors and are independent from the funding sources. No endorsement by ICES or the Ontario MOHLTC is intended or should be inferred. NMI is supported by New Investigator Awards from the Canadian Institutes of Health Research and the Department of Family and Community Medicine, University of Toronto.

Competing interests: All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an

interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Key words: choosing wisely, low value care, low back pain, cervical cancer screening, bone mineral density testing

Word count (text excluding references, tables, figures, appendices): 2471
Abstract Word count: 249

Background: This study's purpose was to explore utilization and variability of three Choosing Wisely recommendations related to primary care: (1) low back pain imaging with no red flags; (2) cervical cancer screening for women <21 or >69; and (3) dual energy X-ray absorptiometry (DEXA) scans repeated more often than every two years.

Methods: We conducted a population-based retrospective cohort study using administrative healthcare databases from Ontario to identify rates of the following low value services between fiscal years 2008 and 2012: CT and/or MRI imaging following a low back pain diagnosis, Pap testing in women <21 or >69, and repeated DEXA scanning within two years of index scan. Regional- and primary practice-level rates were calculated. Bivariate analyses were conducted to explore associations between patient factors and repeat DEXA scans.

Results: Repeated DEXA scans was the most prevalent service (21.0%), while cervical cancer screening among women <21 or >69 (8.0%) and CT and/or MRI imaging for low back pain (4.5%) were less frequent. There was substantial variation across practices with rates of repeated DEXA scans ranging from 4.0% to 54.9%, and cervical cancer screening from 0.9% to 35.2%. Patients with a high risk index DEXA were more likely to receive a repeat scan (28.1%) than those with a baseline (8.9%) or low risk (8.1%) scan.

Interpretation: There is significant, practice-level variation in the frequency of low value testing for DEXA scans, back imaging, and cervical cancer screening. There is a particular need for interventions aiming to reduce unnecessary DEXA testing.

INTRODUCTION

Low value care, defined as care where there is a lack of benefit, or where the benefits are outweighed by the potential risks, can lead to higher healthcare costs, patient inconvenience, and in some cases harm to patients [1, 2]. There is growing recognition that low value care is common in health systems around the world [3]. The Institute of Medicine estimates that up to 30% of medical care may be classified as low value care [1].

The Choosing Wisely® (CW) campaign is a grassroots effort to address the issue of low value care that launched in the United States in 2012 [4]. The CW campaign, which has been adopted by 18 countries, aims to change practice by harnessing physician leadership, increasing awareness regarding low value tests, procedures, and treatments, and by emphasizing the inherent risks to patients [3]. The CW campaign launched in Canada in 2014, with eight specialty societies releasing "Top Five" lists of common clinical practices that are considered low value care [5]. One of the original specialties to participate was the College of Family Physicians of Canada (CFPC), which now endorses eleven evidence based CW recommendations [6].

As countries around the world implement CW campaigns, there is a need to assess which low value services are frequently performed in clinical practice [7], particularly in primary care where patients most often receive care. To maximize the likelihood of impact, interventions developed to address low value care should focus on topics where there is substantial room for improvement. A previously published framework for selecting target areas for improvement suggests using administrative data to identify frequently performed services with a high degree of inappropriate variation as a signal

point to investigate deeper into the factors driving overutilization [7]. We selected three CW recommendations relevant to primary care for investigation: (1) imaging for low back pain in the absence of red flags [6, 8, 9]; (2) cervical cancer screening for women <21 or >69 years of age [6, 8, 10]; and (3) repeat dual X-ray absorptiometry (DEXA) scans more often than every two years [11, 12]. These recommendations were chosen because we believed them to be frequently ordered in primary car, and accurately measurable from administrative data using previously published search algorithms [13-15].

The objectives of this study are to conduct exploratory analyses to understand how frequently selected CW recommendations are ordered, assess the degree of variation in ordering that exists across regions and practices, identify services that may warrant further investigation and targeted interventions [7].

METHODS

Study Design and Data Sources

We conducted a retrospective cohort study in Ontario, Canada, using linked population-based administrative health care databases held at the Institute for Clinical Evaluative Sciences (ICES). The datasets were linked using unique encoded identifiers and analyzed at ICES. The Registered Persons Database (RPDB) contains demographic information on all Ontario residents eligible for the Ontario Health Insurance Plan (OHIP). The OHIP claims database contains all billing claims made by Ontario physicians. The Client Agency Program Enrolment (CAPE) tables were used to identify patients rostered to primary care physicians.

Cohort Selection

The study cohort was selected from Ontario patients with a valid provincial OHIP number meeting eligibility criteria for one or more study recommendation between April 1, 2008 and March 31, 2013. Drawing from indicator definitions in the literature [13-17], we developed algorithms using physician claims and hospital encounter data to identify the cohorts for each study recommendation. **Table 1** describes the inclusion and exclusion criteria, follow up period, and outcome definitions for each measure (**Appendix 1** contains full cohort definitions). In brief, we selected patients meeting eligibility criteria for one or more cohort: 1) adults with a low back pain diagnosis from a family physician without red flags using methods developed by ICES [13]; 2) women <21 or >69 with no prior gynaecological cancer diagnoses or hysterectomy using a validated algorithm to identify women screened for cervical cancer in Ontario[15]; or 3) adults ≥40 and older receiving a DEXA scan using billing claims previously described by Jaglal and colleagues and previously validated [14, 18].

Covariates

We collected patient age, sex, rurality and neighbourhood income quintile. For patients in the repeat DEXA scan cohort, we also collected information on the index scan type from the fee schedule. A patient's first ever DEXA is a 'baseline scan.' Afterwards, patients are classified by risk where patients with osteoporosis, osteopenia, or considered being high risk for accelerated bone loss on a previous DEXA receive 'high risk scans' and the remaining patients receive 'low risk scans.' There are no differences in the amount payable across risk levels. We determined whether patients had a regular family physician using enrolment status in the CAPE tables, or a validated billing algorithm.

Practices were defined as billing groups: three or more primary care physicians who submit joint billings to OHIP for reimbursement. We excluded practices with less than three physicians for privacy reasons and those with missing demographic variables. Practices with fewer than 30 patients meeting recommendation eligibility were excluded from analyses for that measure to avoid practices with small numbers of cases unduly influencing the practice analyses.

Outcomes

Our primary outcome was receipt of a potentially low value test assessed using OHIP claims, as outlined by the CW recommendations and described in **Table 1**.

Statistical Analyses

We calculated events rates for each measure for all of Ontario, as well as at the regional- and practice-levels. Poisson regression was used to investigate temporal trends among each recommendation and when overdispersion was detected, a negative binomial distribution was used instead to obtain more precision estimates of standard error. Regional variation was assessed using the coefficient of variation (CV) across Ontario's 14 Local Health Integration Networks (LHIN) – geographically organized administrative regions that plan, integrate, and fund local health care. We assessed variation in ordering across primary care practices by comparing unadjusted event rates for each measure and calculating the CV. We considered recommendations warranting further investigation to be those with substantial room for improvement, defined as having a utilization rate ≥15% which would better lend itself to quality improvement initiatives designed to reduce frequency of these low value tests. Recommendations meeting these criteria were explored by identifying potential patient level predictors of testing using two sample t-

tests and Chi-square tests, where appropriate. All statistical analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC).

RESULTS

Cohort

Between 2008/09 and 2012/13 we selected a unique cohort of patients meeting eligibility criteria for each CW recommendation: 271,588 patients with low back pain, 2,229,113 patients with an index DEXA scan, and 7,417,444 women aged <21 or >69 (**Appendix 2** contains diagrams for each cohort and **Appendix 3** describes patient characteristics for each cohort in 2012/2013)**.**

Provincial Frequency of CW Recommendations

The most prevalent potentially low value service was repeated DEXA scans, where 21.0% of patients with an index scan received a second scan within two years. Overall, 8.0% of women in the cervical cancer screening population received at least one low value Pap test, with significantly higher screening rates for women <21 than those >69 (10.8% vs. 5.0%; $p < 0.001$). Imaging for low back pain was the least prevalent service with 4.5% of patients receiving a CT and/or MRI within three months of initial diagnosis. Over the study period, the rates of cervical cancer screening decreased significantly ($p = 0.002$) while there was no significant trend in rates of imaging for low back pain ($p = 0.071$) or repeat DEXA scans ($p = 0.17$). (**Figure 1**).

Variability

Substantial variation in the frequency of utilization rates was observed across LHINs (**Appendix 4**). At the regional level, the highest degree of variation observed was

for low back pain imaging (CV = 0.35), which ranged from 2.5% to 8.3% across LHINs. The rate of repeat DEXA scans ranged from 13.8% to 28.2% (CV = 0.24). The lowest degree of variation was observed for cervical cancer screening (CV = 0.14), which ranged from 6.6% to 10.4%.

Figure 2 displays the degree of practice-level variation in the use of low value testing. Variation was highest for imaging for low back pain (range 0.8-32.6%; CV = 0.59), followed by repeat DEXA scans (range 4.0-54.9%; CV = 0.39), and cervical cancer screening (range 0.9-35.2%; CV = 0.36).

Potential Predictors of Low Value Testing

Repeat DEXA scans was the only potential low value test with substantial room for improvement, and as such, was the only low value test that warranted further investigation into the potential drivers of overutilization. Patients receiving a repeat scan were significantly older ($p < 0.001$), and women were more likely to receive a repeat scan than men ($p < 0.001$; **Table 2**). Living in urban or higher income areas was associated with increased testing rates. There were significant differences in utilization rates across index scan risk level: patients who had a high risk index scan had a much higher repeat testing rate (28.1%) than patients who had a baseline (8.7%) or low risk (8.1%) scan.

INTERPRETATION

The results from this large, retrospective cohort study demonstrate that some low value tests are more frequent than others with utilization rates ranging from 4.5% for low back pain imaging to 21.0% for DEXA testing. We found substantial variability in utilization rates regardless of the frequency of ordering overall, including a 14-fold difference in DEXA ordering and a 40-fold difference in low back pain imaging across

practices. Our findings suggest some potential predictors of ordering low value DEXA scans, including female sex, higher neighbourhood income quintile, and the risk level of the index scan.

While the focus of quality improvement initiatives has predominantly been on misuse and underuse [1], there is emerging research on overuse that offers comparisons for our findings. Among U.S. Medicare beneficiaries ≥65, similar frequencies of low back pain imaging (4.1-9.4%) and use of cervical cancer screening (6.4-6.9%) have been reported, though rates of repeat DEXA scans among patients with osteoporosis were lower than in our study (0.8-1.0%) [17]. However a recent study that examined temporal ordering trends of CW recommendations in a large US commercial health plan found substantially higher rates of low back pain imaging without red flags (53.7%) [19]. This large discrepancy is likely related to varying definitions of low value care, but may also be influenced by differences in testing practices and populations. While prior analyses have examined population-level data and regional variation, few studies have assessed utilization rates at the primary care practice level and variability in ordering across practices. Furthermore, our study includes an entire population from a single payer, publicly funded system with no patient co-payments, which is novel as most prior research on overuse has been done in the United States [16, 17, 19].

Our study has several limitations. First, administrative databases do not provide important clinical information, such as presence of symptoms or abnormal physical exam findings that are necessary to determine appropriateness [27]. For example, clinical information not captured may identify patients with an accelerated expected rate of bone loss where repeat scans may be appropriate. Second, our rate of imaging for low back

pain may be underestimated. Since administrative data lacks clinical nuance, we developed an exhaustive list of red flag exclusions for this cohort to avoid capturing false positives; however, excluding higher risk patients may have biased our sample. Prior literature has shown that the rate of low back pain scans for red flag conditions is a small minority of overall ordering [28]. Third, we were unable to measure individual physician ordering behaviour within a practice, and thus are unable to assess the extent to which an individual physician may skew the results of the practice. Fourth, we cannot determine whether the ordering physician for the test was the primary care doctor, or a subspecialist, though prior research has demonstrated that the majority of ordering is by family physician [29]. Fifth, we were unable to account for factors that may account for differences in ordering across practices, including decision support tools associated with an electronic medical record [30]. Finally, as we conducted exploratory analyses into potential predictors, we were unable to assess the adjusted association of patient, provider, and practice characteristics with low value DEXA testing. Provider-level factors, including years since graduation or practice setting, would be valuable in identifying potential intervention targets. However, our findings identify potential predictors that future research may build upon.

The results of our study have significant importance for public policy. The dramatic variation in ordering across practices in a large jurisdiction like Ontario suggests more work is needed to understand the drivers of low value care at the patient, practice, and provider levels. The lower rates of cervical screening and low back pain imaging compared to repeat DEXA may reflect increased penetrance of guideline recommendations and policy changes. The Ontario government amended the fee schedule

to align with the guideline changes made in 2012 [20]: effective January 2013, cervical cancer screening was not insured to women <21 or >70 years of age [21]. Imaging for low back pain has been the subject of significant quality improvement efforts funded in part by the provincial government [22]. While it's too early to assess the longer term impact of these policy changes on ordering patterns, the likelihood of further improvements in population rates for cervical screening and low back pain imaging seems low. To address low value testing that is relatively uncommon at the population level but with high variation, targeted feedback to high ordering practices [22] that incorporates social norms may be a promising approach. In contrast, funding changes or other policy levers may be appropriate to address low value tests that are commonly used across a population. For example, provisions in the Ontario fee schedule allowing annual DEXA scans among high risk patients may drive higher testing rates. This would be supported by Canadian Rheumatology Association and Canadian Association of Nuclear Medicine guidelines, which recommend against repeating scans within two years as it is likely that more time is needed to reliably measure bone mineral density change [6, 8-12, 23, 24]. However, strategies to reduce overuse of low value services should consider unintended consequences and be balanced with efforts to prevent concurrent underuse of high value services [25][24] as previous limits to scanning for "low risk" patients in Ontario led to reductions in use for both "low" and "high risk" patients [14]. Strategies to reduce overuse should be communicated carefully to avoid negatively impacting appropriate use, confusion, and undermining trust in the medical system [26].

CONCLUSIONS

In this large, population-based retrospective study of low value services in primary care, we found significant regional and practice variation of all three services. While rates of cervical screening and imaging for low back pain were lower than expected, significant practice variation was observed, and low value DEXA scans were frequent. The results suggest opportunities for further reducing low value care in primary care.

Tables

Table 1: Cohort selection criteria

Description	Denominator	Numerator
Imaging for low back pain		
Don't do imaging for lower-back pain unless red flags are present (CFPC; CAR; CSS).	Inclusion criteria: claim for visit to primary care physician with low back pain diagnosis with first visit as index date. Exclusions: age <18 or >105; red flag medical history up to 5 years prior: previous low back pain diagnoses, certain diagnoses (e.g. neoplasms, neurological diagnoses, fractures), visits to neurosurgeons or orthopaedic surgeons, prior spine-related scans or operations.	Individuals meeting inclusion and exclusion criteria with at least one claim for spine CT and/or MRI up to 3 months after index event.
Repeat DEXA scans		
Don't repeat dual X-ray absorptiometry (DEXA) scans more often than every two years (CRA; CANM).	Inclusion criteria: claim for baseline or subsequent DEXA scan with claim date as index date. Exclusions: age <40 or >105.	Individuals meeting inclusion and exclusion criteria with at least one claim for repeat DEXA scan within two years of index date.
Cervical cancer screening		
Don't screen women with Pap smears if under 21 years of age or over 69 years of age (CFPC; CAP).	Inclusion criteria: females aged <21 or >69 years of age. Exclusions: age <13 or >105; previous gynecologic cancer diagnoses; previous hysterectomy; pregnancy; HIV infection.	Individuals meeting inclusion and exclusion criteria with at least one claim for cervical cancer screening Pap smear.

CFPC = College of Family Physicians of Canada; CAR = Canadian Association of Radiologists; CSS = Canadian Spine Society; CRA = Canadian Rheumatology Association; CANM = Canadian Association of Nuclear Medicine; CAP = Canadian Association of Pathologists.

Table 2: Bivariate associations between patient characteristics and having a repeat DEXA scan within 2 years of a previous scan

Characteristic, n (%)*	Received repeat DEXA	Did not receive repeat DEXA	p-value
N	86,213	308,181	
Age, mean (95% CI)	65.2 (65.1-65.3)	63.6 (63.5-65.6)	<0.001
Gender			<0.001
Female	75,582 (22.8)	256,616 (77.2)	
Male	10,631 (17.1)	51,485 (82.9)	
Neighbourhood income quintile			<0.001
1 (lowest)	13,151 (20.4)	51,304 (79.6)	
2	15,774 (21.2)	58,494 (78.8)	
3	16,453 (21.3)	60,681 (78.7)	
4	19,054 (22.4)	65,832 (77.6)	
5 (highest)	21,516 (23.4)	70,464 (76.6)	
Rurality			<0.001
Urban	79,983 (22.5)	274,745 (77.5)	
Rural	6,144 (15.7)	32,867 (84.3)	
Index scan risk level			<0.001
Baseline scan	6,596 (8.7)	68,860 (91.3)	
Low risk scan	4,030 (8.1)	45,540 (91.9)	
High risk scan	75,587 (28.1)	193,711 (71.9)	

Figure legends

Figure 1: Utilization rates of low value services across study period

Figure 2: Practice-level variation in utilization rates of low value services. Each dot represents the utilization rate at an individual primary care practice and the dashed line represents the mean utilization rate across all practices.

Contributors: CP and RSB were responsible for study concept and design. CP, GM and RSB acquired the data. CP and GM did the statistical analyses. All authors analysed and interpreted the data. CP, MB and RSB drafted the manuscript. All authors critically revised the manuscript for important intellectual content and approved the final version to be published. RSB obtained funding. WL and RSB supervised the study. All authors had full access to all of the data. RSB is the guarantor.

Acknowledgements: Parts of this material are based on data and information compiled and provided by the Canadian Institute for Health Information (CIHI). However, the analyses, conclusions, opinions and statements expressed herein are those of the author, and not necessarily those of CIHI. Parts of this material are based on data and information provided by Cancer Care Ontario (CCO). The opinions, results, view, and conclusions reported in this paper are those of the authors and do not necessarily reflect those of CCO. No endorsement by CCO is intended or should be inferred.

Ethical approval: Research ethics approval was received from Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada.

Transparency statement: The lead author, guarantor of the manuscript, affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Data sharing: no additional data available

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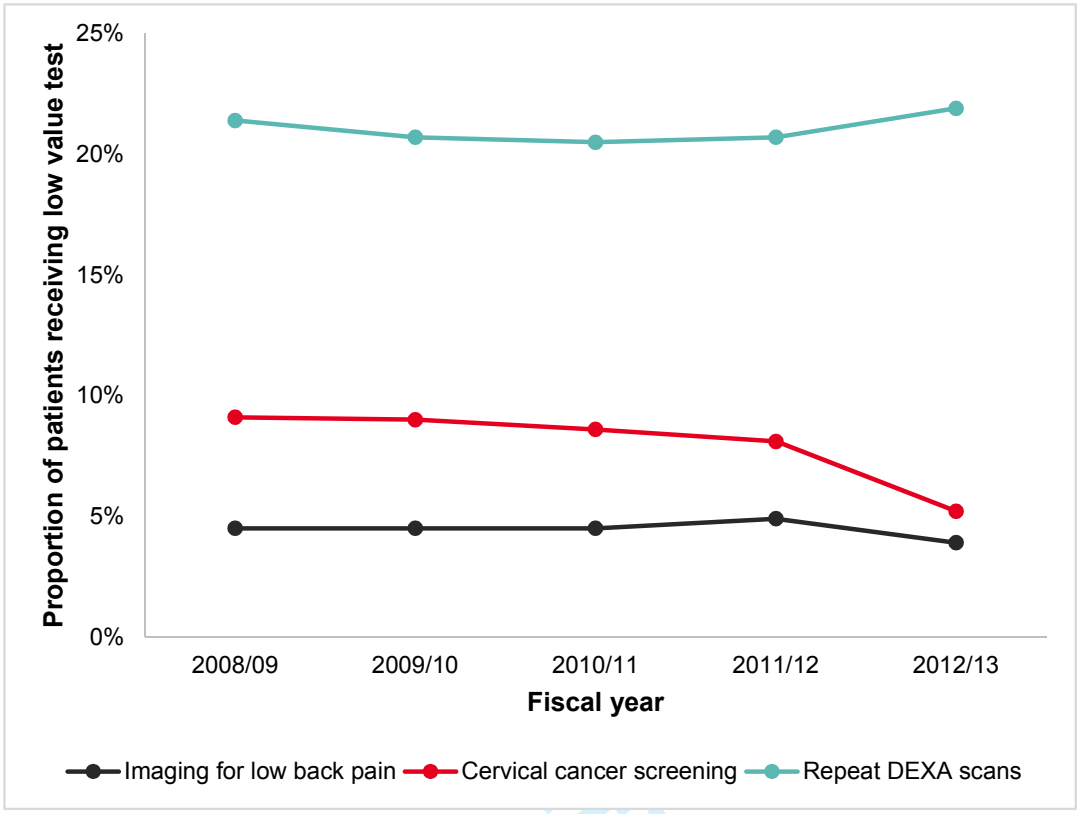
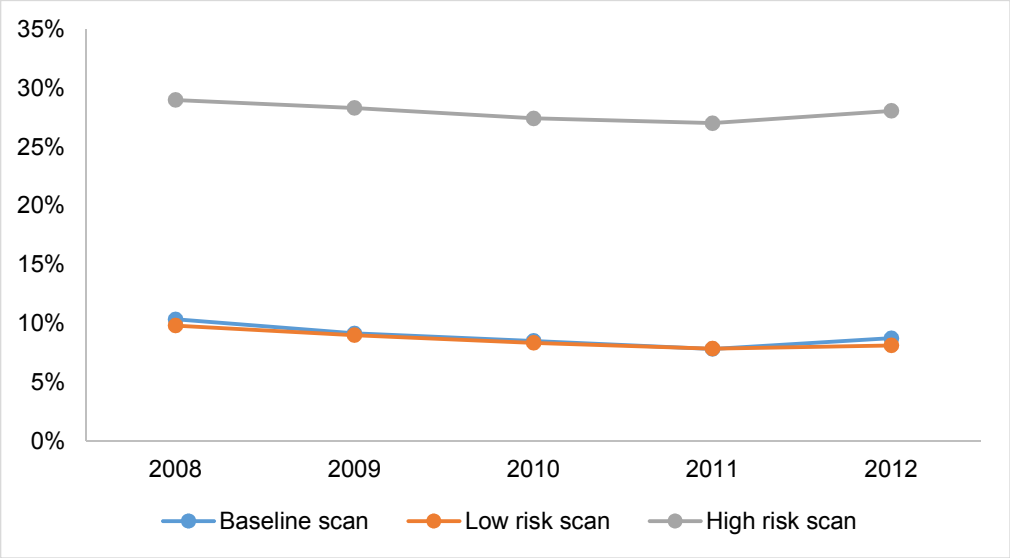
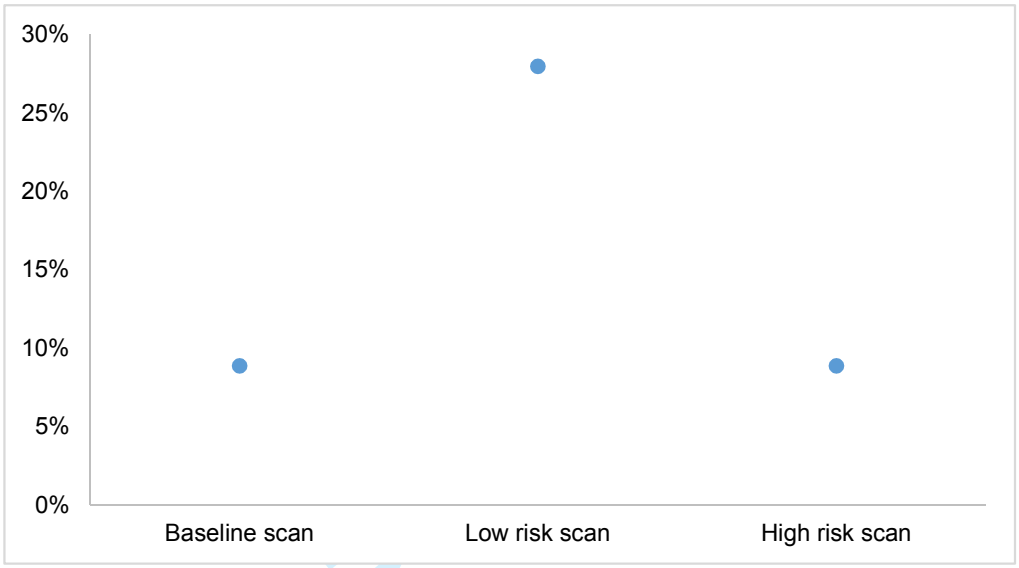
Fiscal yea	Imaging fc	Cervical ca	Repeat DEXA scans
2008/09	5%	9%	21%
2009/10	5%	9%	21%
2010/11	5%	9%	21%
2011/12	5%	8%	21%
2012/13	4%	5%	22%

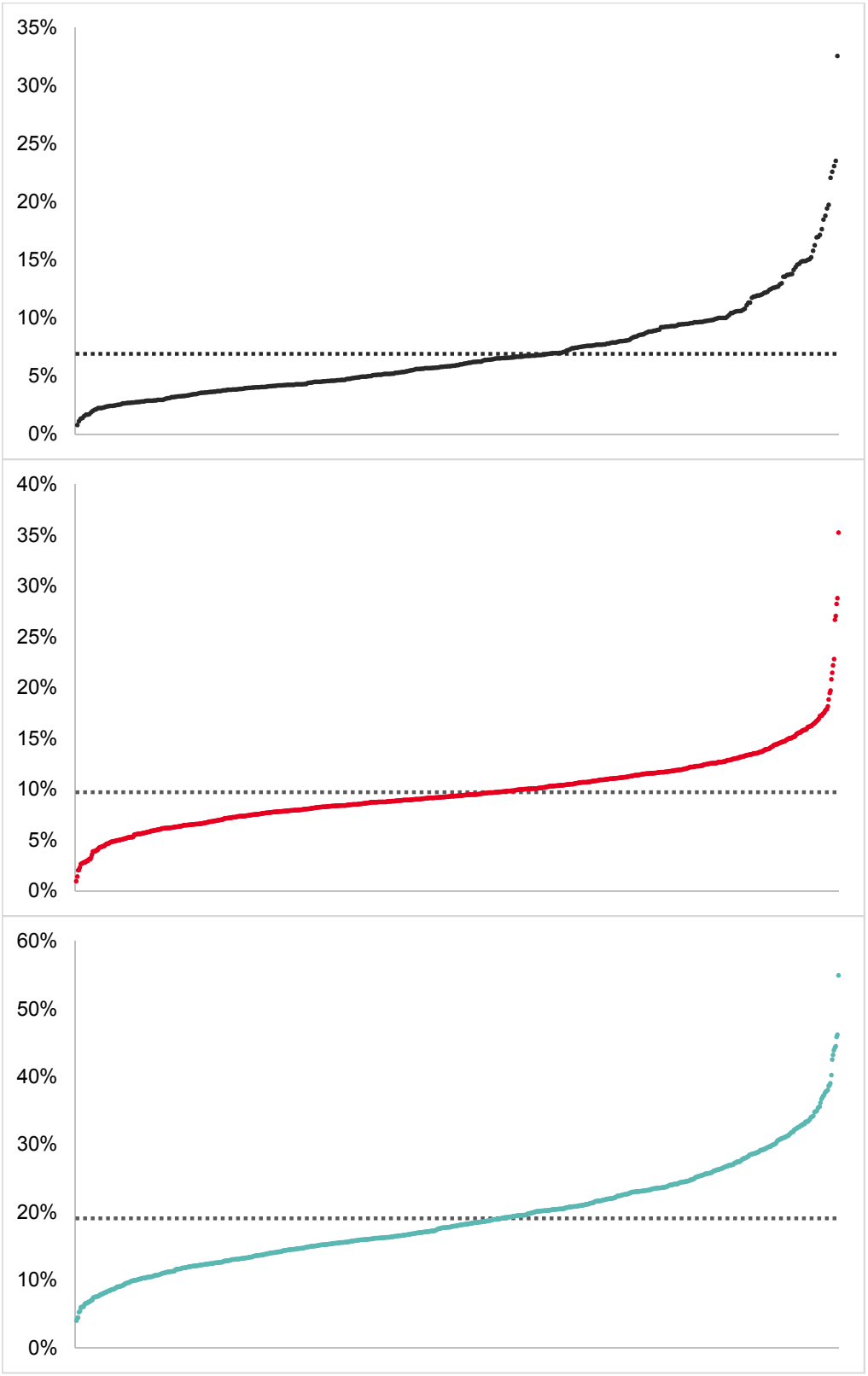


Fiscal yea	Baseline s	Low risk s	High risk scan
2008	10.4%	9.8%	29.0%
2009	9.2%	9.0%	28.3%
2010	8.5%	8.4%	27.4%
2011	7.8%	7.9%	27.0%
2012	8.7%	8.1%	28.1%



	Baseline s	Low risk s	High risk scan
Overall	8.9%	28.0%	8.9%




35%
30%
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30%
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15%
10%
5%
0%
60%
50%
40%
30%
20%
10%
0%

Imaging for low back pain	N	Average	SD	Coefficient variation
0.007785	436	0.068674	0.040178	0.585062
0.011161				
0.013183				
0.013857				
0.015584				
0.016688				
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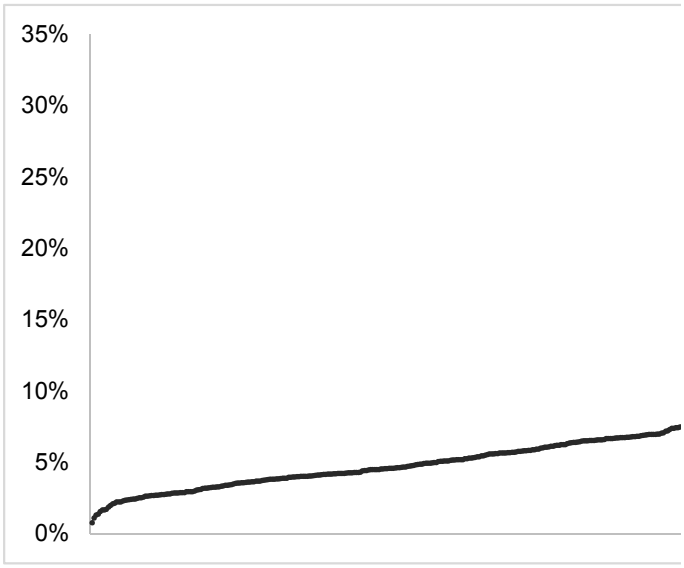

Appendix 1: Codes used for cohort definitions and outcomes

Inclusion criteria	Exclusion criteria	Outcomes
Imaging for low back pain		
OHIP claim for home or office visit to a primary care physician between April 1, 2008-March 31, 2013 with one of the following diagnostic codes as dxcode: 722, 724, 847	Invalid IKN Age <18 on visit date Red flag history up to 5 years prior to back pain visit: OHIP claims with dxcode for the following conditions: Prior diagnoses of low back pain: 722, 724, 847 Neoplasms: 140-239 Conditions of the nervous system: 320-359 Arthritis: 714, 715, 716, 730 Congenital abnormalities: 741-759 Fractures: 805, 806, 829 OHIP claims with fee code for visits to the following specialists: Neurosurgery: A043, A044, A045, A046, C042, C043, C044, C045, C046, C047, C048, C049; office visits to physician with specialty = "04" in IPDB Orthopaedic surgery: A063, A064, A065, A066, C062, C063, C064, C065, C066, C067, C068, C069; office visits to physicians with specialty = "06" in IPDB OHIP claims with fee code for a spine-related scan: Spinal x-ray: X025, X027, X028, X031, X032, X033, X034, X202, X203, X204, X205, X206, X207; CT: X415, X416, X128; MRI: X490, X492, X493, X495, X496, X498; EMG: G455, G456, G457, G458, G459, G465, G466, G467, G469; Other tests on spine fee codes: X057, X058, X080, X081, X164, X173, J006, J011, J020, J030, J038, Z454, G368, G386 OHIP claims with fee code for a spine-related operation: E533, E534, E535, E536, E548, E549, E554, E562, E565, E566, E567, E568, E570, E573, E574, E897, E901, E909, E910, E913, E914, E915, E920, E924, E926, E928, E929, F103, F105, F107, M137, N126, N182, N185, N186, N192, N194, N195, N196, N197, N248, N313, N314, N317, N318, N319, N320, N321, N323, N324, N329, N330, N331, N332, N333, N334, N335, N336, N337, N338, N339, N340, N341, R234, R251, R252, R254, R264, R270, R271, R274, R275, R296, R303, R310, R336, R346, R348, R350, R356, R357, R358, R359, R361, R362, R368, R369, R370, R371, R373, R374, R397, R419, R447, R450, R451, R452, R455, R457, R459, R461, R464, R493, R494, R634, R635, R636, S312, Z215, Z219, Z226, Z228, Z236, Z241, Z244, Z662, Z800, Z810, Z817, Z823, Z868 Hospital admission with one of the following diagnostic codes in CIHI-DAD: ICD-9 324.1, 334.8, 334.9, 335, 336, 340, 342, 344, 349, 349.81, 350-359, 720-724, 737, 738.5, 739.3, 710-742, 805, 806, 839, 847, 950-957	At least one OHIP claim with feecode for back imaging up to 3 months after index visit for low back pain: CT: X415, X416, X128 MRI: X490, X492, X493, X495, X496, X498

Inclusion criteria	Exclusion criteria	Outcomes
Cervical cancer screening		
Females aged <21 or >69 years of age between April 1, 2008-March 31, 2013	Invalid IKN Male sex Age <13; age >105 Diagnosis of invasive gynaecological cancer prior to index date: Entry in OCR with dxcode: 179, 1800, 1801, 1808, 1809, 1820, 1821, 1828, 1830, 1832, 1833, 1834, 1835, 1838, 1839 Evidence of hysterectomy prior to index date: OHIP claim with feecode: S710, S727, S757, S758, S759, S762, S763, S765, S766, S767, S810, S816, P042 Entry in CIHI-DAD or SDS with CCP code: 79.2, 80.3, 80.4, 80.5, 80.6, 80.7, 86.42 Entry in CIHI-DAD or SDS with CCI code: 1RM89x, 1RM91x, 1RN89x, 5MD60CB, 5MD60KE, 5MD60KF, 5MD60RC, 5MD60RD Entry in ICES HIV database Pregnancy	At least one OHIP claim for cervical cancer screening with Pap smear: Feecode: G365, G394, E430, E431 Lab feecode: L812, L713, L733
Repeat DEXA scans		
OHIP claim for DEXA scan between April 1, 2008-March 31, 2013 with one of the following feecodes: X145, X146, X152, X153, X142, X148, X149, X155	Invalid IKN Age <40 or age >105 on date of index scan	At least one OHIP claim for DEXA scan up to 2 years after date of index scan with feecode: X152, X153, X142, X148, X149, X155

OHIP = Ontario Health Insurance Plan; IKN = ICES Key Number; CIHI-DAD = Canadian Institute for Health Information Discharge Abstract Database; SDS = Same-day Surgery; CCP = Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures; CCI = Canadian Classification of Health Interventions; DEXA = dual energy X-ray absorptiometry

Appendix 4: Characteristics of cohort populations of interest (2012/13)

Characteristic, n (%)	Imaging for low back pain	Cervical cancer screening	Repeat DEXA scans
N*	51,929	1,483,962	394,314
Age, mean (95% CI)**	41.8 (39.9-43.6)	-	63.9 (62.6-65.4)
Age, grouped†			
<21 years	-	729,901 (49.2)	-
>69 years	-	754,061 (50.8)	-
Female	22,650 (43.6)	1,483,962 (100.0)	332,198 (84.2)
Neighbourhood income quintile			
1 (lowest)	10,537 (20.5)	299,740 (20.3)	64,455 (16.4)
2	10,511 (20.4)	295,519 (20.0)	74,268 (18.9)
3	10,452 (20.3)	289,017 (19.5)	77,134 (19.6)
4	10,560 (20.5)	297,597 (20.1)	84,886 (21.6)
5 (highest)	9,353 (18.2)	296,934 (20.1)	91,980 (23.4)
Missing	516	5,155	1,591
Rurality			
Urban	47,614 (92.3)	1,316,339 (88.7)	354,728 (90.1)
Rural	3,978 (7.7)	167,623 (11.3)	39,011 (9.9)
Missing	337	0	575
Index DEXA scan risk level			
Baseline scan	-	-	75,446 (19.1)
Low risk scan	-	-	49,570 (12.6)
High risk scan	-	-	269,298 (68.3)

*N refers to the cohort denominator for the fiscal year 2012/13; **mean age was not calculated for the cervical cancer screening population; †grouped age was only calculated for the cervical cancer screening population; DEXA = dual energy X-ray absorptiometry

Appendix 3: Regional variation in ordering of CW recommendations by Local Health Integration Network. CW = Choosing Wisely; DEXA = dual energy X-ray absorptiometry.