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Health Quality Ontario

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Hospital Performance Series

Pre-operative testing before low-risk surgeries

Technical Appendix

Ontario
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Purpose of the Technical Appendix

The purpose of this Technical Appendix is to accompany Health Quality Ontario's *Hospital Performance Series* Report. It provides users with the methodological details for the pre-operative testing before low-risk surgery indicators so they can better understand the results of these measures and use the results for quality improvement activities.

Indicator Technical Specifications

Table 1. Percentage of endoscopy procedures with pre-operative testing

GENERAL DESCRIPTION	Indicator description	The percentage of endoscopy procedures with pre-operative • Electrocardiography (ECG) • Chest radiography (X-ray)
	Relevance	Assess utilization of testing before low-risk procedures
	Importance	A study using Ontario data from recent years has found frequent use of pre-operative electrocardiography (ECG) and chest radiography (X-ray) among low-risk surgeries (31.0% and 10.8%, respectively). Significant variation across hospitals exists as well. [1] However, there is no evidence that conducting routine ECG or chest X-ray testing in asymptomatic patients undergoing elective low-risk surgeries improves outcomes. In fact, routine testing may lead to further unnecessary downstream testing, cancellation of surgery, and increases in patient anxiety and cost.[2-4]
	Dimension of Quality	Effectiveness
	Type	Process
DEFINTION & SOURCE INFORMATION	Calculation	**Denominator:** *Description:* Number of records with eligible endoscopy procedures between April 1 and March 31 of the fiscal year. *Inclusions:* • Outpatient day surgery or acute in-patient settings • Ontario patients • Aged 18 and older • Elective admission • Endoscopy procedure is identified by one of the following CCI intervention codes in the first intervention code field: o Esophagus/Stomach 2.NA.70.BA, 2.NA.71.BA, 2.NA.71.BP, 2.NA.71.BR, 2.NF.70.BA, 2.NF.71.BA, 2.NF.71.BP, 2.NF.71.BR o Large Bowel 2.NM.70.BA, 2.NM.71.BA, 2.NM.71.BR • The date of the intervention is on the date of admission • All procedures for patients who underwent more than one eligible procedure during the reporting period are included. *Exclusions:* • Records with missing institution number

		• Hospitals that have less than 50 eligible low-risk surgeries in the six-year reporting period, i.e. from April 1st 2010 to March 31st 2016. **Numerator:** *Description:* Number of records within the denominator with a pre-operative ECG or chest X-ray test within 60 days prior to the index procedure. *Inclusions:* • The test has occurred within 60 days prior to the intervention date of the endoscopy procedure • Tests are identified based on the following professional fee codes o ECG: Fee code: G313 o Chest X-ray: Fee suffix= C AND Fee codes : X090, X091 or X092 **Method:** Numerator/Denominator * 100
	Data sources	Canadian Institute for Health Information (CIHI) Discharge Abstract Database (DAD) for acute inpatient surgery data; CIHI National Ambulatory Care Reporting System (NACRS) for outpatient day surgery data; The Ontario Health Insurance Plan (OHIP) Claims History Database (i.e. OHIP physician service claims) for pre-operative test data; and The Registered Persons Database (RPDB) for patient's age calculation
	Risk adjustment, age/sex standardization	Available as crude rates
GEOGRAPHY & TIMING	Available Data Periods	Fiscal year data from 2010/11 to 2015/16
	Reporting Level	Province, hospital, and hospital corporation for multi-site hospitals
ADDITIONAL INFORMATION	Limitations	• The currently available data from administrative databases do not have the information to determine the appropriateness and the reason of the pre-operative test. Some tests might be valuable, but these cannot be differentiated from unnecessary ones. However, patients who have undergone these elective low-risk surgery generally have a low number of comorbidities. (1) With the selection of the low-risk procedures and the low-risk patient group, it is unlikely that the majority of tests were ordered to evaluate new clinical symptoms or abnormal physical findings. • All tests conducted within 60 days before the index low-risk surgery are included in the analysis. It is possible that some tests were ordered for indications other than pre-operative testing. However, this period is generally accepted by hospitals for preoperative evaluation and has been used in previous studies. (1, 5, 6) • No validated comprehensive "low-risk" surgical procedure list exists. However, the selection of low-risk surgery in the analysis is in line with the broad definition of "low-risk procedures" outlined in existing research (1) and guidelines on perioperative cardiac evaluation .(5,7) The majority of the procedures are minimally invasive and are performed in outpatient settings.

	Comments	N/A
	Alignment	Choosing Wisely Canada recommendations, which suggest routine pre-operative testing should be avoided for asymptomatic patients undergoing low-risk surgery. [8–10]

Table 2. Percentage of ophthalmologic surgeries with pre-operative testing

GENERAL DESCRIPTION	Indicator description	The percentage of ophthalmologic surgeries with pre-operative • Electrocardiography (ECG) • Chest radiography (X-ray)
	Relevance	Assess utilization of testing before low-risk procedures
	Importance	A study using Ontario data from recent years has found frequent use of pre-operative electrocardiography (ECG) and chest radiography (X-ray) among low-risk surgeries (31.0% and 10.8%, respectively). Significant variation across hospitals exists as well. [1] However, there is no evidence that conducting routine ECG or chest X-ray testing in asymptomatic patients undergoing elective low-risk surgeries improves outcomes. In fact, routine testing may lead to further unnecessary downstream testing, cancellation of surgery, and increases in patient anxiety and cost.[2-4]
	Dimension of Quality	Effectiveness
	Type	Process
DEFINTION & SOURCE INFORMATION	Calculation	**Denominator:** *Description:* Number of records with eligible ophthalmologic surgery between April 1 and March 31 of the fiscal year. *Inclusions:* • Outpatient day surgery or acute in-patient settings • Ontario patients • Aged 18 and older • Elective admission • Ophthalmologic surgery is identified as one of the following CCI intervention codes in the first intervention code field: 1.CC, 1.CD, 1.CE, 1.CF, 1.CG, 1.CH, 1.CJ, 1.CL, 1.CM, 1.CN, 1.CP, 1.CQ, 1.CR, 1.CS, 1.CT, 1.CU, 1.CV, 1.CX, 1.CZ • The date of the intervention is on the date of admission • All procedures for patients who underwent more than one eligible procedure during the reporting period are included. *Exclusions:* • Records with missing institution number • Hospitals that have less than 50 eligible low-risk surgeries in the six-year reporting period, i.e. from April 1st 2010 to March 31st 2016. **Numerator:** *Description:* Number of records within the denominator with a pre-operative ECG or chest X-ray test within 60 days prior to the index procedure.

		Inclusions: • The test has occurred within 60 days prior to the intervention date of the endoscopy procedure • Tests are identified based on the following professional fee codes o ECG: Fee code: G313 o Chest X-ray: Fee suffix= C AND Fee codes : X090, X091 or X092 **Method:** Numerator/Denominator * 100
	Data sources	Canadian Institute for Health Information (CIHI) Discharge Abstract Database (DAD) for acute inpatient surgery data; CIHI National Ambulatory Care Reporting System (NACRS) for outpatient day surgery data; The Ontario Health Insurance Plan (OHIP) Claims History Database (i.e. OHIP physician service claims) for pre-operative test data; and The Registered Persons Database (RPDB) for patient's age calculation
	Risk adjustment, age/sex standardization	Available as crude rates
GEOGRAPHY & TIMING	Available Data Periods	Fiscal year data from 2010/11 to 2015/16
	Reporting Level	Province, hospital, and hospital corporation for multi-site hospitals
ADDITIONAL INFORMATION	Limitations	• The currently available data from administrative databases do not have the information to determine the appropriateness and the reason of the pre-operative test. Some tests might be valuable, but these cannot be differentiated from unnecessary ones. However, patients who have undergone these elective low-risk surgery generally have a low number of comorbidities. (1) With the selection of the low-risk procedures and the low-risk patient group, it is unlikely that the majority of tests were ordered to evaluate new clinical symptoms or abnormal physical findings. • All tests conducted within 60 days before the index low-risk surgery are included in the analysis. It is possible that some tests were ordered for indications other than pre-operative testing. However, this period is generally accepted by hospitals for preoperative evaluation and has been used in previous studies. (1, 5, 6) • No validated comprehensive "low-risk" surgical procedure list exists. However, the selection of low-risk surgery in the analysis is in line with the broad definition of "low-risk procedures" outlined in existing research (1) and guidelines on perioperative cardiac evaluation .(5,7) The majority of the procedures are minimally invasive and are performed in outpatient settings.
	Comments	N/A
	Alignment	Choosing Wisely Canada recommendations, which suggest routine pre-operative testing should be avoided for asymptomatic patients undergoing low-risk surgery. (8–10)

Table 3. Percentage of other low-risk surgeries with pre-operative testing

GENERAL DESCRIPTION	Indicator description	The percentage of other low-risk surgeries with pre-operative • Electrocardiography (ECG) • Chest radiography (X-ray)
	Relevance	Assess utilization of testing before low-risk procedures
	Importance	A study using Ontario data from recent years has found frequent use of pre-operative electrocardiography (ECG) and chest radiography (X-ray) among low-risk surgeries (31.0% and 10.8%, respectively). Significant variation across hospitals exists as well. [1] However, there is no evidence that conducting routine ECG or chest X-ray testing in asymptomatic patients undergoing elective low-risk surgeries improves outcomes. In fact, routine testing may lead to further unnecessary downstream testing, cancellation of surgery, and increases in patient anxiety and cost.[2-4]
	Dimension of Quality	Effectiveness
	Type	Process
DEFINTION & SOURCE INFORMATION	Calculation	**Denominator:** *Description:* Number of records with eligible low-risk surgery between April 1 and March 31 of the fiscal year. *Inclusions:* • Outpatient day surgery or acute in-patient settings • Ontario patients • Aged 18 and older • Elective admission • Other low-risk procedure is identified as one of the following CCI intervention codes in the first intervention code field: ○ Orthopedic ▪ Shoulder (endoscopic drainage/extraction/procurement/release) 1.TA.52.DA, 1.TA.57.DA, 1.TA.58.DA, 1.TA.72.DA ▪ Clavicle (endoscopic drainage/distal resection) 1.TB.52.GB, 1.TB.52.GD, 1.TB.87.DA ▪ Rotator Cuff (endoscopic extraction/release/repair) 1.TC.57.DA, 1.TC.59.DA 1.TC.72.DA, 1.TC.80.DA, 1.TC.80.GC ▪ Arm/Forearm (Nerve decompression/repair/excision) 1.BM.72, 1.BM.80, 1.BM.87, 1.BN.72 ▪ Wrist/Hand 1.UB.52, 1.UB.53, 1.UB.55, 1.UB.57, 1.UB.58, 1.UB.72, 1.UB.73, 1.UB.74, 1.UB.75, 1.UB.80, 1.UB.87, 1.UC.53, 1.UC.55, 1.UC.57, 1.UC.72, 1.UC.73, 1.UC.74, 1.UC.75, 1.UC.79, 1.UC.80, 1.UC.82, 1.UC.87, 1.UC.89, 1.UF.55, 1.UF.73, 1.UF.74, 1.UF.80, 1.UF.87, 1.UG.52, 1.UG.53, 1.UG.55, 1.UG.57, 1.UG.72, 1.UG.73, 1.UG.74, 1.UG.75, 1.UG.80, 1.UG.87, 1.UJ.71, 1.UJ.73, 1.UJ.74, 1.UJ.75, 1.UJ.82, 1.UJ.87, 1.UJ.93, 1.UK.53, 1.UK.55, 1.UK.72, 1.UK.73, 1.UK.74, 1.UK.75, 1.UK.80, 1.UK.87, 1.UK.93, 1.US.58, 1.US.72, 1.US.80, 1.UT.53, 1.UT.55, 1.UT.72, 1.UT.80, 1.UT.84, 1.UU.53, 1.UU.55, 1.UU.72, 1.UU.80, 1.UU.84, 1.UV.72, 1.UV.80, 1.UY.52, 1.UY.55, 1.UY.56, 1.UY.57, 1.UY.59, 1.UY.72, 1.UY.80, 1.UY.87 ▪ Nerve 1.BP.72, 1.BP.80, 1.BP.87, 1.BQ.72, 1.BQ.80, 1.BQ.87

		▪ Hip Arthroscopy (extraction/procurement/release/partial excision) 1.VA.57.DA, 1.VA.58.DA, 1.VA.72.DA, 1.VA.87.GB ▪ Knee ♦ Arthroscopy (drainage/extraction/procurement/release/partial excision) 1.VG.52.DA, 1.VG.57.DA, 1.VG.58.DA, 1.VG.72.DA, 1.VG.87.GB ♦ Meniscus (endoscopic repair/partial or total excision) 1.VK.80.DA, 1.VK.87.DA, 1.VK.89.DA ♦ Ligament (ACL)(endoscopic repair/partial excision) 1.VL.80.DA, 1.VL.80.FY, 1.VL.87.DA, 1.VL.87.GB ▪ Ankle/Foot Arthroscopy (extraction/procurement/release) 1.WA.57.DA, 1.WA.58.DA, 1.WA.72.DA ▪ Microdiscectomy 1.SE.87 o Urologic ▪ Bladder neck suspension 1.PL.74 ▪ Transurethral partial excision 1.PL.87 ▪ Bladder Drainage 1.PM.52, 1.PM.54 ▪ Bladder 1.PM.59 ▪ Prostate resection (TURP) 1.QT.87 ▪ Urethra 1.PQ.26, 1.PQ.35, 1.PQ.50, 1.PQ.52, 1.PQ.53, 1.PQ.54, 1.PQ.55, 1.PQ.57, 1.PQ.58, 1.PQ.59, 1.PQ.72, 1.PQ.77, 1.PQ.78, 1.PQ.80 o Gynecologic ▪ Hysteroscopy (endometrial ablation) 1.RM.59.BA ▪ Laparoscopy (oophorectomy, cystectomy) 1.RB.52.BA, 1.RB.52.DA, 1.RB.56.DA, 1.RB.74.DA, 1.RB.87.DA, 1.RB.89.DA, 1.RD.52.BA, 1.RD.89.DA o General ▪ Hernia repair (repair muscles of chest and abdomen) 1.SY.80 ▪ Inguinal lymph nodes 1.MJ.52, 1.MJ.87, 1.MJ.89 ▪ Peripheral lymph nodes 1.MK.52, 1.MK.87, 1.MK.89 ▪ Breast (removal of device/fixation/size reduction/size increase/repair/partial or total excision) 1.YM.55, 1.YM.74, 1.YM.78, 1.YM.79, 1.YM.80, 1.YM.87, 1.YM.89

		▪ Laparoscopic Cholecystectomy 1.OD.57 • The date of the intervention is on the date of admission • All procedures for patients who underwent more than one eligible procedure during the reporting period are included. *Exclusions:* • Records with missing institution number • Hospitals that have less than 50 eligible low-risk surgeries in the six-year reporting period, i.e. from April 1st 2010 to March 31st 2016. **Numerator:** *Description:* Number of records within the denominator with a pre-operative ECG or chest X-ray test within 60 days prior to the index procedure. *Inclusions:* • The test has occurred within 60 days prior to the intervention date of the endoscopy procedure • Tests are identified based on the following professional fee codes o ECG: Fee code: G313 o Chest X-ray: Fee suffix= C AND Fee codes : X090, X091 or X092 **Method:** Numerator/Denominator * 100
	Data sources	Canadian Institute for Health Information (CIHI) Discharge Abstract Database (DAD) for acute inpatient surgery data; CIHI National Ambulatory Care Reporting System (NACRS) for outpatient day surgery data; The Ontario Health Insurance Plan (OHIP) Claims History Database (i.e. OHIP physician service claims) for pre-operative test data; and The Registered Persons Database (RPDB) for patient's age calculation
	Risk adjustment, age/sex standardization	Available as crude rates
GEOGRAPHY & TIMING	Available Data Periods	Fiscal year data from 2010/11 to 2015/16
	Reporting Level	Province, hospital, and hospital corporation for multi-site hospitals
ADDITIONAL INFORMATION	Limitations	• The currently available data from administrative databases do not have the information to determine the appropriateness and the reason of the pre-operative test. Some tests might be valuable, but these cannot be differentiated from unnecessary ones. However, patients who have undergone these elective low-risk surgery generally have a low number of comorbidities. (1) With the selection of the low-risk procedures and the low-risk patient group,

		it is unlikely that the majority of tests were ordered to evaluate new clinical symptoms or abnormal physical findings. • All tests conducted within 60 days before the index low-risk surgery are included in the analysis. It is possible that some tests were ordered for indications other than pre-operative testing. However, this period is generally accepted by hospitals for preoperative evaluation and has been used in previous studies. [1, 5, 6] • No validated comprehensive "low-risk" surgical procedure list exists. However, the selection of low-risk surgery in the analysis is in line with the broad definition of "low-risk procedures" outlined in existing research [1] and guidelines on perioperative cardiac evaluation .[5,7] The majority of the procedures are minimally invasive and are performed in outpatient settings.
	Comments	N/A
	Alignment	Choosing Wisely Canada recommendations, which suggest routine pre-operative testing should be avoided for asymptomatic patients undergoing low-risk surgery. [8–10]

Important Data Interpretation Notes

Data suppression due to privacy: to ensure privacy, when numerators and/or denominators are between 1 and 5, all values, including numerator, denominator and rate are suppressed and denoted by the symbol "†". Please note that in order to avoid back calculation, suppressed hospital site level data are not included in the hospital corporation level reporting.

No procedures during reporting period: all values, including numerator, denominator and rate are denoted by the symbol "§" if no selected low-risk surgical procedures were performed within the reporting period.

Flag for unstable rates: indicator rates are considered as unstable and are flagged with an asterisk **"*"** if the denominator is between 6 and 29. In this case, the data should be interpreted with caution.

Data used for the institutional variation graph/analysis: The most recent fiscal year, i.e., FY2015/16 data are used in the institutional variation bar graphs and corresponding range analysis. Please note that hospitals with suppressed data or without any selected low-risk procedures are not included. Hospitals with flagged unstable rates are included.

Data distribution analysis in the institutional variation section: In order to help hospitals better understand their performance compared to others, the following distribution data are provided in a table under the institutional variation graph: minimum, maximum, and quartiles (i.e., the 25th percentile, median, and the 75th percentile). These statistics are defined as follows:

- **Minimum and maximum**: Upon ordering a set of numbers from smallest to largest, the smallest number is the *minimum* and the largest number is the *maximum*.

- **Quartiles**: The quartiles of a ranked set of numbers are the three points that divide the data set into four equal groups, each group comprising a quarter of the data. It includes the 25th percentile, median and the 75th percentile. The *25th percentile*, i.e., the first quartile, is defined as the middle number between the minimum and the median. The *median* is the second quartile, and is the middle number in the ranked set. The *75th percentile* is the middle value between the median and the maximum.

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