Integrating Pathology Data: Enhancing Patient Care and Quality Improvement

Mary Edgerton, MD, PhD, FCAP
Veronica Klepeis, MD, PhD, FCAP
Aaron Pollett, MD, MSc, FRCPC

OCTOBER 18 | 1–2 PM PT

COLLEGE of AMERICAN PATHOLOGISTS
Laboratory Quality Solutions

CAP24 | LAS VEGAS
#PATHDATA

Mass General Brigham

Integrating Pathology Data: Enhancing Patient Care and Quality Improvement

Veronica E. Klepeis, MD, PhD, FCAP
Massachusetts General Hospital, Boston, MA
Department of Pathology

October 18, 2024

Disclosures

Nothing to disclose.

CAP Pathology Electronic Reporting (PERT) Committee

Responsibilities and Activities

- Oversees, develops and maintains the CAP electronic Cancer Protocols (eCPs)
  - Electronic version of CAP Cancer Protocols from CAP Cancer Committee
- Performs quality review for eCP releases (i.e. HTML protocol format, metadata, and overall modeling) to help reduce risk of error
- Provides oversight for Vendor Implementation Collaboration (VIC) program
  - Efforts to support and improve vendor implementation of CAP eCPs
- Facilitates communication among pathologist end-user, vendors, public health staff, Cancer committee
  - Educates and elicits feedback, advises on issues of user implementation
- Participates in other CAP ventures into synoptic reporting
  - Work with other CAP committees (Autopsy, Cytopathology, etc.) and external organizations (AAPA)
- Supported and led by CAP Cancer Protocols and Data Standards Staff (CPDS)
  - Close interaction with marketing team
- Reports to the Council on Informatics and Pathology Innovation (CIPI)

Current Committee Members

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Jane Jarshaw, MD, MPH
Qinyuan Li, MD

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CPDS

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Sabrina Krejci, Operations Manager
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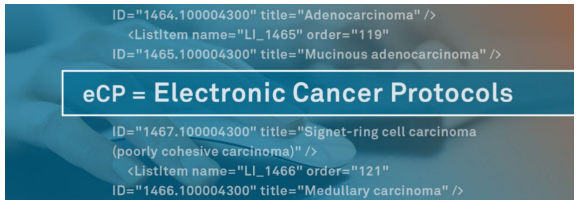
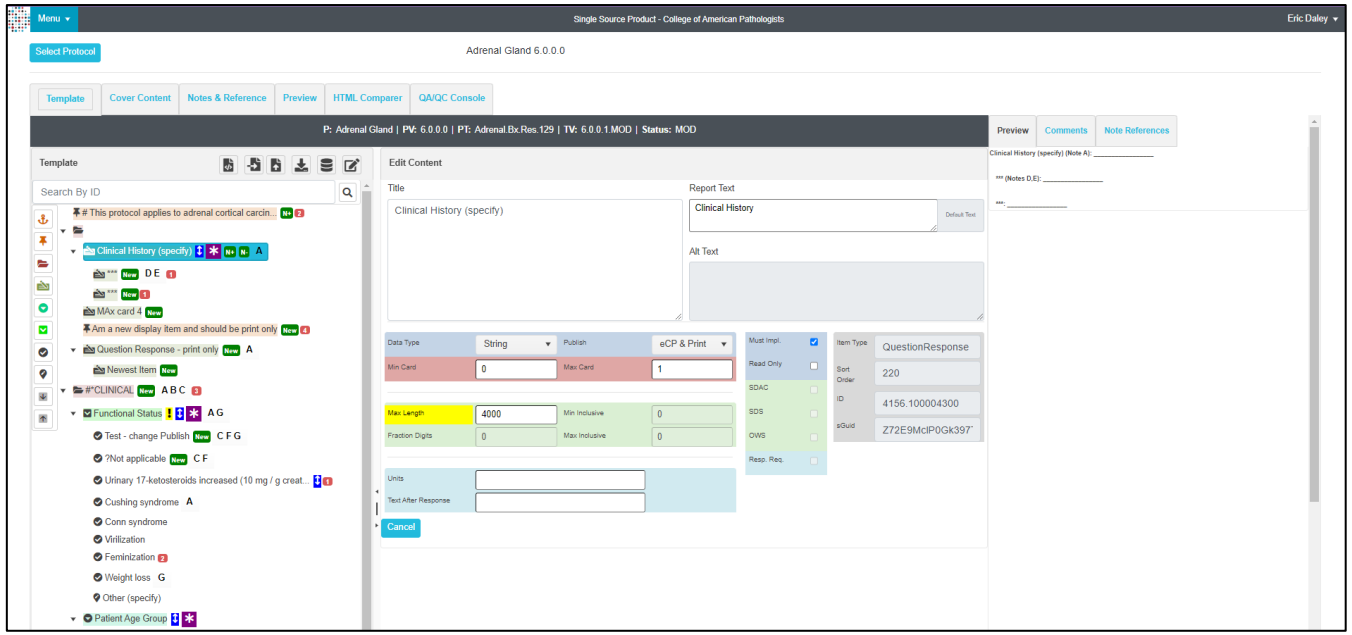
John Bodner, PhD, Clinical Content Manager
Anna Patel, Molecular Content Manager
Jeffery Karp, Technical Product Manager
Kim Durham, Vendor Engagement Specialist
Fred Marsh, Health Information Technology Implementation Engineer

CAP Electronic Cancer Protocols



eCP

- Produced under PERT committee guidance and derived from content created by the CAP Cancer committee
  - Collaborations with AJCC, CDC, WHO, CCO, NAACCR
- Enables pathologists to use CAP cancer protocols *directly* within their AP LIS
- *Standardizes* collection and reporting of cancer data
- Reports are completed with all *required data elements*
- Improves and supports information exchange and data *interoperability*
  - Unique "*ckey*" ID for each data element
  - *SNOMED* mapping
- eCPs provided to vendors using XML format using the *SDC schema definition*
  - Metadata and Rules



Cancer Synoptic Reporting at MGH
Data Capture and Storage

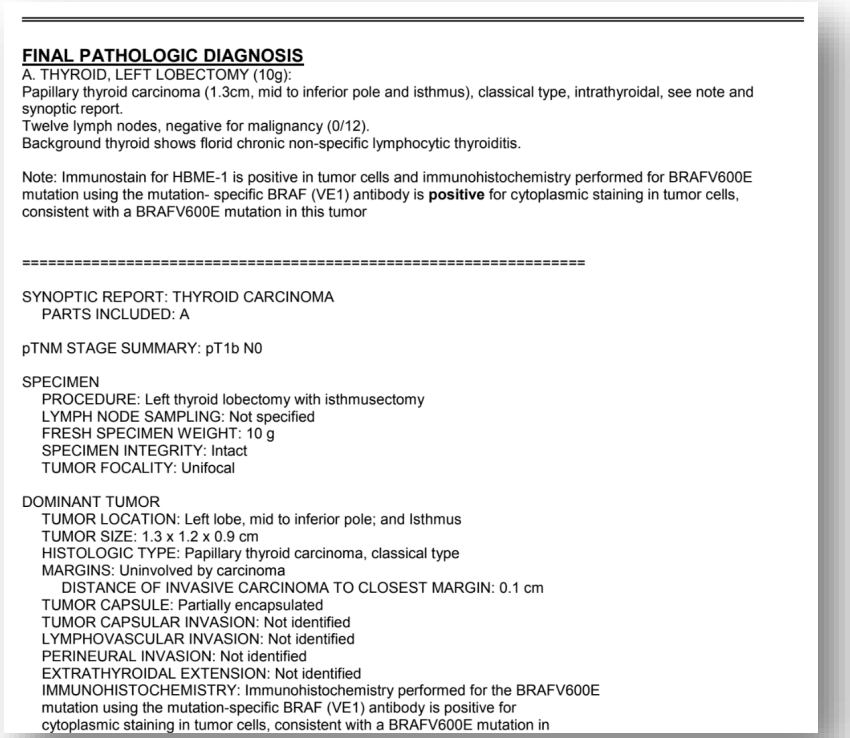
Anatomic Pathology Laboratory Information System (AP LIS)

Clinisys (Sunquest) CoPath Plus

- Case accessioning
- Laboratory workflow and asset tracking
- Pathologist enters free text portion of interpretation into final diagnosis field

mTuitive xPert

- 3rd party vendor synoptic reporting software interfaced with CoPath
- Launched from within a case in CoPath
- Pathologist fills out synoptic report with structured data elements
- Synoptic report is transferred back to the report in CoPath as a locked block of free text
- Synoptic structured data elements stored within database tables in CoPath



FINAL PATHOLOGIC DIAGNOSIS
A. THYROID, LEFT LOBECTOMY (10g):
Papillary thyroid carcinoma (1.3cm, mid to inferior pole and isthmus), classical type, intrathyroidal, see note and synoptic report.
Twelve lymph nodes, negative for malignancy (0/12).
Background thyroid shows florid chronic non-specific lymphocytic thyroiditis.

Note: Immunostain for HBME-1 is positive in tumor cells and immunohistochemistry performed for BRAFV600E mutation using the mutation- specific BRAF (VE1) antibody is **positive** for cytoplasmic staining in tumor cells, consistent with a BRAFV600E mutation in this tumor

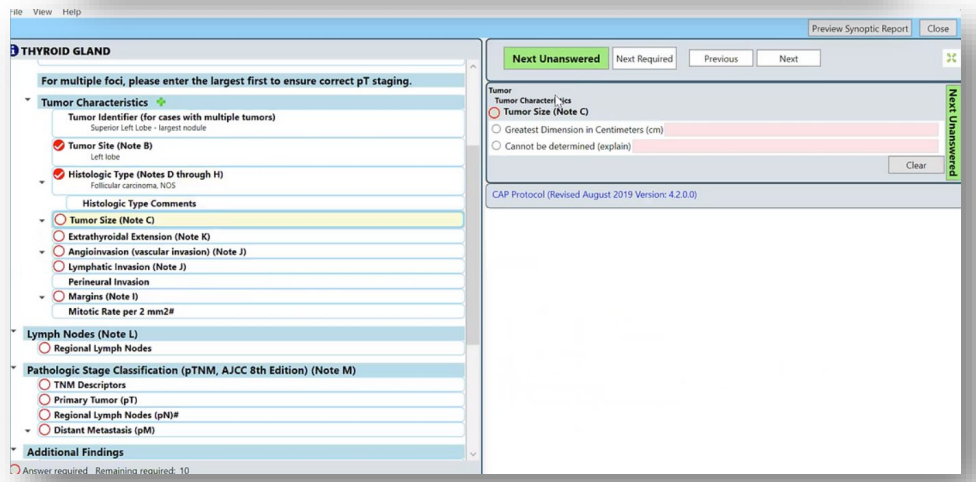
==========

SYNOPTIC REPORT: THYROID CARCINOMA
PARTS INCLUDED: A

pTNM STAGE SUMMARY: pT1b N0

SPECIMEN
PROCEDURE: Left thyroid lobectomy with isthmusectomy
LYMPH NODE SAMPLING: Not specified
FRESH SPECIMEN WEIGHT: 10 g
SPECIMEN INTEGRITY: Intact
TUMOR FOCALITY: Unifocal

DOMINANT TUMOR
TUMOR LOCATION: Left lobe, mid to inferior pole; and Isthmus
TUMOR SIZE: 1.3 x 1.2 x 0.9 cm
HISTOLOGIC TYPE: Papillary thyroid carcinoma, classical type
MARGINS: Uninvolved by carcinoma
DISTANCE OF INVASIVE CARCINOMA TO CLOSEST MARGIN: 0.1 cm
TUMOR CAPSULE: Partially encapsulated
TUMOR CAPSULAR INVASION: Not identified
LYMPHOVASCULAR INVASION: Not identified
PERINEURAL INVASION: Not identified
EXTRATHYROIDAL EXTENSION: Not identified
IMMUNOHISTOCHEMISTRY: Immunohistochemistry performed for the BRAFV600E mutation using the mutation-specific BRAF (VE1) antibody is positive for cytoplasmic staining in tumor cells, consistent with a BRAFV600E mutation in



Cancer Synoptic Reporting at MGH
Data Retrieval

CoPath Shadow Database

- Copy of production CoPath database containing day-old data (100s of tables)
- Query databases using Superset
  - open-source data exploration and visualization platform that allows users to write SQL queries against connected databases and produce customized data output
- Query produces a table → exported as a csv file
- Csv file imported into excel
- Excel Basic functionality used to transform rows into columns

```
men.specnum_formatted AS specimen_number, c_specimen.accession_date, r_encount
cation.name AS location, c_specimen.specpriority_id, r_pat_demograph.patdemog_id
imen.specnum_year, c_specimen.specnum_num, c_specimen.personal_consult,
demograph.lastname, r_pat_demograph.firstname, r_pat_demograph.middlename, c_spe
imen.client_id,
_eventsummary.accessionedbywho_id, c_d_person.id, c_d_person.lookup_display AS a
rson.initials,
imen.billing_comment, c_specimen.billtype_id, c_d_billingtype.name AS billing_ty
opath.copath.dbo.c_specimen, copath.copath.dbo.r_encounter, copath.copath.dbo.c_
.copath.dbo.r_pat_demograph, copath.copath.dbo.c_d_specpriority,
.copath.dbo.c_d_specclass, copath.copath.dbo.c_spec_eventsummary, copath.copath.
.copath.dbo.c_d_billingtype
c_specimen.accession_date BETWEEN '2022-05-15' AND '2022-05-31'
specimen.encounter_id = r_encounter.encounter_id
specimen.patloc_atacc_id = c_d_location.id
specimen.patdemog_id = r_pat_demograph.patdemog_id
specimen.specpriority_id = c_d_specpriority.id
d_specclass.id = c_specimen.specclass_id
specimen.specimen_id = c_spec_eventsummary.specimen_id
spec_eventsummary.accessionedbywho_id = c_d_person.id
imen.billtype_id = c_d_billingtype.id
```

Requirements

- Knowledge of how relational databases are structured and organized and where to find content of interest
- Understanding of synoptic report content and format of questions and answer choices

Impact of COVID pandemic on Breslow Thickness at time of Melanoma Diagnosis

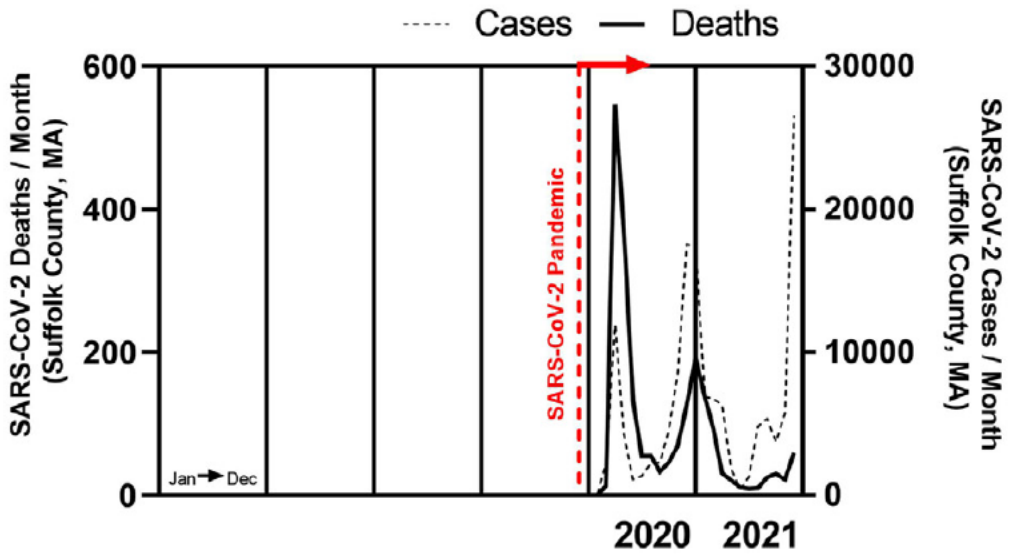
Melanoma Breslow Thickness During COVID
Study Overview

Goal

Evaluate longitudinal effects of care interruptions during the COVID-19 pandemic on melanoma diagnoses

Study Type: Retrospective cohort analysis of patients evaluated in a tertiary care center

Timeframe of greatest preventive care interruption: March 2020 to May 2020 based on population level Sars-COV-2 case count and mortality statistics for Suffolk county, Massachusetts



Melanoma Breslow Thickness During COVID
Data Retrieval and Analysis

Method: Extracted unbiased structured data from standardized synoptic surgical pathology reports, including patient demographic information and Breslow thickness = most important prognostic factor for primary cutaneous melanoma

Data Set: 3160 melanoma cases (Jan 2016-Jan 2022)
1113 internal MGH clinic cases
2407 consultation cases reviewed

Statistical Analysis: GraphPad Prism 9.3.1
Data binned at 1-month resolution
Breslow thickness was compared using nonparametric Kruskal-Wallis analysis of variance

Breslow Thickness Synoptic Question

Maximum Tumor Thickness
___ Specify in millimeters (mm): _____ mm
___ At least ___ mm (specify in millimeters): _____ mm
___ Other (specify): _____
___ Cannot be determined (explain): _____

Superset query of mTuitive and CoPath database tables → csv export

	gender	age_at_pro	Templa	question	answer_(mm)
973	F	42	1	Maximum Tumor Thickness (in mm)	0.37
984	F	32	1	Maximum Tumor Thickness (in mm)	0.42
974	F	41	1	Maximum Tumor Thickness (in mm)	1.33
988	M	27	1	Maximum Tumor Thickness (in mm)	0.42
.965	F	50	1	Maximum Tumor Thickness (other)	1.65
951	M	64	1	Maximum Tumor Thickness (other)	1.1
942	M	73	1	Maximum Tumor Thickness (in mm)	0.81
950	F	65	1	Maximum Tumor Thickness (other)	approximately 1.7 mm
.947	M	68	1	Maximum Tumor Thickness (in mm)	0.51
940	M	75	1	Maximum Tumor Thickness (in mm)	4.5
.932	M	83	1	Maximum Tumor Thickness (other)	0.74
940	F	75	1	Maximum Tumor Thickness (other)	0.75
953	M	62	1	Maximum Tumor Thickness (in mm)	0.21
977	F	38	1	Maximum Tumor Thickness (in mm)	0.53
957	M	58	1	Maximum Tumor Thickness (other)	approximately 0.4 mm (see comn
951	F	64	1	Maximum Tumor Thickness (in mm)	0.28
953	F	62	1	Maximum Tumor Thickness (in mm)	0.92
985	F	30	1	Maximum Tumor Thickness (in mm)	1.2
955	F	60	1	Maximum Tumor Thickness (in mm)	0.38
972	F	43	1	Maximum Tumor Thickness (other)	0.2 mm (measured on S100/D240
.949	M	66	1	Maximum Tumor Thickness (in mm)	0.28
951	M	64	1	Maximum Tumor Thickness (in mm)	1.7
.957	F	58	1	Maximum Tumor Thickness (in mm)	1.35

Melanoma Breslow Thickness During COVID
Results

NUMBER OF MONTHLY MELANOMA DIAGNOSES RENDERED BY MGH DERMATOPATHOLOGY BETWEEN 2016 AND 2021

Monthly melanoma diagnoses fell sharply between March and May 2020 (overall mean of 44 to low of 17 (corresponds with country wide SARS-Cov2-2 mortality

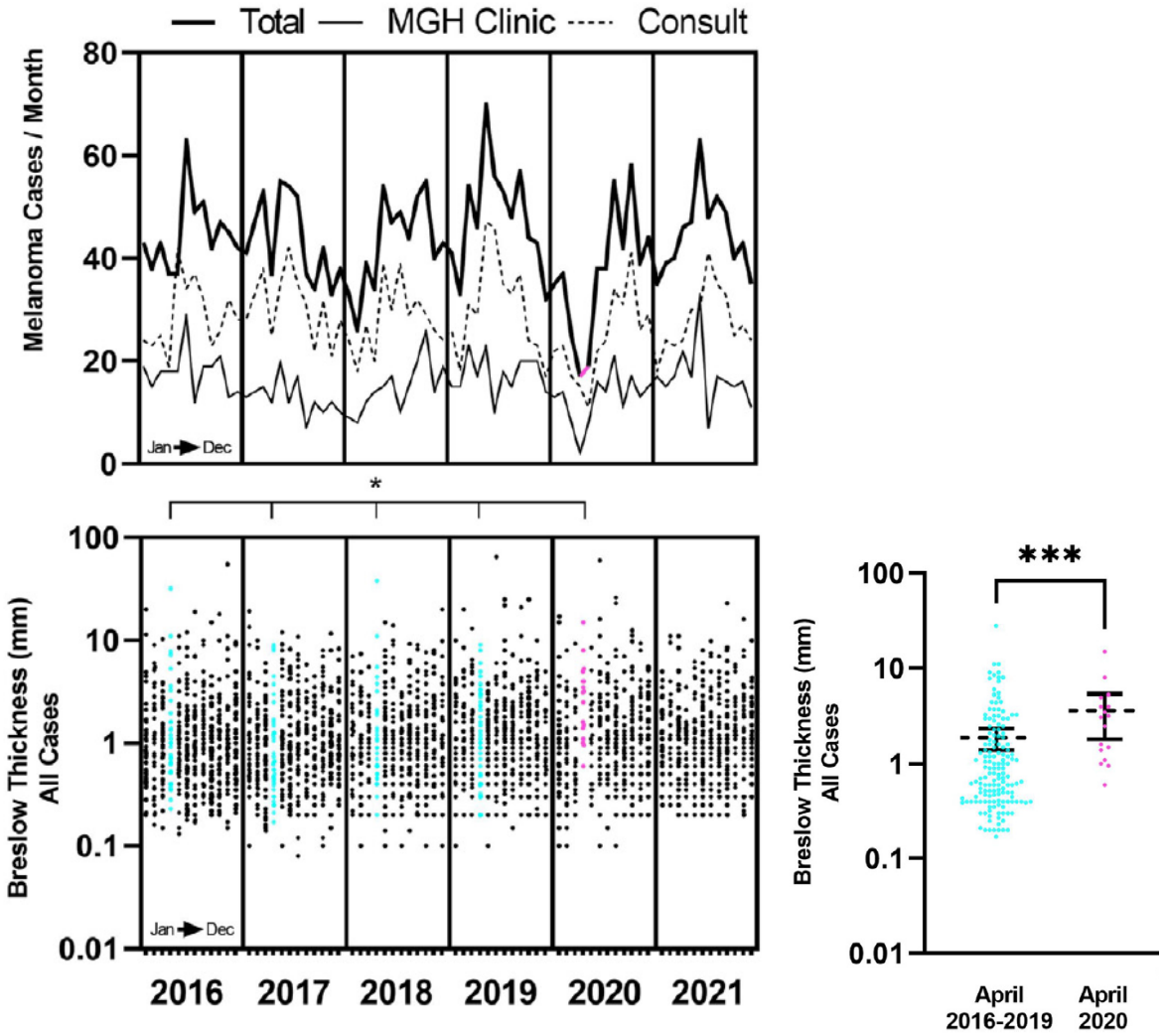
CASE RESOLUTION REPRESENTATION OF BRESLOW THICKNESS

Significant increase in Breslow thickness of melanomas diagnosed in April 2020 when compared to the months of April in prior years as well as compared to aggregate pre-pandemic April data

Driven by loss of thin melanomas < 1mm

Suggests patients presented with more clinically advanced lesions

Long term effects of transiently delayed evaluation may not become apparent for several years



Reporting ER positivity Rates in Invasive Breast Carcinoma

Reporting ER Positivity Rates in Invasive Breast Carcinoma
Overview and Data Collection

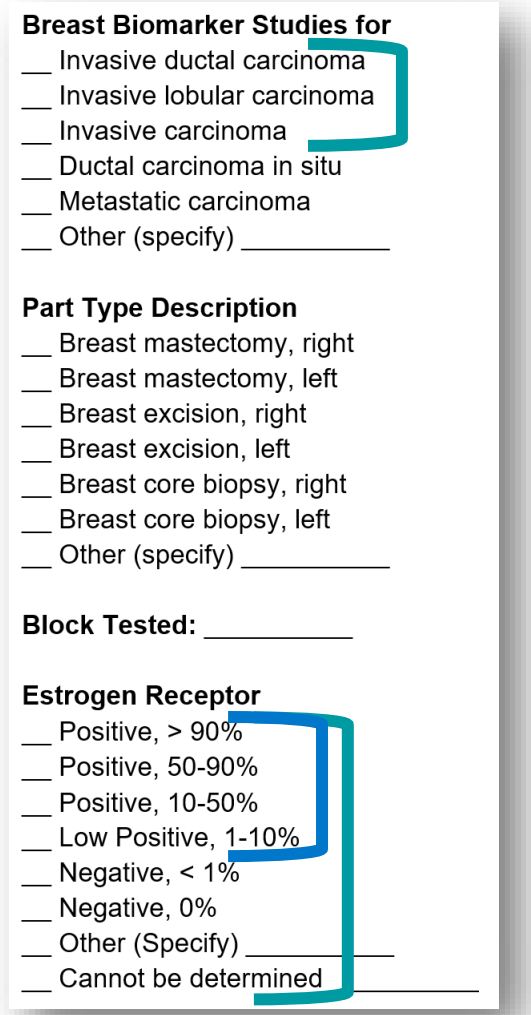
Help ensure the accuracy and quality of hormone receptor testing

Help maintain high standards in diagnostic testing, which is crucial for determining the appropriate treatment for breast cancer patients

Monitor and improve the consistency and reliability of these tests across different laboratories

ER positivity rate for all primary invasive breast cancers over the past 12 months at MGH

- **Total # of cases (invasive ductal carcinoma, invasive lobular carcinoma, invasive carcinoma) for which ER was performed**
- **Number of those cases with positive ER results (positive or low positive)**



Reporting ER Positivity Rates in Invasive Breast Carcinoma

Data Retrieval and Analysis

SQL query Shadow database using Superset

```
SELECT tblSectionData.ReportName, tblSecti
tblSectionData.TemplateInstance, tblSectio
FROM copath.copath.dbo.tblSectionData, cop
WHERE tblSectionData.ReportName LIKE 'mgh%
AND tblSectionData.SectionID = tblSection.
AND c_specimen.accession_date > '05-01-202
```

A	B	C	D	E	F
ReportName	**ReportVersion**	**case_**	**TemplateIn**	**synoptic_element**	**SectionValue**
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Number of Blocks to Report	1
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	'- Wolff AC, et al. 2018	Human Epidermal Growth Factor Receptor 2 Testing in Breast Cancer: American Society of Clinical Oncology/College of Americ
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	'- Wolff AC, et al. 2013	ASCO/CAP HER2 Testing in Breast Cancer Guideline Update. DOI: 10.5858/ARPA.2013-0953-SA
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	'- Allison KH, et al. 2020	Estrogen and Progesterone Receptor Testing in Breast Cancer: American Society of Clinical Oncology/College of American Path
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	'- Hammond MEH, et al. 2009	ASCO/CAP Testing Guideline Recommendations for Immunohistochemical Testing of Estrogen and Progesterone Receptors in B
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Internal Testing Notes	Immunohistochemical studies are evaluated by manual morphometric analysis using the above criteria. External and internal co
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Internal Testing Notes	HER2 IHC results are often complemented by HER2 FISH analysis, which is reported as a separate addendum.
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Internal Testing Notes	The immunoperoxidase, immunofluorescence and in-situ hybridization tests performed at Massachusetts General Hospital (MG
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Positive (3+) HER2 Criteria	Circumferential membrane staining that is complete, intense and in greater than 10% of tumor cells
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Equivocal (2+) HER2 Criteria	Weak to moderate complete membrane staining observed in greater than 10% of tumor cells
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Negative (1+) HER2 Criteria	Incomplete membrane staining that is faint/barely perceptible and in greater than 10% of tumor cellls
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Negative (0) HER2 Criteria	No staining is observed or membrane staining that is incomplete and is faint/barely perceptible and in 10% or less of tumor cells
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Criteria for ER/PR Analysis	Estimation of nuclear immunoreactivity of tumor cells
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Institution Performing Testing	Massachusetts General Hospital (MGH)
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	HER2 performed	Yes
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	ER/PR performed	Yes
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	'==	'================
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	ER/PR/HER2 Status (Block#1)	ER positive
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	ER/PR/HER2 Status (Block#1)	PR negative
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	ER/PR/HER2 Status (Block#1)	Cannot be determined
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	HER2 FISH (Block #1)	Requested and will be reported in a separate addendum
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	HER2 Protein (Block #1)	Other (specify)1+ with focal area of 2+
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Progesterone Receptor (Block #1)	Negative (0%)
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Estrogen Receptor (Block #1)	Positive (greater than 90%, strong staining)
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	IHC Quantitation (Block #1)	ER/PR/HER2
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Block Tested (Block #1)	A3
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Part Type Description (Block #1)	Other (specify)Right liver biopsy
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Breast Biomarker Studies for (Block	Metastatic carcinoma
MGH Breast Biomarker Studies	1.0.0.14	S23-3	1	Block #1	'==
MGH Breast Biomarker Studies	1.0.0.14	S23-4	1	Number of Blocks to Report	1

Reporting ER Positivity Rates in Invasive Breast Carcinoma
Data Retrieval and Analysis

- Query database on date and cases with Breast Biomarker Synoptic
- Export as csv and open in MS Excel
- Filter database for cases with invasive breast cancer
- Filter database for Estrogen Receptor result of positive
- Merge Tables on unique case ID, template instance, block

ReportName	ReportVer	case_numb	Templat	Block	synoptic_element	SectionValue	SectionValue.1
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Invasive carcinoma	Negative (0%)
MGH Breast Biomarker Studies	1.0.0.14	S2	2	1	Breast Biomarker Studies for (Block #1)	Invasive ductal carcinoma	Positive (greater than 90%, strong staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Invasive carcinoma	Negative (0%)
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Invasive ductal carcinoma	Positive (greater than 90%, strong staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	2	1	Breast Biomarker Studies for (Block #1)	Metastatic carcinoma	Positive (10-50%, strong staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Invasive ductal carcinoma	Positive (10-50%, strong staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Invasive ductal carcinoma	Positive (greater than 90%, strong staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Invasive ductal carcinoma	Positive (greater than 90%, strong staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	2	1	Breast Biomarker Studies for (Block #1)	Invasive carcinoma	Positive (10-50%, moderate staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Metastatic carcinoma	Positive (greater than 90%, moderate to stron
MGH Breast Biomarker Studies	1.0.0.14	S2	2	1	Breast Biomarker Studies for (Block #1)	Invasive ductal carcinoma	Positive (50-90%, moderate staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	2	1	Breast Biomarker Studies for (Block #1)	Invasive carcinoma	Other (specify)Positive (>90%, ranging from w
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Invasive carcinoma	Positive (greater than 90%, strong staining)
MGH Breast Biomarker Studies	1.0.0.14	S2	1	1	Breast Biomarker Studies for (Block #1)	Invasive ductal carcinoma	Positive (greater than 90%, strong staining)

- Count total cases and positive cases to get a percentage


Mass General Brigham

Sinai Health | Mount Sinai Hospital
Joseph & Wolf Lebovic Health Complex

Future of Cancer Data Summit

HARNESSING THE POWER OF PATHOLOGY DATA

Integrating Pathology Data: Enhancing Patient Care and Quality Improvement

Aaron Pollett
Pathologist, Co-Director Diagnostic Medical Genetics
Pathology & Laboratory Medicine, Sinai Health System
Associate Professor, Laboratory Medicine & Pathobiology, University of Toronto
Provincial Head, Pathology & Laboratory Medicine Program, Ontario Health – Cancer Care Ontario

Disclosures

- Nothing to disclose

Snapshot of Ontario

Size: Over 1 million square kilometres

Population: 15.9 million people (39% of Canadians)

Health Regions: 5

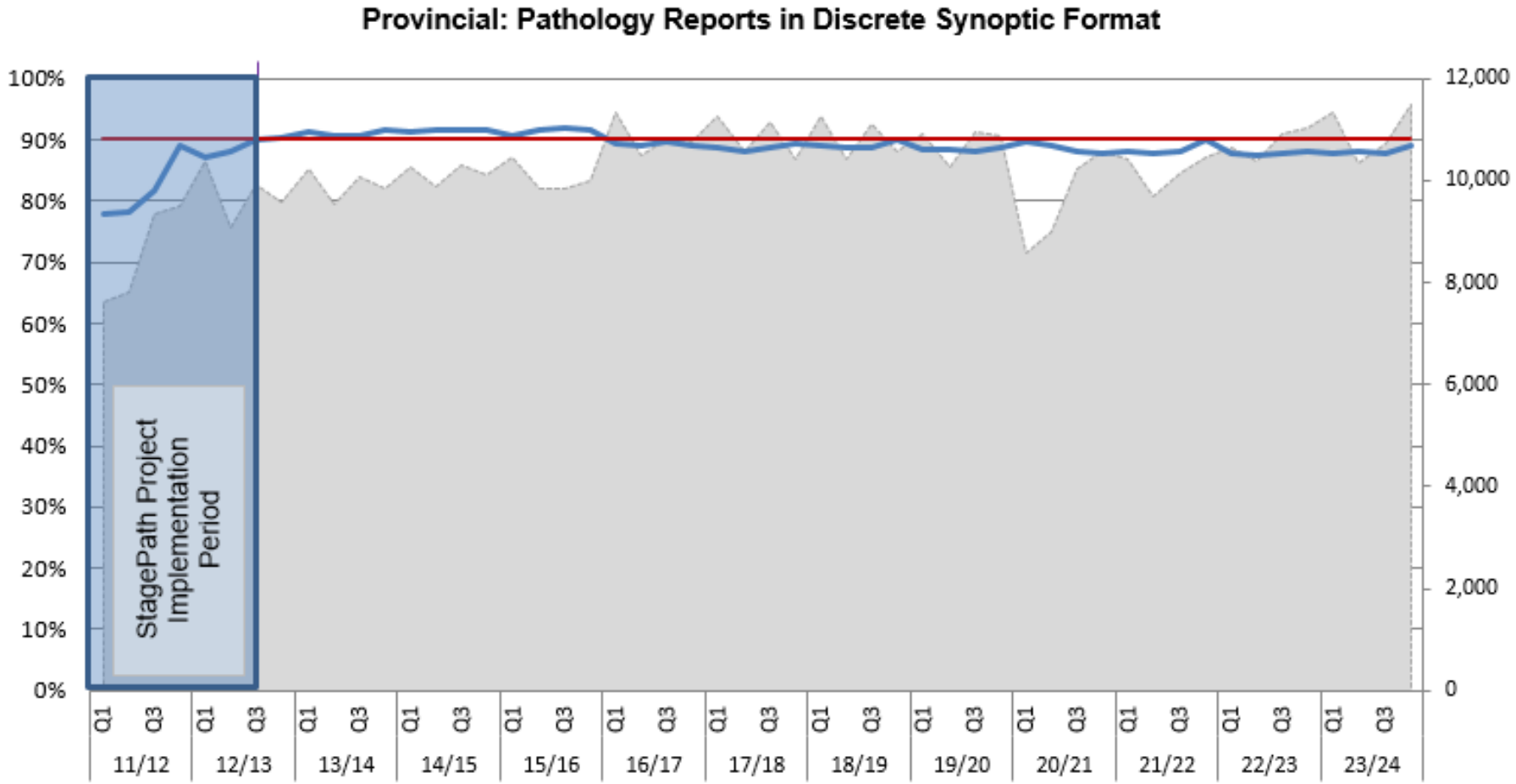
Distributed cancer system:

- 1 central cancer agency: Ontario Health-Cancer Care Ontario (OH-CCO)
- 14 Regional Cancer Programs
- 80 cancer surgery hospitals

Pathology Labs: 61 cancer pathology labs

Pathology reports: 90,0000+ new cancer cases per year

Synoptic Reporting



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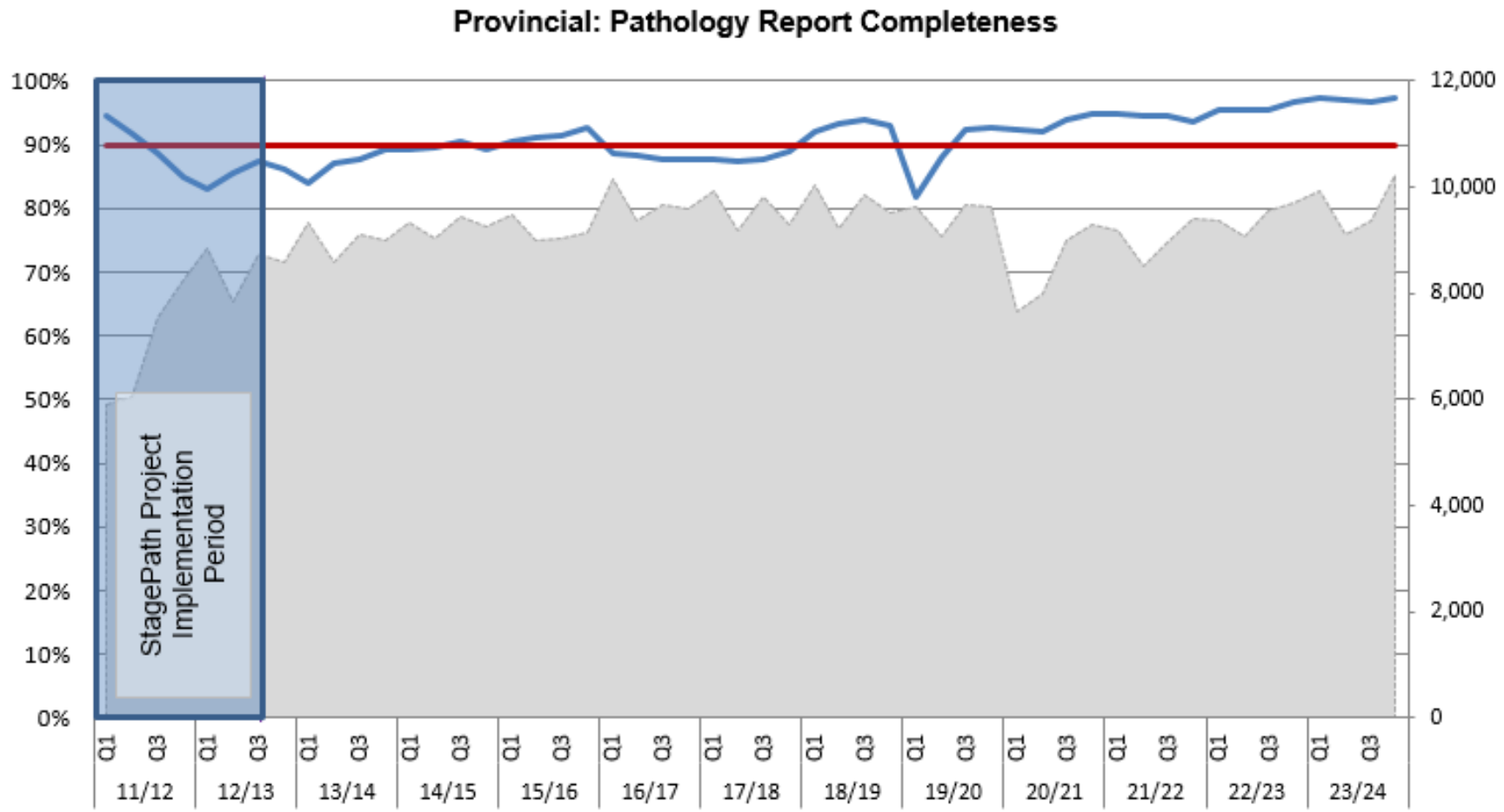
Report Completeness



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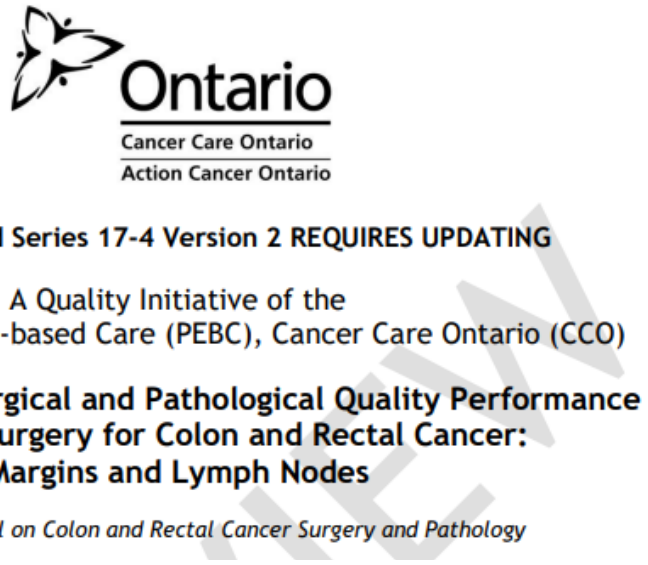
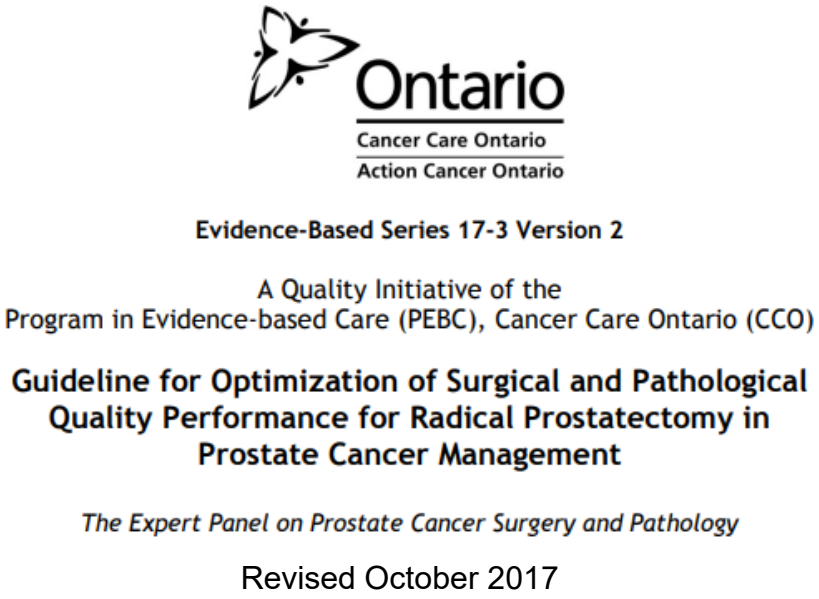
Surgical Pathology Quality Indicators

- The performance reports detail two surgical pathology quality indicators:
- Volume and proportion of positive margins for pT2 radical prostatectomies
- Volume and proportion of colorectal resection that examined 12 or more lymph nodes.





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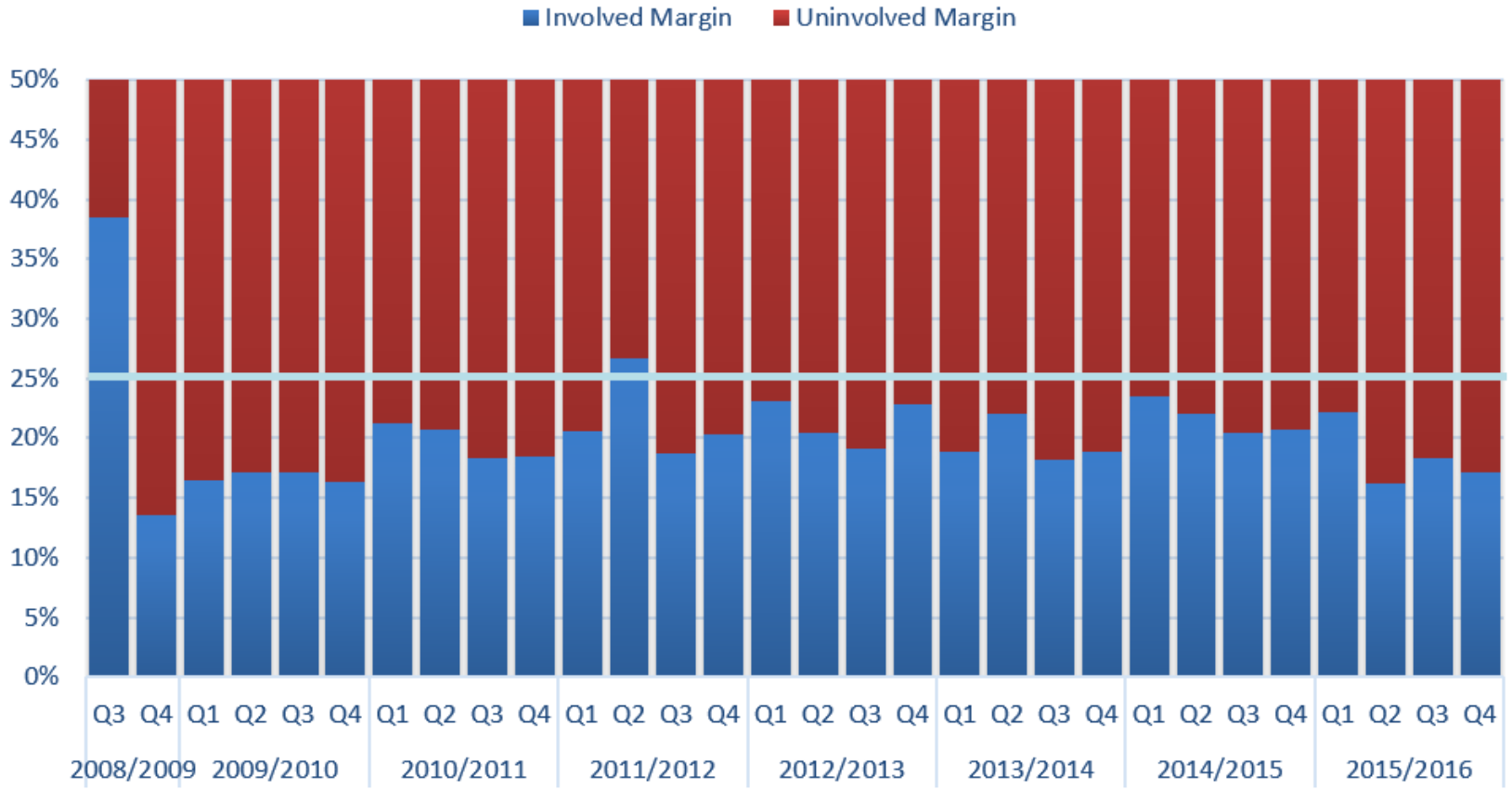
Ontario Radical pT2 Prostatectomies with involved margin



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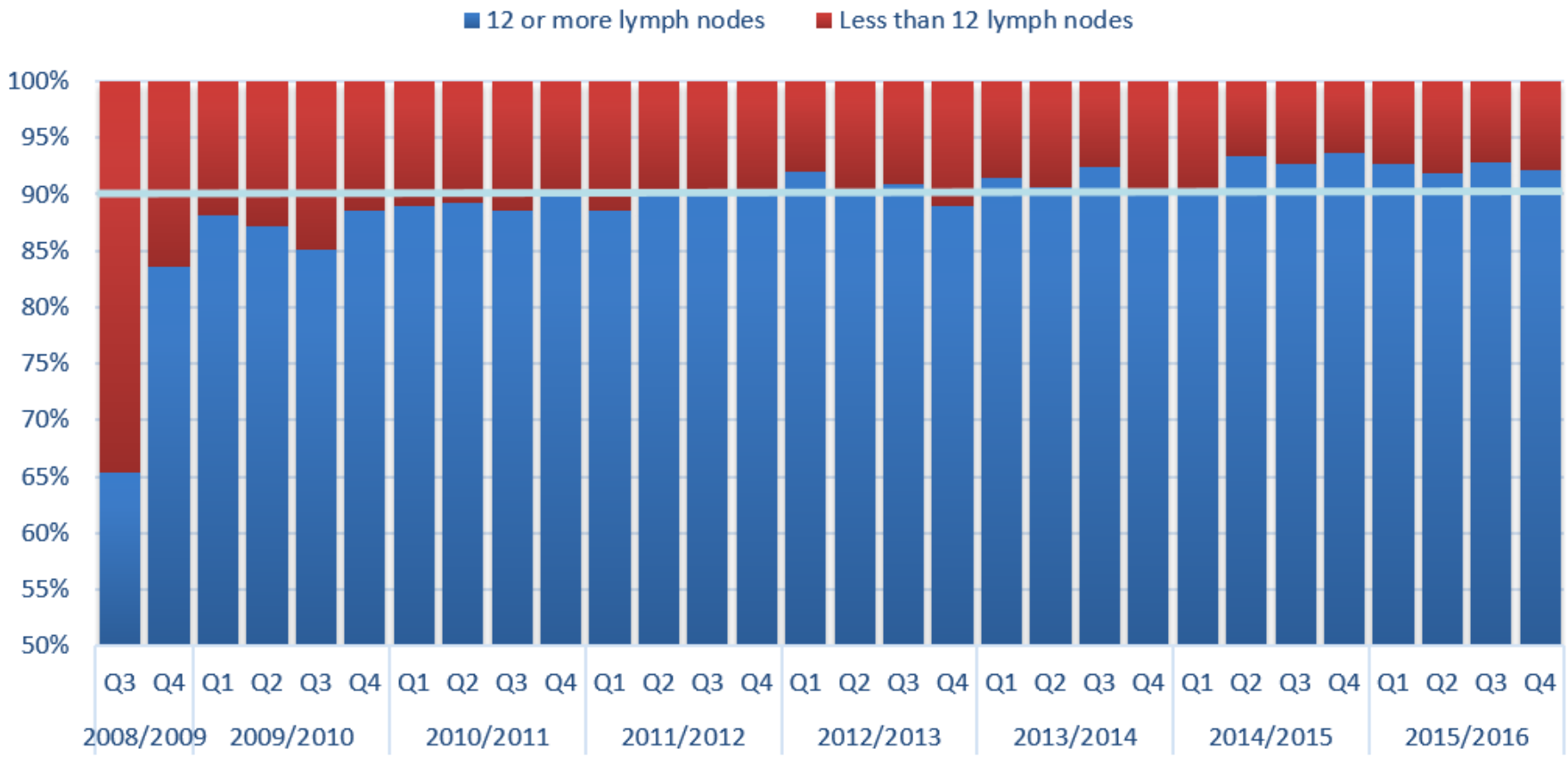
Ontario colon cancer resection with 12 or more lymph nodes



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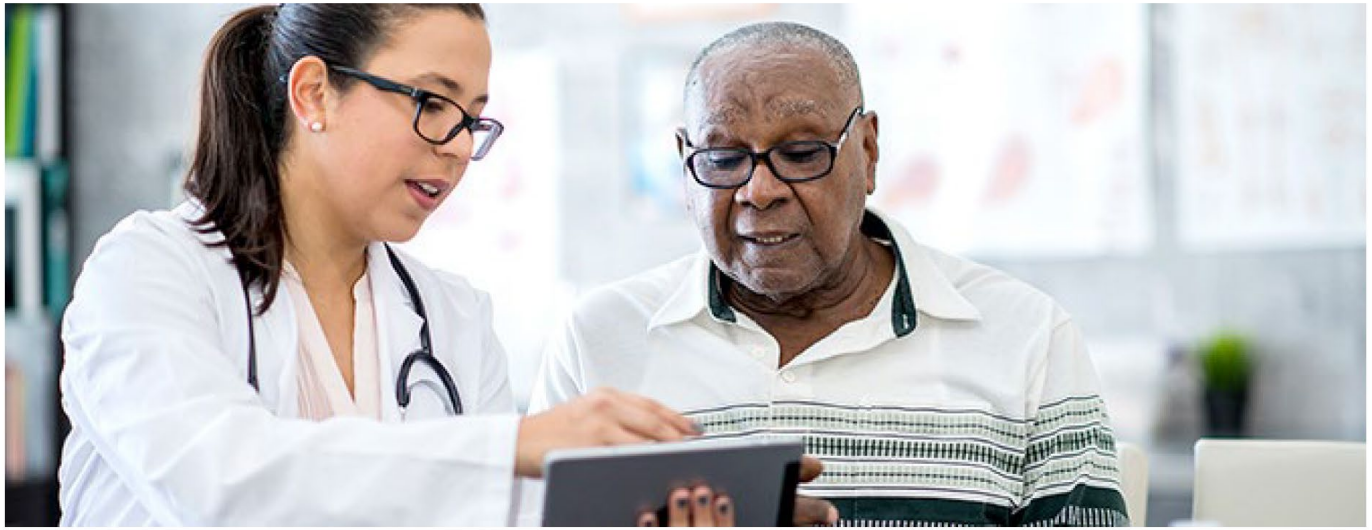
Pathology – Part of Cancer System

Cancer System Quality Index 2021

Ontario Cancer System Performance

November 2021



CQCO Cancer Quality Council of Ontario

Ontario Health

Sinai Health | Mount Sinai Hospital
Joseph & Wolf Lebovic Health Complex

CSQI – 2021 Report

Positive Margins Following Radical (or Total) Prostatectomy: pT2 and pT3

- One of the main goals of radical prostatectomy is to completely remove the cancer with negative margins while preserving urinary and erectile functions.[100] Positive margins increase the risk of biochemical recurrence[101] and may increase the need for secondary treatment.

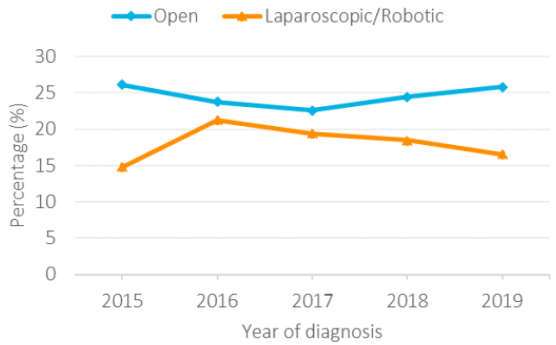
pT2 Positive Margins

- pT2 refers to pathologic staging of the cancer when the tumour is located only in the prostate.
- 21% of radical prostatectomy pathology reports for pT2 prostate cancer showed positive margins in 2019.
- This rate has remained stable since 2014.
- The rate of pT2 positive margins was higher for open compared with laparoscopic or robotic approaches at 26% and 17%, respectively, in 2019.
- Ontario is performing better than Italy (38% in 2011-2017)[102] and worse than Norway (15% in 2013 to 2015, age < 75).[103]
- Ontario has set a target of 20% for pT2 positive margins after surgery.
- This indicator was rated as a bright spot because Ontario is close to its target.

Exhibit 7.14 Positive margins following radical (or total) prostatectomy: pT2

Year	Synoptic reports with positive margins (%)	Synoptic reports with positive margins (N)	pT2 synoptic reports
2015	21	282	1,351
2016	22	299	1,346
2017	21	274	1,322
2018	22	291	1,321
2019	21	239	1,124

Exhibit 7.15 pT2 pathology reports with positive margins, by surgical approach



Notes: 3-7% of pT2 synoptic reports had an unknown surgical approach from 2015-2019.
Data table is available in the Technical Supplement.

Sinai Health | Mount Sinai Hospital
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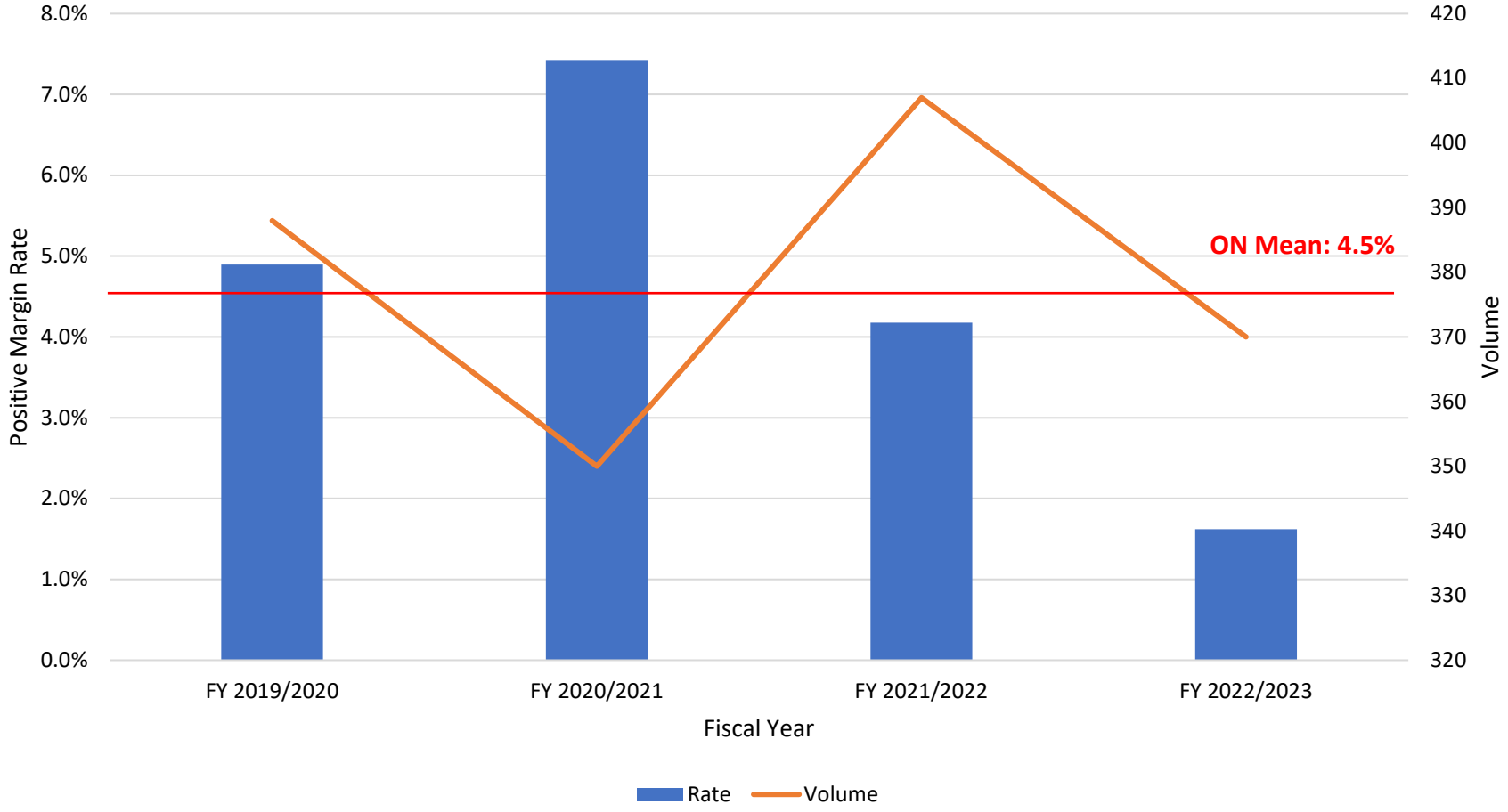
Provincial Rate of Direct to Surgery Rectal Cancer Surgery Patients with a Positive Circumferential Margin, FY 2019/2020 to FY 2022/2023



FY	Volume	Rate
FY 2019/2020	388	4.9%
FY 2020/2021	350	7.4%
FY 2021/2022	407	4.2%
FY 2022/2023	370	1.6%

COVID-19 Timeline
State of Emergency declared: March 17, 2020 **State of Emergency lifted:** July 24, 2020

Surgical – Pathology Indicators

Refining the thoracic surgical oncology regionalization standards for esophageal surgery in Ontario, Canada: Moving from good to better

Frances C. Wright, MD, MEd,[a,b,c] John Milkovich, BHSc Candidate,[a,c] Amber Hunter, MBA,[a,c] Gail Darling, MD,[a,c,d] and Jonathan Irish, MD, MSc[a,c,e]

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- international consensus on a set of 10 short-term quality measures, including negative margins, ≥ 20 lymph nodes retrieved and examined, no hospital stay ≥ 14 days, no in-hospital mortality, no readmission related to the surgical procedure, and no anastomotic leakage. It is recommended that these quality metrics be implemented into quality assurance programs to improve the overall survival of patients with esophageal cancer.

Using eCP's and Re-Using Data

Mary E. Edgerton, M.D., Ph.D., FCAP
Professor
Department of Pathology, Microbiology and Immunology
University of Nebraska Medical Center
Omaha, NE

University of Nebraska Medical Center℠

Disclosures

- Nothing to disclose

Experiences with electronic Cancer Protocols

- Prior to electronic, used the paper version as insert at Vanderbilt University Medical Center
  - Checklist for completeness
  - Talked to Dr. Kay Washington about automatically SNOMED encoding them
- Used paper as insert to reports at Moffitt Cancer Center
- Used paper as insert to reports at University of Texas MD Anderson Cancer Center (UTMDACC)
- Used electronic protocols at UT MDACC
- Using electronic worksheets at University of Nebraska Medical Center
  - Recently migrated from in-house version based on CAP to CAP eCP

Current applications at UNMC

- Annotation of Biorepository
- Quality Improvement Projects
  - Identify and follow-up patients with mismatch repair defects identified by IHC on tumor sections
    - Insure access to appropriate therapy, e.g. immunotherapy has been approved for any solid tumor with evidence of mismatch repair defects
    - Insure work-up for germ-line mutation
    - Insure that those with a germline mutation (Lynch's syndrome) are adequately counseled and testing offered to family members
    - Insure that Lynch's syndrome becomes a part of their problem list
      - Heightened risk of developing multiple cancers
      - Immunotherapy options for treatment
- Support SNOMED encoding project (more to come this afternoon from Professor Campbell)

Future Plans

- Use Mismatch repair IHC template searches for monthly QI review to address patient needs
- Implement Biopsy Protocols
- Support Professor Campbell's continuing work in SNOMED coding all of the required protocols (solid and pediatric tumors)
  - Listen to his talk later today to find out more!

University of Nebraska Medical Center