# Timely Access and Quality of Care in Colorectal Cancer:

## A Population-Based Cohort Study Using Administrative Data

Geoffrey Porter, Robin Urquhart, **Cynthia Kendell**, Jingyu Bu, Yarrow McConnell, Eva Grunfeld

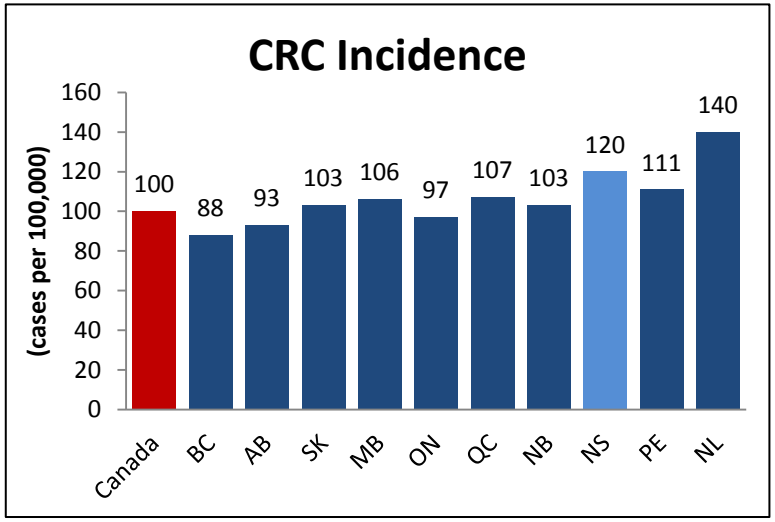
*Cancer Outcomes Research Program, DAL/Capital Health

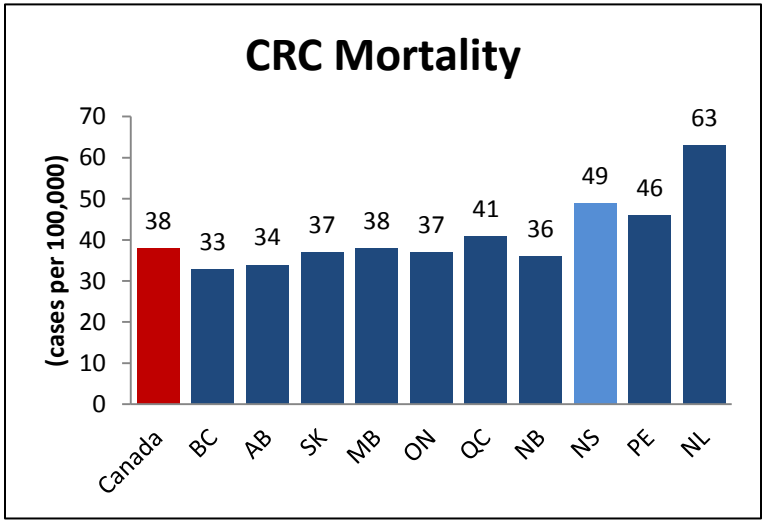
# Context

- 2007 CIHR New Emerging Team grant
- Team ACCESS was formed
  - Team in Access to Colorectal Cancer Services in Nova Scotia
- Study issues related to access to and quality of colorectal cancer (CRC) care
- Use linked administrative health databases
- Over 20 studies completed to date

# Background

- Colorectal Cancer (CRC)[1]
  - Third most commonly diagnosed cancer in Canada
  - Accounts for 12% of cancer related mortality



# Background

- Quality of Care
  - *"The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."* [2]
  - Performance on **quality indicators**
  - Adherence to **clinical practice guidelines**

# Background

- Access to care
  - Ability to obtain appropriate healthcare
  - Recent emphasis on **timeliness**
    - First Ministers identified timely access to care across Canada as "their biggest concern and national priority"[3]
    - Evidence based timeliness benchmarks established in five priority areas (radiotherapy, hip/knee replacements, cataract surgery, cardiac bypass surgery, diagnostic imaging)[4]
    - Formation of the Wait Times Alliance [5]
  - Wait-time **benchmarks**

# Current Study

- Potential implications of emphasizing timeliness
  - Wait times often caused by “bottlenecks” in the system
  - Addressing these requires more resources, or reallocation existing resources
  - Potential to affect other aspects of care (i.e., quality)

- **Objective: To explore the relationship between quality and timeliness of CRC care in NS at a population level**

# Methods

- Cohort
  - Identified from the Nova Scotia Cancer Registry
  - All individuals diagnosed with invasive CRC between 2001-2005 who had a non-emergent resection for primary CRC (n=2282)
  - Population-based study

# Methods


- 14 linked administrative health databases
- Complete data available from January 1, 1999 to March 31, 2008
- Complete chemotherapy data via chart review
- NSCR staged entire cohort

# Methods

- Clinicodemographics
  - age, sex, stage, etc.
- Quality Indicators (QIs)[6,7,8,9,10]
  - Complete pre-operative colonoscopy
  - Margin status reported in path report
  - ≥12 lymph nodes removed during surgery
  - Died within 30 days of surgery
  - Appropriate radiation oncology consultation[10]
  - Received an appropriate medical oncology consultation[10]

# Methods

- Wait-time benchmarks[11,12,13]
  - Presentation to clinical diagnosis (4-week benchmark)
  - Clinical diagnosis to surgery (4-week benchmark)
  - Surgery to adjuvant therapy (8-week benchmark)

# Methods

- Calculated descriptives (i.e., cohort characteristics, QI performance, median wait times and % meeting benchmarks
- Multivariate logistic analysis to examine factors associated with benchmark achievement

# Results

| Table 1. Quality indicator performance | | |
|---|---|---|
| **Quality indicator** | **n** | **% achieved** |
| Complete preoperative colonoscopy | 2282 | 57.8 |
| Margin status reported | 2282 | 94.6 |
| Adequate lymph node harvest (≥ 12) | 2282 | 31.8 |
| Peri-operative mortality | 2282 | 2.7 |
| Appropriate radiation oncology consultation * | 514 | 72.6 |
| Appropriate medical oncology consultation ** | 1772 | 60.9 |

*All stage II, III rectal patients + rectal patients who had preoperative consultation
** A post-operative consultation for all stage II to IV colorectal patients

# Results

| Table 2. Access time intervals | | | | |
|---|---|---|---|---|
| **Access time interval** | **n** | **Median time (days)** | **Benchmark** | **Benchmark achievement (%)** |
| Presentation to diagnosis* | 1807 | 44 | 4 weeks | 37.1 |
| Diagnosis to surgery- CRC** | 2282 | 19 | 4 weeks | 67.4 |
| Diagnosis to surgery-RC Only** | 818 | 25 | 4 weeks | 56.5 |
| Surgery to adjuvant therapy*** | 526 | 66 | 8 weeks | 39.2 |

*Presentation date not available if there were no physician visits in the year prior to diagnosis, or if no presentation codes present consistent with those that we identified.
**For rectal cancer patients who received neo-adjuvant radiotherapy, this interval was adjusted by subtracting 10 weeks from the total time between diagnosis to surgery to account for the delivery of radiation and subsequent recovery time prior to surgery.
***Contains stage II, III rectal cancer patients and stage III colon cancer patients who received adjuvant therapy. (i.e., this includes both post-operative chemotherapy and post-operative radiotherapy).

# Results

| Table 3. Multivariate analyses. Factors associated with meeting benchmarks. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Wait-time benchmark** | **Significant factors** | | **n** | **Benchmark achievement (%)** | **OR** | **95% CI** | | **p** |
| **Presentation to diagnosis: 4-weeks (n=1807)** | **Rural/urban** | Urban | 1112 | 35.1 | 1.0 | | | |
| | | Rural | 695 | 40.4 | 1.2 | 1.0 | 1.5 | 0.03 |
| | **Sex** | Male | 969 | 40.3 | 1.0 | | | |
| | | Female | 838 | 33.5 | 0.8 | 0.6 | 0.9 | 0.004 |
| | **Complete preoperative colonoscopy** | NO | 746 | 40.1 | 1.0 | | | |
| | | YES | 1061 | 35.1 | 0.8 | 0.7 | 1.0 | 0.04 |

# Results

| Table 4. Multivariate analyses. Factors associated with meeting benchmarks. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Wait-time benchmark** | **Significant factors** | | **n** | **Benchmark achievement (%)** | **OR** | **95% CI** | | **p** |
| **Diagnosis to surgery: 4-weeks (n=2282)** | **Age group** | Overall | | | | | | 0.004 |
| | | >= 70 | 1200 | 66.4 | 1.0 | | | |
| | | 50-69 | 935 | 69.2 | 1.4 | 1.1 | 1.7 | 0.001 |
| | | < 50 | 147 | 64.0 | 1.1 | 0.8 | 1.6 | 0.59 |
| | **Complete preoperative colonoscopy** | NO | 962 | 72.5 | 1.0 | | | |
| | | YES | 1320 | 63.7 | 0.7 | 0.6 | 0.9 | 0.001 |
| | **Stage** | Overall | | | | | | <0.001 |
| | | I | 467 | 55.9 | 1.0 | | | |
| | | II | 785 | 70.5 | 2.0 | 1.5 | 2.6 | <0.001 |
| | | III | 712 | 69.0 | 2.1 | 1.6 | 2.8 | <0.001 |
| | | IV | 275 | 78.2 | 2.5 | 1.8 | 3.5 | <0.001 |
| | | UNK | 43 | 41.9 | 0.7 | 0.4 | 1.4 | 0.31 |
| | **Appropriate radiation oncology consultation** | Overall | | | | | | <0.001 |
| | | YES | 373 | 49.6 | 1.0 | | | |
| | | NO | 445 | 62.3 | 2.4 | 1.8 | 3.3 | <0.001 |

# Results *rectal cancer only

| Table 5. Multivariate analyses. Factors associated with meeting benchmarks. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Wait-time benchmark** | **Significant factors** | | **n** | **Benchmark achievement (%)** | **OR** | **95% CI** | | **p** |
| **Diagnosis to surgery (rectal patients only): 4-weeks**<br><br>**(n = 818)** | **Age group** | Overall | | | | | | 0.02 |
| | | >= 70 | 354 | 53.1 | 1.0 | | | |
| | | 50-69 | 394 | 59.9 | 1.6 | 1.2 | 2.2 | 0.004 |
| | | < 50 | 70 | 54.3 | 1.3 | 0.8 | 2.2 | 0.36 |
| | **Stage** | Overall | | | | | | 0.001 |
| | | I | 216 | 52.8 | 1.0 | | | |
| | | II | 215 | 59.1 | 2.3 | 1.5 | 3.8 | <0.001 |
| | | III | 272 | 55.5 | 2.2 | 1.4 | 3.5 | 0.001 |
| | | IV | 91 | 68.1 | 1.8 | 1.1 | 3.1 | 0.03 |
| | | UNK | 24 | 33.3 | 0.7 | 0.3 | 1.7 | 0.38 |
| | **Appropriate radiation oncology consultation** | YES | 373 | 49.6 | 1.0 | | | |
| | | NO | 445 | 62.3 | 2.7 | 1.8 | 4.0 | <0.001 |

# Results

| Table 6. Multivariate analyses. Factors associated with meeting benchmarks. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Wait-time benchmark** | **Significant factors** | | **n** | **Benchmark achievement (%)** | **OR** | **95% CI** | | **p** |
| **Surgery to adjuvant therapy: 8 weeks (n=526)** | **Length of stay** | | 526 | | 0.95 | 0.91 | 1.0 | 0.007 |
| | **Appropriate radiation oncology consultation** | Overall | | | | | | 0.01 |
| | | YES | 236 | 29.7 | 1.0 | | | |
| | | NO | 27 | 48.2 | 2.6 | 0.3 | 20.7 | 0.36 |

# Discussion

- Where significant relationships existed, those who received ‘higher quality care’ had longer wait times
- Those who received a complete pre-operative colonoscopy waited longer for diagnosis and for surgery
  - Interval from presentation to diagnosis is complex, requires expertise from many and various tests and investigations
  - Capacity/resource issues: surgeon availability, endoscopes, endocopy suites, etc.

# Discussion

- Those who had an appropriate radiation oncology consultation waited longer for both surgery and adjuvant treatment
  - Capacity/resource issues: radiation oncologist availability, located only at cancer centers (Sydney and Halifax)

# Limitations

- Examined complete pre-operative colonoscopy
  - sigmoidoscopy + barium enema (BE) is acceptable
  - Did not have imaging data to examine BE
- Retrospective
  - What would we see today?
- Wait times used were not being endorsed in NS during the study period
  - Goal not to evaluate system performance

# Conclusions

- In some cases increased wait times may be required to ensure a patient receives quality care (i.e. trade-off)
- Re: system performance and monitoring
  - Need to use various measures of system performance
  - Timeliness cannot be addressed without careful consideration of the resources required to achieve benchmarks
  - Are we setting standards we do not have the capacity to achieve?

# Funders


- Canadian Institutes of Health Research
- Cancer Care Nova Scotia
- Nova Scotia Department of Health and Wellness
- Capital Health
- Dalhousie Medical Research Foundation
- Dalhousie University, Faculty of Medicine

# Questions?

cynthia.kendell@ccns.nshealth.ca

www.teamaccess.ca

# References


1. Canadian Cancer Society's Steering Committee: Canadian Cancer Statistics 2011. Toronto, ON: Canadian Cancer Society; 2011.
2. Lohr K: Medicare: A Strategy for Quality Assurance. Vols I and II. Washington, DC: National Academy Press; 1990.
3. Health Canada. (2006). Health Care System: First Ministers' Meeting on the Future of Health Care System. A 10-year plan to strengthen healthcare. Retrieved from http://www.hc-sc.gc.ca/hcs-sss/delivery-prestation/fptcollab/2004-fmm-rpm/index-eng.php
4. Norris, S. (2009). The Wait Times Issue and the Patient Wait Times Guarantee. Government of Canada, Social Affairs Division. Library of Parliament. Retrieved from http://www.parl.gc.ca/content/LOP/ResearchPublications/prb0582-e.htm#a5
5. Wait Time Alliance (WTA). (2008). Retrieved from http://www.waittimealliance.ca
6. Gagliardi AR, Simunovic M, Langer B, Stern H, Brown AD: Development of quality indicators for colorectal cancer surgery, using a 3-step modified Delphi approach. Can J Surg 2005, 48(6):441-452.
7. McGory ML, Shekelle PG, Yo CY: Development of quality indicators for patients undergoing colorectal cancer surgery. J Natl Cancer Inst 2006, 98(22):1623-1633.
8. Prosnitz RG, Patwardhan MB, Samsa GP, Mantyh CR, Fisher DA, McCrory DC, Cline K, Gray RN, Morse MA: Quality measures for the use of adjuvant chemotherapy and radiation therapy in patients with colorectal cancer: a systematic review. Cancer 2006, 107(10):2352-2360.
9. Urquhart R GE: Measuring the quality of care provided to patients with colorectal cancer: the potential of quality indicators. Oncology Exchange 2009, 8(4):6-10,40.
10. Nelson H, Petrelli N, Carlin A, Couture J, Fleshman J, Guillem J, Meidema B, Ota D, Sargent D, Panel NCIE: Guidelines 2000 for colon and rectal cancer surgery. J Natl Cancer Inst 2001 Apr 18, 93(8):583-596.
11. Cancer Care Ontario: Target Wait Times for Cancer Surgery in Ontario 2006.
12. National Health Service: The NHS Cancer Plan: a plan for investment, a plan of reform. United Kindom Department of Health; 2000.
13. Wait Times for Cancer [http://www.gov.ns.ca/health/waittimes/category.asp]

# Cohort Characteristics

| Table 1. Clinicodemographics (n = 2282) | | | |
|---|---|---|---|
| **Characteristic** | | **n** | **%** |
| Age | < 50yrs | 147 | 6.4 |
| | 50 - 69 yrs | 935 | 41.0 |
| | ≥ 70 yrs | 1200 | 52.6 |
| Sex | Male | 1259 | 55.2 |
| | Female | 1023 | 44.8 |
| Comorbidity count | 0-3 | 2185 | 95.8 |
| | ≥ 4 | 97 | 4.3 |
| History of cancer | Yes | 339 | 14.9 |
| | No | 1943 | 85.1 |
| Tumor location | Right colon | 865 | 37.9 |
| | Left colon | 579 | 25.4 |
| | Rectum | 818 | 35.9 |
| | Colon NOS | 20 | 0.9 |
| Stage | I | 467 | 20.5 |
| | II | 785 | 34.4 |
| | III | 712 | 31.2 |
| | IV | 275 | 12.1 |
| | Unkown | 43 | 1.9 |
| Rural/urban | Rural | 876 | 38.4 |
| | Urban | 1406 | 61.6 |
| Length of stay (post-resection) | Median (days) | 9 | |
| | Inter-quartile range (days) | 5 | |