

# **Predictors of standard of care for stage III colon cancer patients living in Alberta**

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# Outline of presentation

1. Background
2. Objective
3. Methods
  - a. Data
  - b. Inclusion and exclusion criteria
  - c. Outcome and predictor variables
4. Results
5. Conclusion

# Background

- Colorectal cancer - 4th most common incident cancer and 2<sup>nd</sup> most common cause of cancer death in Canada
- Five-year survival for stage III colon is about 65%
- Standard treatment stage III- surgery then chemotherapy
- Despite this “standard”, many patients do not receive chemotherapy

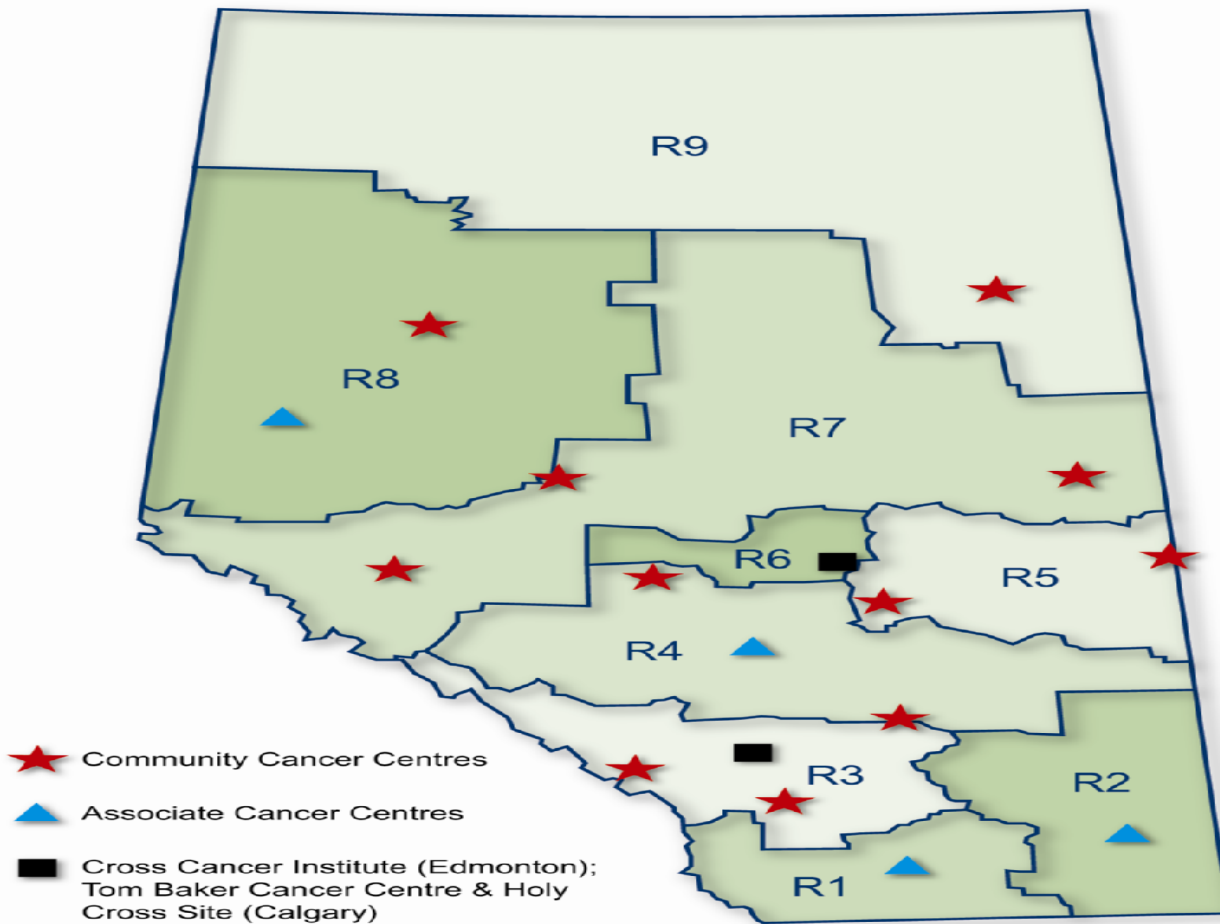
# Background



# Background – Alberta Model

- Cancer Corridor/ Alberta Health Services
- All non-surgical cancer treatment
- 6 facilities provide consults and chemo
  - Two urban (Calgary & Edmonton)
  - Four rural
- 11 facilities provide chemo only (rural)

**Figure 1:** Map of Alberta showing the boundaries of the nine health regions and facilities of the Alberta Cancer Board



# Objective

- Quantify the proportion of patients referred to an oncologist post-surgery
- Quantify the proportion who received adjuvant chemotherapy
- Identify factors related to consult and/or timely receipt of adjuvant chemotherapy

## Methods: Data Sources

- Alberta Cancer Registry
  - Clinical and demographic variables
- Hospital inpatient and outpatient visit data
  - Co-morbidities
- Cancer Electronic Medical Record
  - Consult dates
- 2001 Canadian Census Data
  - Dissemination area variables

# Methods: Inclusion Criteria

- Diagnosed 2002-2005 in Alberta
- Histologically confirmed adenocarcinoma
- Received surgery

## Methods: Exclusion Criteria

- Died within one week of diagnosis
- Diagnosed with another cancer within 6 months of their diagnosis
- Patient treated outside Alberta

## Methods: Outcome variables

- Attended a consult with an oncologist within six months of diagnosis
- Received standard of care treatment = surgery + chemotherapy

# Methods: Factors of Interest

- Gender
- Age
- Region of residence at diagnosis
- Driving distance to nearest cancer center
- Co-morbidity score
- Five census variables

## Methods: Census variables

- Median household income (quartiles)
- Proportion employed
- Proportion not graduated from high school
- Proportion separated, divorced, or widowed
- Proportion that live alone

## Results: Excluded Patients

Reasons for Exclusions	# of patients
No surgery	3
Not adenocarcinoma	16
No histologic confirmation	3
Died within 7 days	13
Other cancer w/in 6 months	41
Treated outside Alberta	1

# Results: Univariate Analysis

Characteristic	No. with surgery	Consult within 6 months Number (%)	Guideline Treatment Number (%)
Colon stage III patients	770	617(80%)	385 (62)
Age at diagnosis		<b>P&lt;0.0001</b>	<b>P&lt;0.0001</b>
<65	258	255 (99)	208 (82)
65-74	195	173 (89)	115 (67)
75+	317	189 (60)	62 (33)
Gender		<b>P=0.01</b>	<b>P=0.92</b>
Female	373	286 (77)	179 (63)
Male	397	331 (83)	206 (62)

# Results: Univariate Analysis (con't)

Characteristic	No. with surgery	Consult within 6 months Number (%)	Guideline Treatment Number (%)
Comorbidity score		<b>P&lt;0.0001</b>	<b>P&lt;0.0001</b>
0	521	457 (88)	319 (70)
1+	249	160 (64)	66 (41)
Distance		<b>P&lt;0.001</b>	<b>P=0.91</b>
≤50	554	459 (83)	287 (63)
>50	216	158 (73)	98 (62)
% employed		<b>P&lt;0.001</b>	<b>P&lt;0.0001</b>
<60	210	157 (75)	84 (54)
60-72	323	250 (80)	155 (62)
72+	219	196 (90)	137 (70)

# Results: Univariate Analysis (con't)

Characteristic	No. with surgery	Consult within 6 months Number (%)	Guideline Treatment Number (%)
Median income		<b>P&lt;0.001</b>	<b>P=0.01</b>
<37881	184	118 (64)	61 (52)
37881-51057	193	154 (80)	97 (63)
51058-67124	186	156 (84)	93 (60)
67124+	189	175 (93)	125 (71)
Regions at diagnosis		<b>P&lt;0.0001</b>	<b>P=0.71</b>
Southern Alberta	75	45 (60)	31 (69)
Central Alberta	125	97 (78)	59 (61)
Northern alberta	74	59 (80)	36 (61)
Calgary	241	195 (81)	116 (60)
Edmonton	255	221 (87)	143 (65)

# Results: Univariate Analysis (con't)

Characteristic	No. with surgery	Consult within 6 months Number (%)	Guideline Treatment Number (%)
<b>% of people who live alone</b>		<b>P&lt;0.001</b>	<b>P&lt;0.0001</b>
<7	310	277 (89)	187 (68)
7-24	363	279 (77)	170 (61)
24+	79	47 (60)	19 (41)
<b>% of divorced separated or widowed</b>		<b>P&lt;0.001</b>	<b>P=0.91</b>
<13	218	194 (89)	136 (70)
13-29	443	354 (80)	219 (62)
29+	91	55 (61)	21 (38)
<b>% of not graduated from high school</b>		<b>P&lt;0.001</b>	<b>P&lt;0.0001</b>
<27	375	317 (85)	202 (64)
≥27	377	286 (76)	174 (61)

## Results-univariate analysis: Factors related to having consult

- Gender
- Age
- Southern Alberta residents
- Co-morbidity
- Distance to the nearest cancer center
- Five census variables

## Results-univariate analysis: Factors related to receiving chemo

- Age
- Co-morbidity
- % employed
- % separated/divorced/widowed
- % living alone
- Median household income

# Model 1: Multiple Logistic Regression- Consult

- Age
- Comorbidity
- Distance to the nearest cancer center
- Median household income
- Region of residence

## Results: Multiple logistic regression-Consult

<b>Variables</b>	<b>Adjusted OR (95% CI)</b>
<b>Age at diagnosis</b>	P<0.001
<65	1.00*
65-74	<b>0.11 (0.03-0.38)</b>
75+	<b>0.02 (0.01-0.08)</b>
<b>Comorbidity Score</b>	P<0.001
0	1.00*
1+	<b>0.43 (0.28-0.66)</b>
<b>Driving distance to nearest cancer center</b>	P=0.05
≤50	1.00*
>50	<b>0.51 (0.26-1.00 )</b>

## Results: Multiple logistic regression -consult (con't)

Variables	Adjusted OR (95% CI)
<b>Median income at 2000</b>	P<0.001
<37881	<b>0.30 (0.14-0.63)</b>
37881 - 67124	0.72 (0.36-1.43)
67124+	1.00*
<b>Region at diagnosis</b>	P=0.02
Southern Alberta	<b>0.35 (0.17-0.71)</b>
Calgary	0.57 (0.32-1.02)
Central Alberta	1.02 (0.44-2.34)
Northern Alberta	0.81 (0.28-2.33)
Capital	1.00*

# Model 2: Multiple Logistic Regression- Chemotherapy

- Age
- Comorbidity
- Proportion separated, divorced, or widowed

## Results: Multiple logistic regression-Chemotherapy

Variables	Adjusted OR (95% CI)
<b>Age at diagnosis</b>	P<0.0001
<65	1*
65-74	<b>0.47 (0.29-0.75)</b>
75+	<b>0.12 (0.07-0.19)</b>
<b>Comorbidity Score</b>	P<0.0001
0	1.00*
1+	<b>0.36 (0.23-0.54)</b>
<b>% of divorced, separated or widowed</b>	P=0.04
<13	1.00*
13-29	0.82 (0.54-1.24)
29+	<b>0.4 (0.20 - 0.81)</b>

## Conclusion

- Age is the strongest factor related to both having a consult and receiving chemotherapy even after adjusting for co-morbidities. Physician bias or patient choice????
- Distance may play a role in having a consult

# Conclusion

- People living in dissemination areas having the lowest income quartile were less likely to have a consult. Caution needed in interpretation----not individual-level variable

## Conclusion

- Region of residence - finding is consistent with a similar study for non-small cell lung cancer—Southern Alberta residents less likely to have consult
- Educational intervention for surgeons' referrals needed???

## Conclusion

- Proportion separated, divorced, or widowed may be a proxy for social support or isolation
- Further investigation warranted with individual-level data that capture support/isolation more accurately.

# Acknowledgement



National  
Cancer Institute  
of Canada

Institut national  
du cancer  
du Canada

- **QUESTIONS?**