

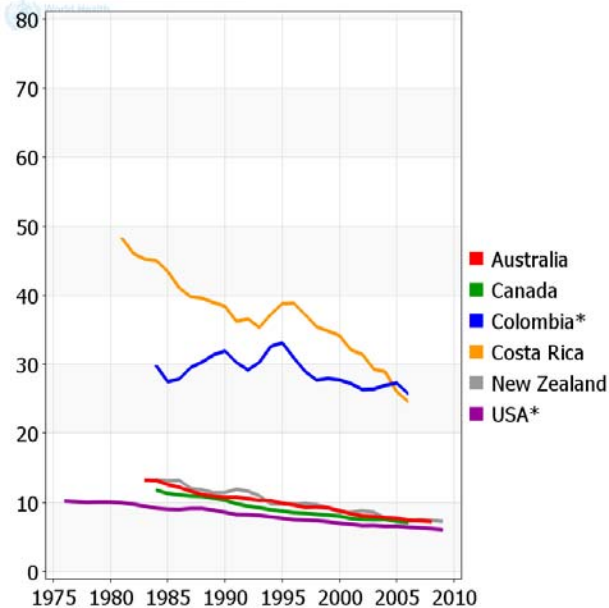
Gastric Cancer Resections in BC: How are we doing?

Trevor D Hamilton MD FRCSC

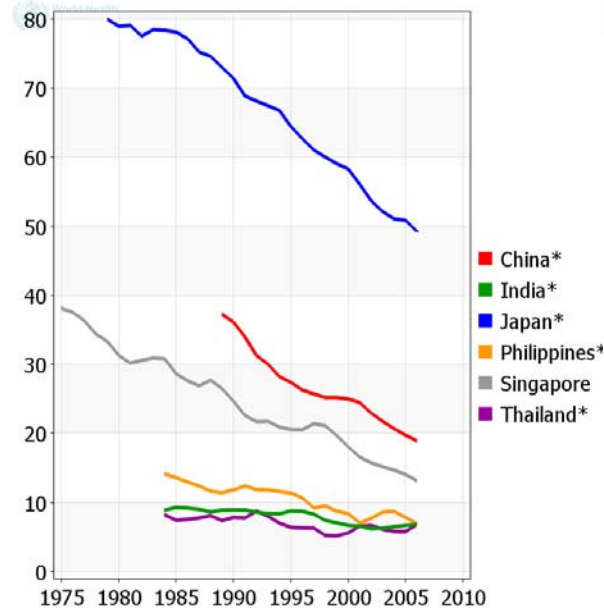
Surgical Oncology Network
November 7, 2015

Gastric Cancer incidence declining

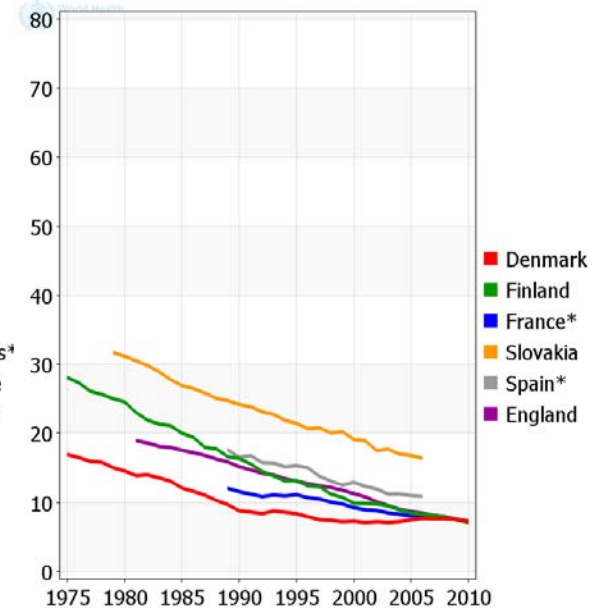
International Agency for Research on Cancer



International Agency for Research on Cancer

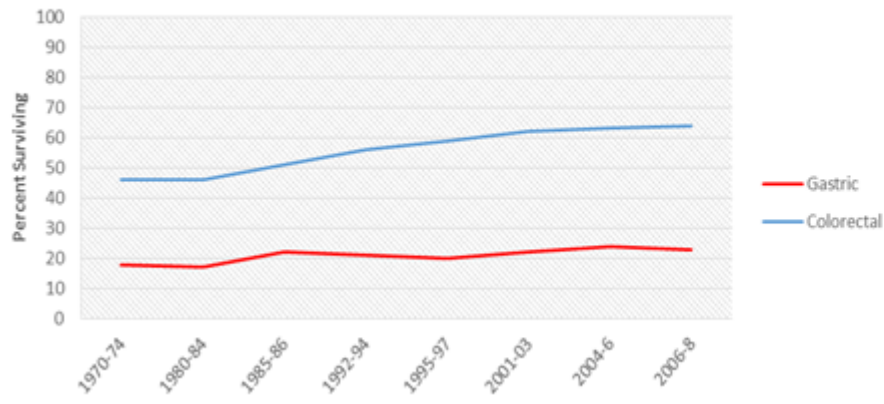


International Agency for Research on Cancer

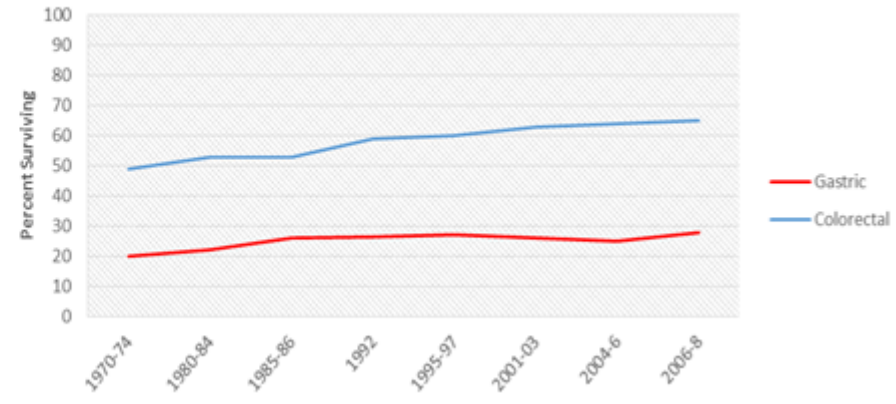


Minimal Improvements in Survival

5-Year Relative Survival, Canada, Males, 1970-2008



5-Year Relative Survival, Canada, Females, 1970-2008



5-yr OS (resected) ~ 29%

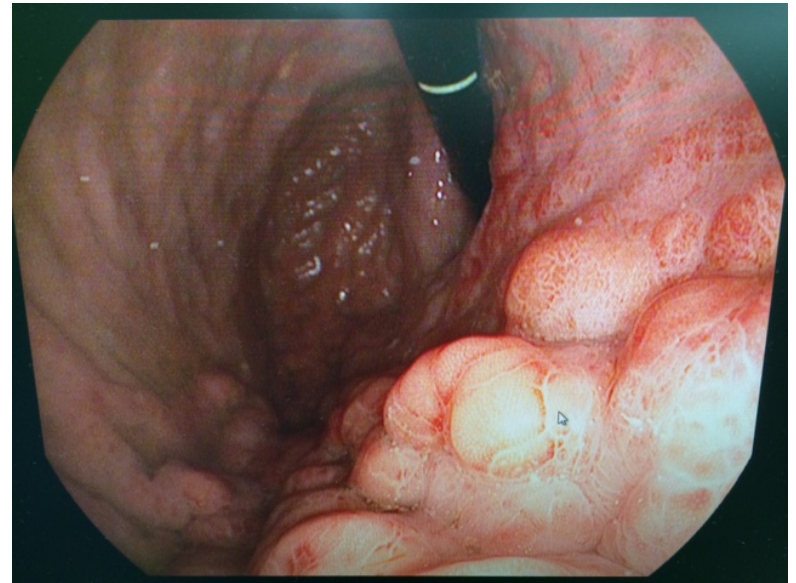
Howlader et al. 2015 SEER Cancer Statistics

In Western countries

Majority advanced disease

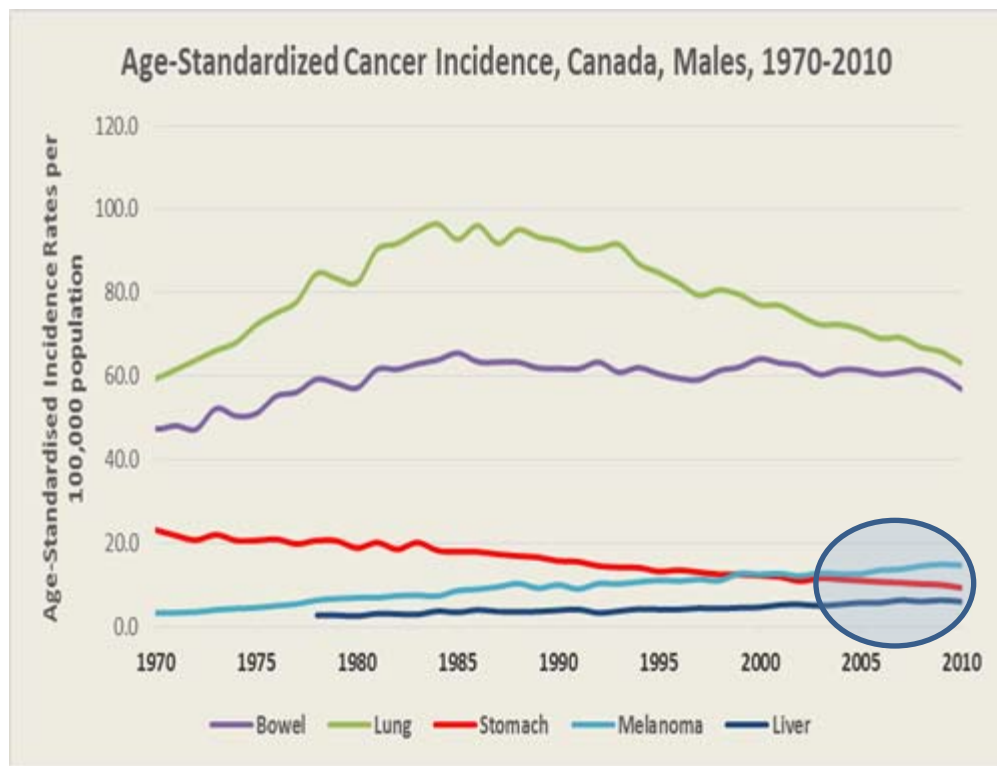
Multi-disciplinary treatment
is integral to care

Significant regional
variations in survival



Cunningham et al. 2006 N Eng J Med
Birkmeyer et al. 2002 N Eng J Med
Coburn et al. 2006 Cancer

...similar to pancreas, liver



	Males	Females
Canada	11.4	4.9
US	10.1	5.3
UK	14.6	6.2

M & M

Underappreciated

8-13% peri-op mortality (non-asian)

Considerably higher in very low-volume centres

Birkmeyer et al. 2002 N Eng J Med

Hospital volume and survival

Appendix 8. The Effect of Institution Volume on 5-Year Survival

Study	Survival definition	Volume categories	Outcomes result, %	Significance*
Birkmeyer ¹⁵	5-y survival [‡]	High (16.5–137.4)	32	<0.001
		Low (0.3–7.2)	25.6	
Enzinger ¹⁸	Overall 5-y survival [§]	High (≥14)	36.7	NS
		Medium (6–13)	36.5	
		Low (0–5)	30.8	
Thompson ³⁴	5-y survival	High (≥35)	43.4	NS
		High medium (20–34)	38.5	
		Low medium (13–19)	37.6	
		Low (<13)	36.8	
Bilimoria ¹³	5-y overall survival [§]	High (>17)	30	<0.05
		Medium (2nd–4th quintiles)	28.9	
		Low (<4)	26.7	

“High-volume gastric cancer hospital” >10/year

Mahar et al. 2012 JACS

Objective

... evaluate current outcomes of gastric cancer surgery in British Columbia

Methods

2004-2012

Population-based cohort

All patients referred to BC Cancer Agency

Gastro-intestinal clinical outcomes unit (GICOU)

Inclusion:

- Gastric cancer
- Curative intent resection

Exclusion:

- Metastatic
- Esophageal

BC Data

Gastric adenoCA

N=377

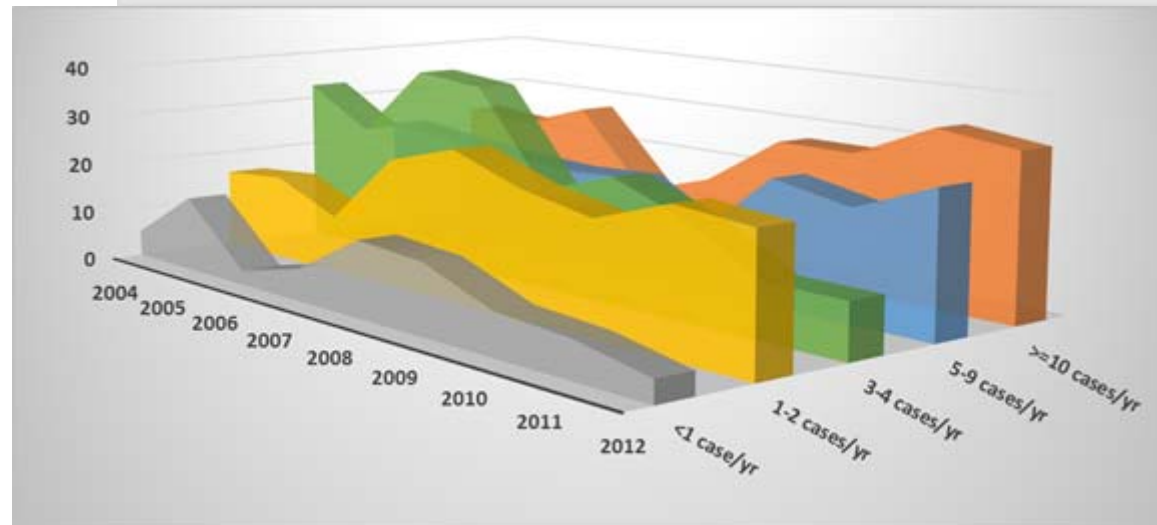
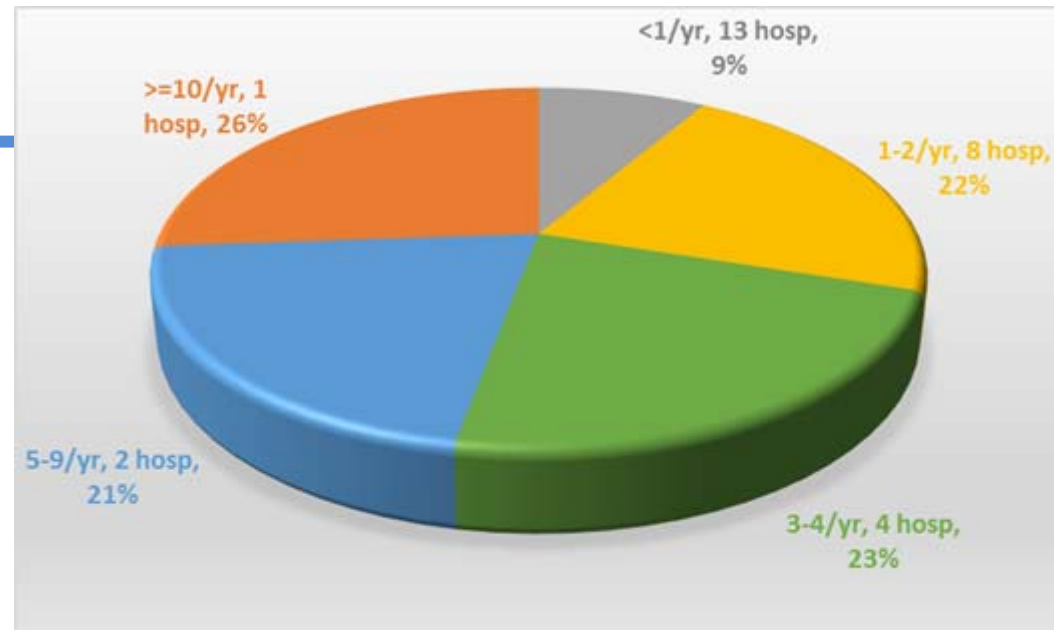
28 institutions

~average 1.7
cases/hosp/year

26% in hosp w >10
cases/year

31% in hosp w <3
cases/year

3 institutions
performing half cases



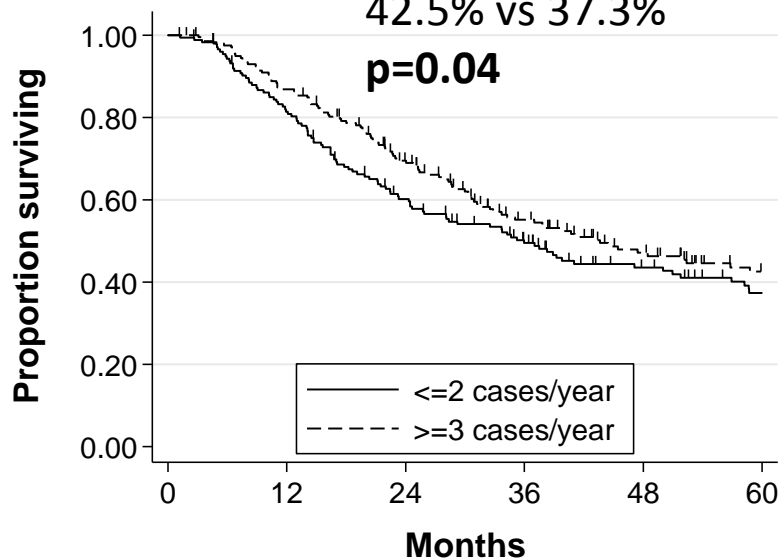
Hospital volume & survival

≤2 vs ≥3 cases/yr

5-yr OS

42.5% vs 37.3%

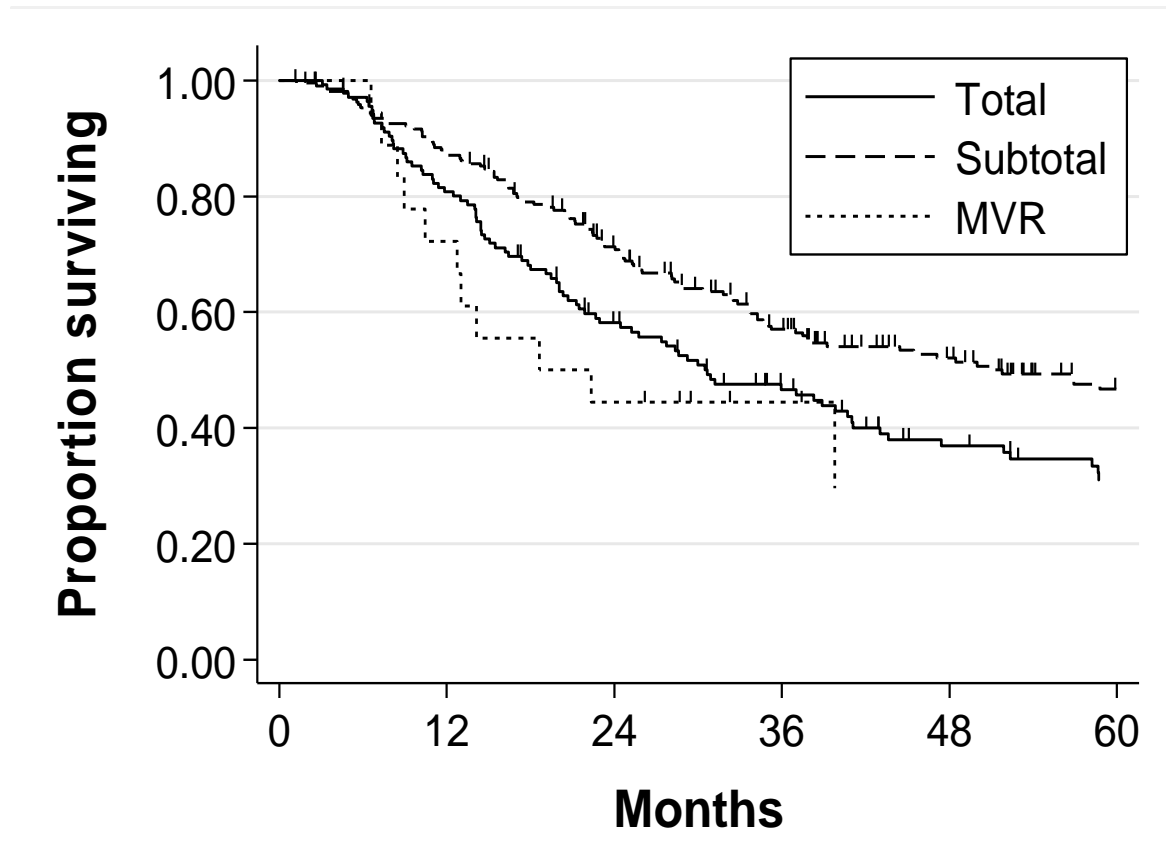
p=0.04



Number at risk		0	12	24	36	48	60
≤2 cases/yr	175	140	99	73	53	39	
≥3 cases/yr	201	171	124	84	60	41	

	≤2/yr	≥3/yr	P
Case #	175	201	
Institution #	21	7	
Age>70	45.1%	44.3%	NS
Male gender	71.4%	64.8%	NS
ECOG 3/4	2.4%	17.1%	0.02
T stage 3/4	51.2%	48.8%	NS
Node positive	64.6%	65.5%	NS
Diffuse-type histology	39.3%	44.8%	NS
Total gastrectomy	36.0%	42.8%	NS
Distal pancreatectomy	2.3%	3.0%	NS
Splenectomy	6.3%	2.0%	0.03
Neoadjuvant chemo	10.3%	17.9%	0.05
Postop chemorads	37.7%	38.8%	NS

Survival by resection



MVR – Multi-visceral resection (pancreas or spleen) = 4.8%

Multivariate analysis

Factor		HR	P
Age	<70	-	0.96
	>=70	1.01	
T stage	1/2	-	0.02
	3/4	1.43	
N stage	Neg	-	<0.001
	Pos	2.10	
LN harvest	>=15 nodes	-	0.87
	<15 nodes	1.02	
Final Margins	Negative	-	<0.001
	Positive	2.35	
Periop adjuvant therapy	No	-	0.009
	Yes	0.68	
Hospital volume	<=2 cases/yr	-	0.05
	>=3 cases/yr	0.75	

Similar results in Ontario

Characteristic	Curative-intent resection (n = 1,645)	Variable	
Age, mean (\pm SD)	66.8 (12.49)	Surgery category (REF = subtotal resection)	
Age groups, n (column %)	614 (37.3)	MVR (colon)	1.20 [0.96, 1.51] (0.11)
<65	535 (32.5)	MVR (pancreas)	1.44 [0.90, 2.30] (0.13)
65–74	496 (30.2)	MVR (spleen)	1.97 [1.48, 2.63] (<0.01)
75+		Esophagogastrectomy	1.21 [1.03, 1.42] (0.02)
Males, n (column %)	1,099 (66.8)	Total resection	1.20 [1.00, 1.44] (0.05)
Surgery type, n (column %)		Age group (REF = <65)	
MVR (colon)	154 (9.4)	65–74	1.34 [1.15, 1.57] (<0.01)
MVR (spleen)	29 (1.8)	>75	1.87 [1.61, 2.18] (<0.01)
MVR (pancreas)	67 (4.1)	Sex (REF = male)	1.01 [0.88, 1.15] (0.89)
Esophagogastrectomy	368 (22.4)	Year of diagnosis (REF = 2000)	
Total	247 (15)	2001	0.91 [0.74, 1.11] (0.35)
Subtotal	780 (47.4)	2002	0.91 [0.74, 1.13] (0.40)
Post-operative treatment		2003	0.86 [0.70, 1.05] (0.14)
Chemotherapy, n (%)	757 (46)	2004	0.97 [0.79, 1.19] (0.77)
Radiation, n (%)	855 (52)	2005	0.58 [0.40, 0.85] (0.01)
		Charlson index	1.22 [1.01, 1.48] (0.04)
		Institution volume	0.93 [0.88, 0.99] (0.01)
		Chemotherapy	0.90 [0.79, 1.02] (0.10)
		Radiation	0.90 [0.80, 1.02] (0.11)

Coburn et al. 2010 JSO

Hospital volume

Likely a marker for:

- Rapid access to diagnostic procedures
- Skilled pre-op staging (i.e. EUS)
- Peri-op infrastructure
- Access to peri-op Med/Rad Onc
- Access to peri-op rescue therapy (ICU, IR)

How can we as surgeons ensure that patients are getting the best possible treatment?

What are our Quality Indicators?

Defining Surgical Quality in Gastric Cancer: A RAND/UCLA Appropriateness Study

Savtaj Brar, MD, MSc, Calvin Law, MD, MPH, Robin McLeod, MD, FACS, Lucy Helyer, MD, MSc, Carol Swallow, MD, PhD, FACS, Lawrence Paszat, MD, MSc, Rajini Seevaratnam, MSc, Roberta Cardoso, RN, PhD, Matthew Dixon, MD, Alyson Mahar, MSc, Laercio G Lourenco, MD, Lavanya Yohanathan, MD, Alina Bocicariu, MD, Tanios Bekaii-Saab, MD, Ian Chau, MD, Neal Church, MD, Daniel Coit, MD, FACS, Christopher H Crane, MD, Craig Earle, MD, MSc, Paul Mansfield, MD, FACS, Norman Marcon, MD, Thomas Miner, MD, FACS, Sung Hoon Noh, MD, Geoff Porter, MD, MSc, FACS, Mitchell C Posner, MD, FACS, Vivek Prachand, MD, FACS, Takeshi Sano, MD, PhD, Cornelis van de Velde, MD, PhD, FACS, Sandra Wong, MD, FACS, Natalie Coburn, MD, MPH, FACS

“Most patients with curative GC should undergo resection with D2 lymphadenectomy assessing at least 16 LNs. ...

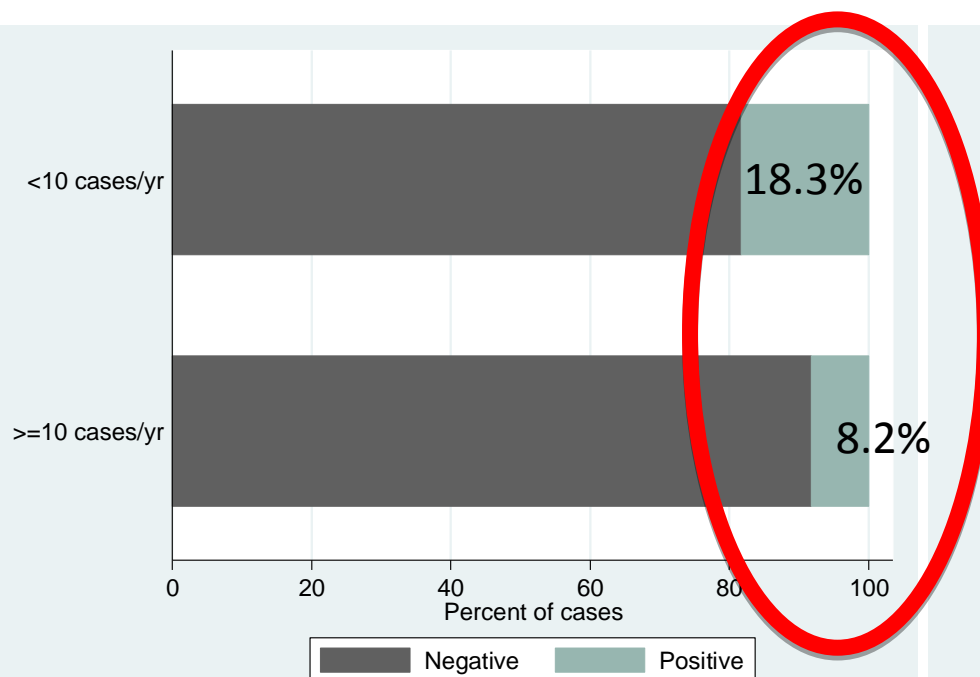
Frozen section analysis and subsequent consideration of re-resection to ensure negative margins is appropriate if the gross margin is <5 cm, or the lesion is T3 or T4.”

Quality Indicators

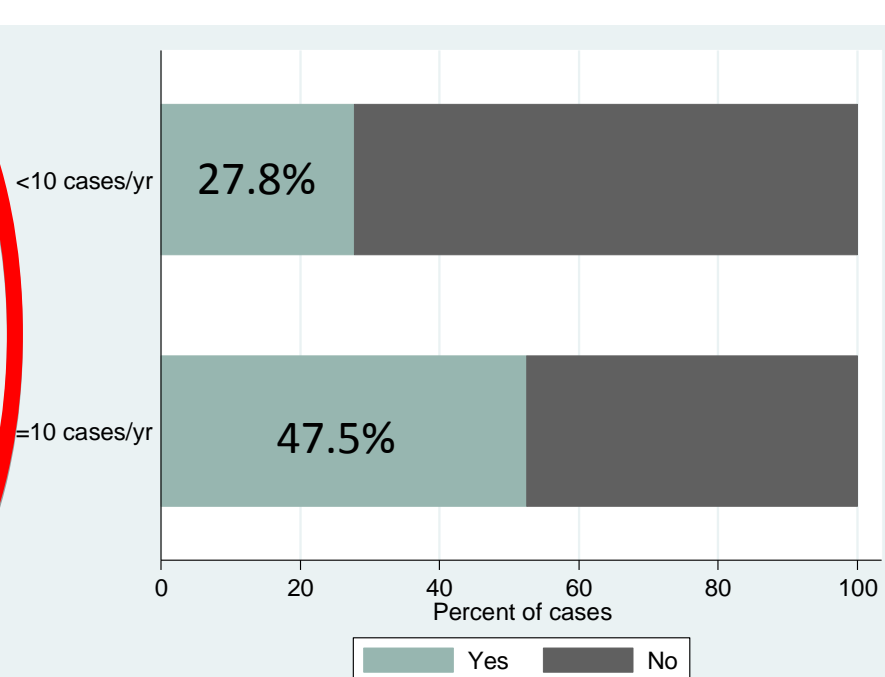
- Negative margins (R0), with frozen section
- Lymphadenectomy with ≥ 16 LNs
- Multi-disciplinary treatment

Margins

Final Margin Status, p=0.02



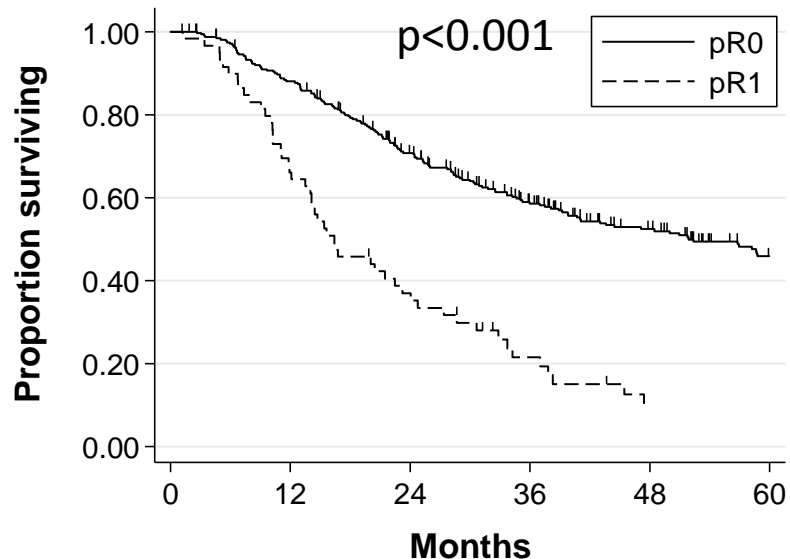
Use of Frozen Section, p=0.001



Margins

Overall Survival

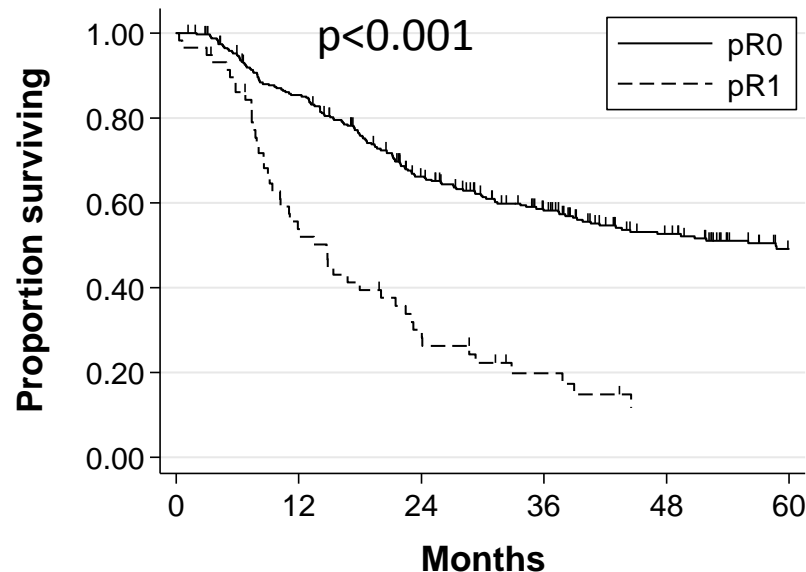
$p < 0.001$



Number at risk						
Final pR0	316	272	202	147	109	76
Final pR1	59	39	21	10	4	4

Recurrence-free Survival

$p < 0.001$

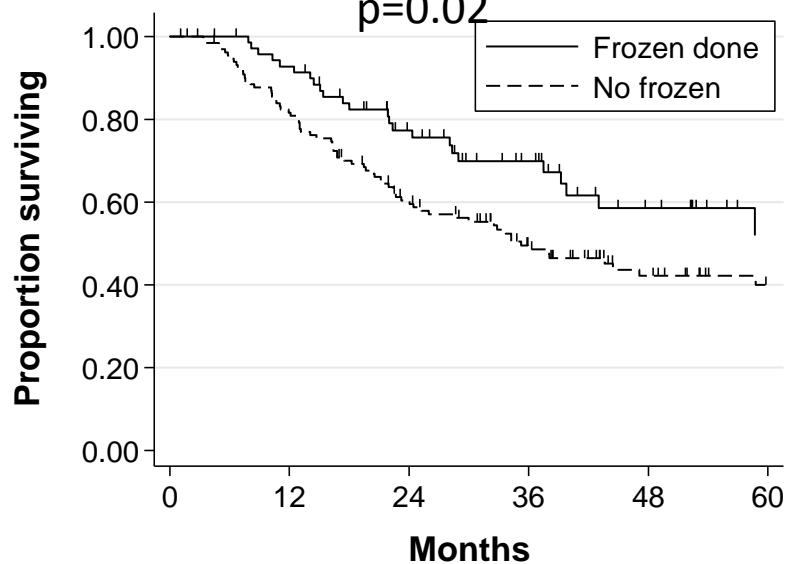


Number at risk						
Final pR0	316	261	185	141	104	73
Final pR1	58	30	16	8	4	4

Frozen

Overall Survival

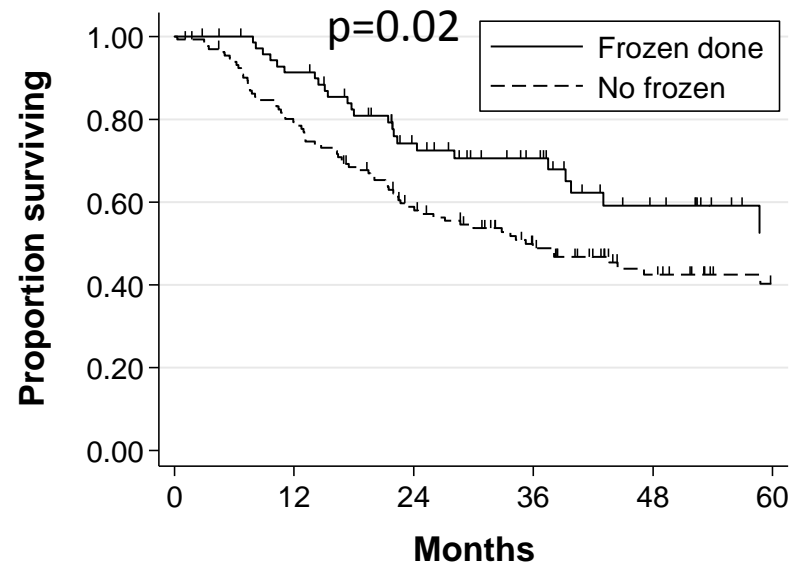
p=0.02



Number at risk		0	12	24	36	48	60
Frozen done	72	64	44	30	17	8	
No frozen done	133	106	73	48	29	16	

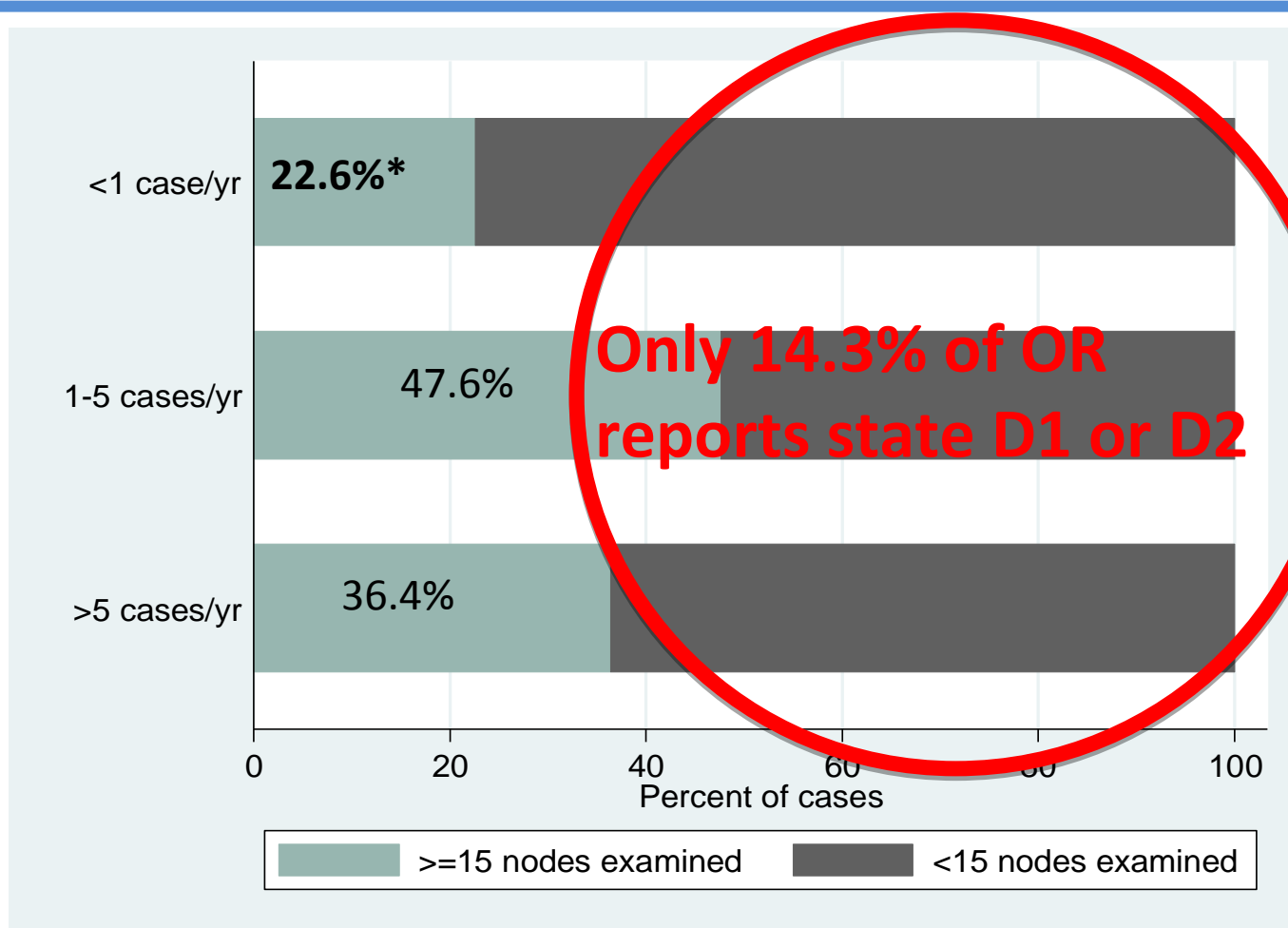
Recurrence-free Survival

p=0.02

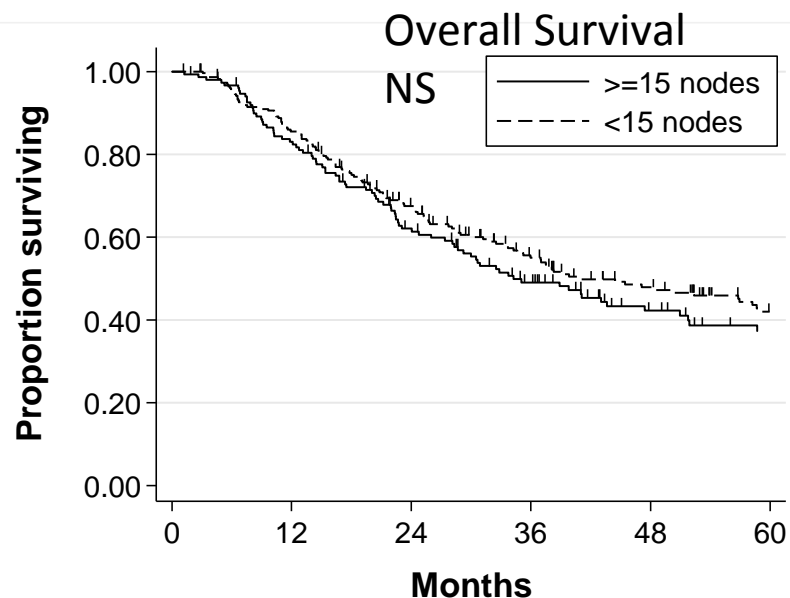


Number at risk		0	12	24	36	48	60
Frozen done	72	63	42	30	17	8	
No frozen done	133	103	71	48	29	16	

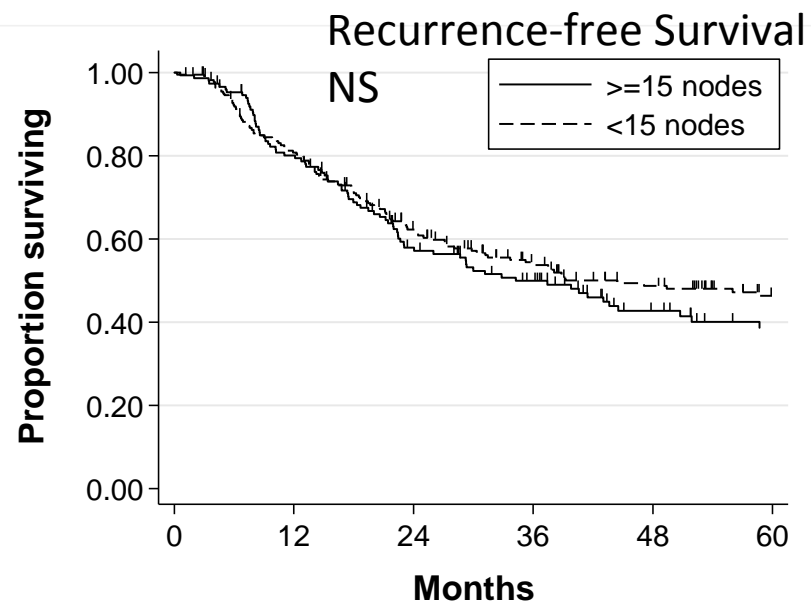
LN Harvest



LN Harvest

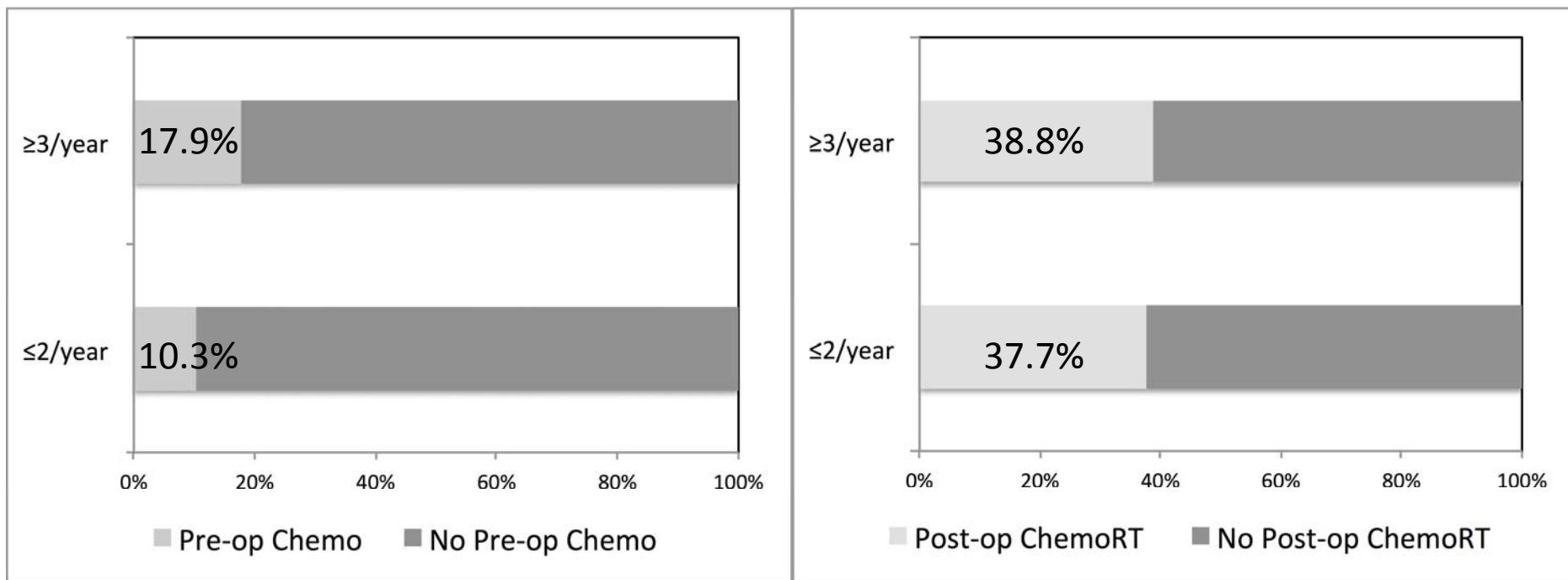


Number at risk		0	12	24	36	48	60
≥ 15 nodes	151	122	85	59	38	28	
< 15 nodes	224	189	138	98	75	52	



Number at risk		0	12	24	36	48	60
≥ 15 nodes	150	116	77	58	36	26	
< 15 nodes	224	175	124	91	72	51	

Multi-disciplinary





Discussion

Room for improvement in gastric cancer treatment in BC

- Reduce (+)margins (routine frozen)
- Adequate nodal harvest
- All patients reviewed at multi-disciplinary conference pre-op (consider peri-op chemo)
- Minimize low-volume hospital resections



Acknowledgements

Dr. Yarrow McConnell

Dr. Andy McFadden

Dr. Hannah Adamson

Dr. Noelle Davis

Dr. Rona Cheifetz

Dr. Howard Lim

Dr. Hagen Kennecke

Dr. Winson Cheung

Caroline Speers

GICOU

Gastric Cancer Resections in BC: How are we doing?

Trevor D Hamilton MD FRCSC

Surgical Oncology Network
November 7, 2015