

Dividing the pie into smaller slices

**A qualitative and quantitative analysis
of the general surgery workforce
In British Columbia 1992-2012**

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Disclosures

- The authors have no conflicts of interest to declare
- Dr. Hwang is the economics representative and Dr. Karimuddin is the president of the BCMA Section of General Surgery

Introduction

- General surgeons provide an irreplaceable role in both urban and rural settings in BC
- Urban
 - Liver transplant
 - Surgical oncology
 - Colorectal
 - Quaternary trauma care
 - Medical student core training

Introduction

- Rural
 - Emergency abdominal surgery
 - Elective daycare surgery
 - GI Endoscopy
 - Bulk of colorectal and breast cancer care
 - Peripheral trauma sites
 - Emergency obstetrics and critical care in smaller hospitals

Introduction

- In Canada, there are 5.0 general surgeons for a population of 100,000
- In the US, there are 7.1
- The ideal number to ensure high quality and timely care is 7.53
- In BC there are currently 4.0 and has been as low as 3.3 in 2002

Introduction

- Due to population growth and aging in the US many articles predict a shortage of general surgeons in the future
 - Sheldon GF Am Surgeon 2007;73:101-8
 - Lynge DC Arch Surg 2008;143:345-50
 - Lynge DC Surg Clin N Am 2009;89:1285-91
 - Richardson JD Social Work in Public Health 2011;26:513-23
 - Etzioni DA Arch Surg 2011;146:381-4
 - Williams TE Surgery 2011;150:617-25

Introduction

- Other contributing factors
 - Fixed number of training positions despite population growth
 - Decrease in interest in general surgery as a career choice
 - Increase in the number of residents who pursue fellowship training and do not end up practicing general surgery

Introduction

- In Canada and BC the population is growing and rapidly aging
- The population of BC
 - grew by 33.8% between 1992 and 2012
 - projected to grow another 12% by 2022
- Those aged 65+
 - grew by 66% between 1992 and 2012
 - projected to grow another 42% by 2022
 - By 2022 20% of BCs population will be 65+

Introduction

- Considering BC is lagging behind the rest of Canada in general surgeons per 100,000 population
- It is imperative to examine the cause for the shortage, the projected need over the next 10 years and potential solutions to alleviate the shortfall

Objective

- Design a study to analyze over 20 years
 - The change in number of FTE general surgeons
 - The population growth
 - Available hospital based resources
 - Wait times for 4 index procedures

Methods

- An electronic survey sent to all members (178) of the BCMA Section of General Surgery
- Follow up by fax, phone and email
- Surgeons asked to recall 1992-2012
 - number FTE general surgeons
 - FTE = OR/endoscopy time + call coverage
 - OR days per month for general surgery service at their hospital
 - Average wait time for 4 index procedures

Methods

- Surgeons asked about need for recruitment
- Surgeons also invited to submit written comments
- Data correlated with information from CIHI, population projections and BC Government waitlist data

Methods

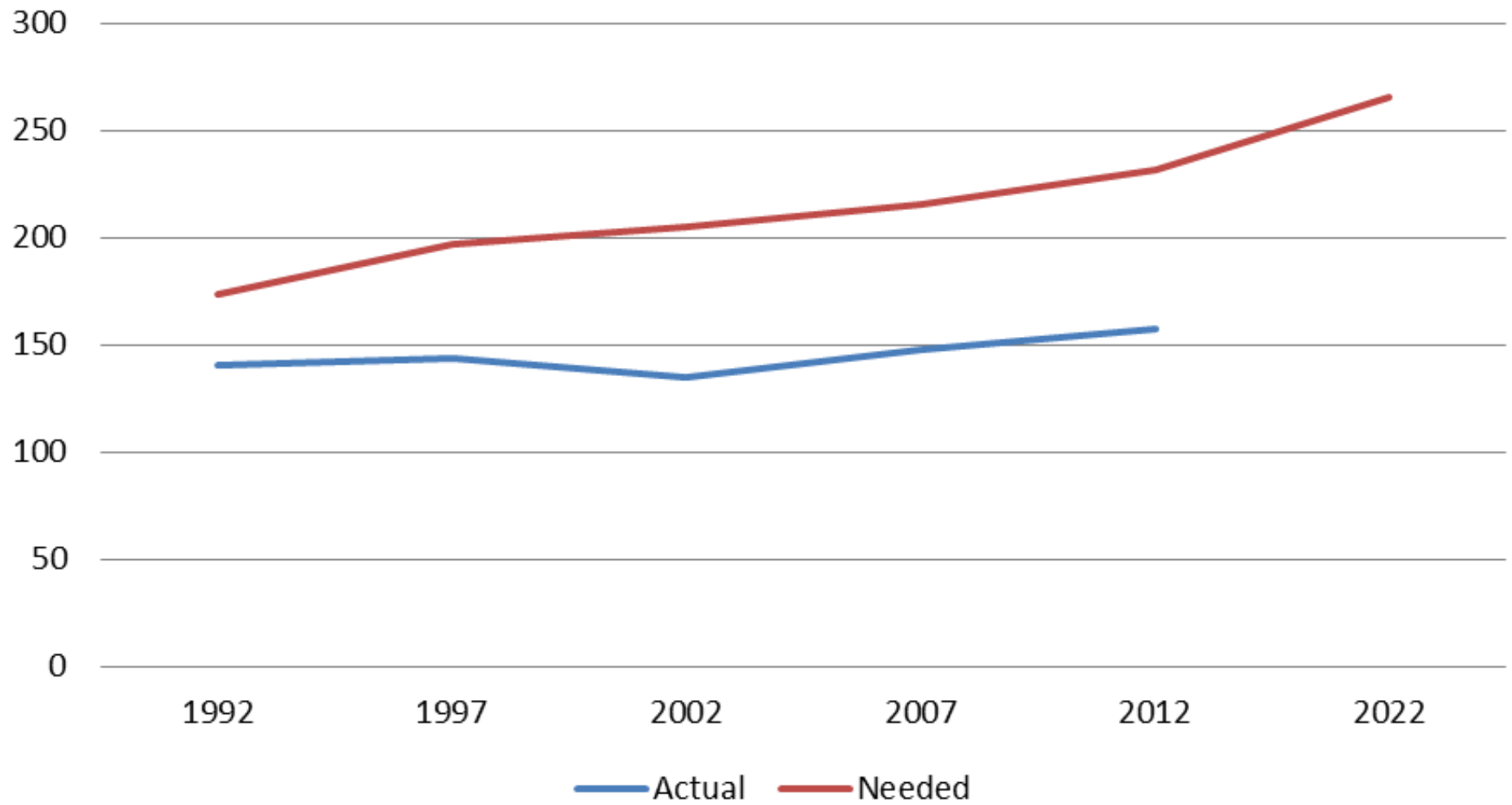
- Continuous variables compared with paired t-test or Wilcoxon signed rank test
- Predictive comparisons made with chi-square model goodness-of-fit test
- P value of 0.05 considered significant
- Statistics calculated using an internet based statistical calculator

Results

- 75 responses received from 34 individual hospitals
- All 5 health authorities represented
- The number of FTE general surgeons increased from 141 in 1992 to 158 in 2012
- To match the Canadian average there should be 232 general surgeons
- 260 needed by 2022 to match population growth

Results

BC FTE General Surgeons



Results

- 75 responses to questionnaire
 - 85% worked full time
 - 8% worked part time
 - 3% worked part time as a vascular, thoracic or pediatric surgeon
 - 1% performed only surgical assists
 - 3% were fully retired

Results

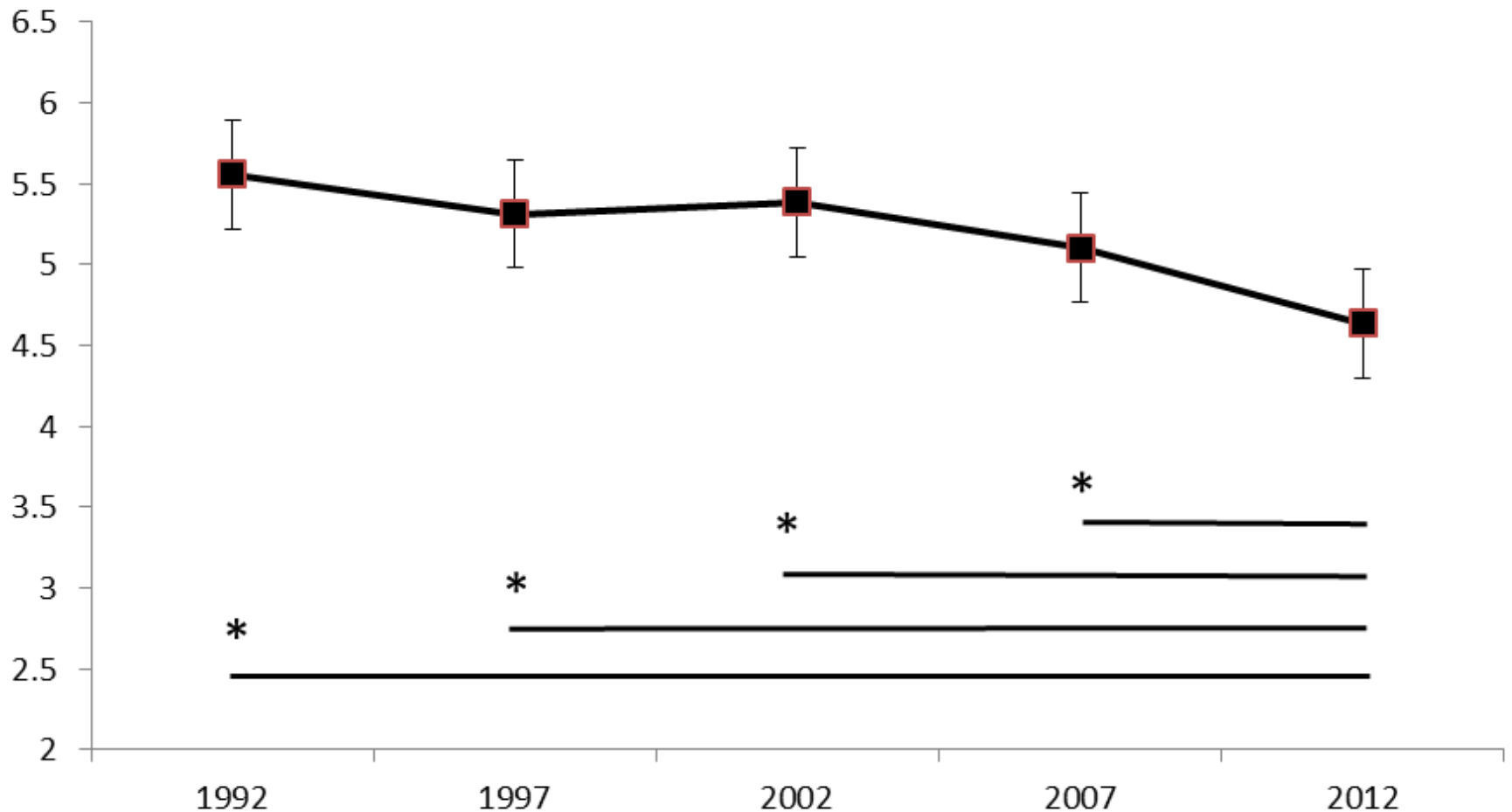
- 71 responses to recruitment question
 - 65% indicated an immediate need to recruit but were prevented from doing so as a result of lack of OR time, endoscopy time or both
 - 26% not recruiting and had no need
 - 6% had a need but lack of suitable candidates
 - 3% recently recruited and did not have need

Results

- Based on responses from 34 hospitals
 - Mean OR days per month per hospital decreased from 18.8 days in 1992 to 18.6 days in 2012
 - The population grew 34% so OR days should have increased to 25.1 days
 - The difference was significantly lower than expected $p < 0.0001$
 - The mean OR days per FTE significantly decreased from 5.6 in 1992 to 4.6 in 2012 ($p = 0.011$)

Results

OR days per FTE per month



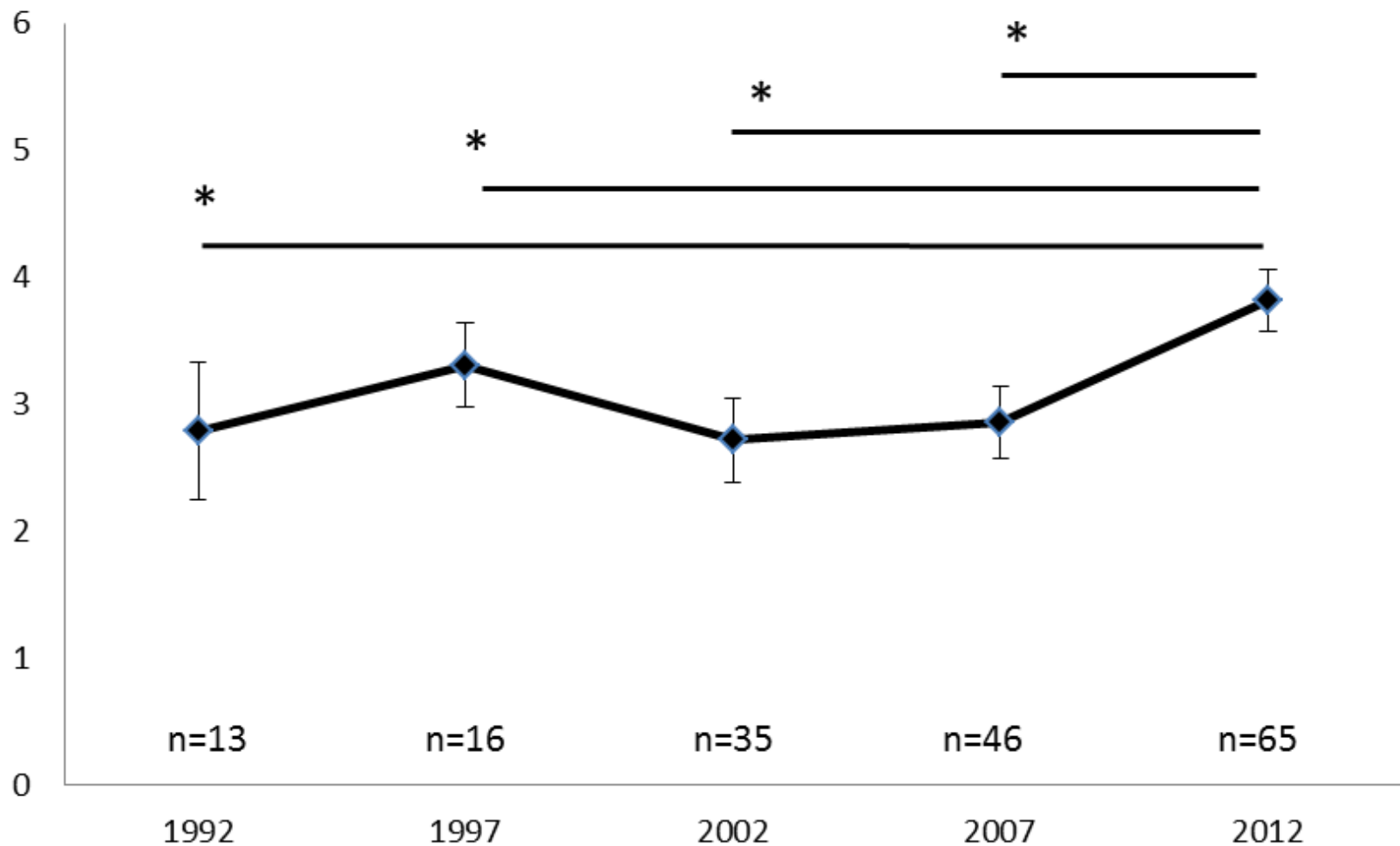
* $p < 0.05$

Results

- Mean wait times increased between 1992-2012
 - Cholecystectomy 2.8 to 3.8 months (37%)
 - Inguinal hernia 3.5 to 4.5 months (27%)
 - Bowel resection 1.3 to 2.3 months (77%)
 - Colonoscopy 3.0 to 5.2 months (73%)
 - All $p < 0.05$
- Overall a 54% increase in wait times

Results

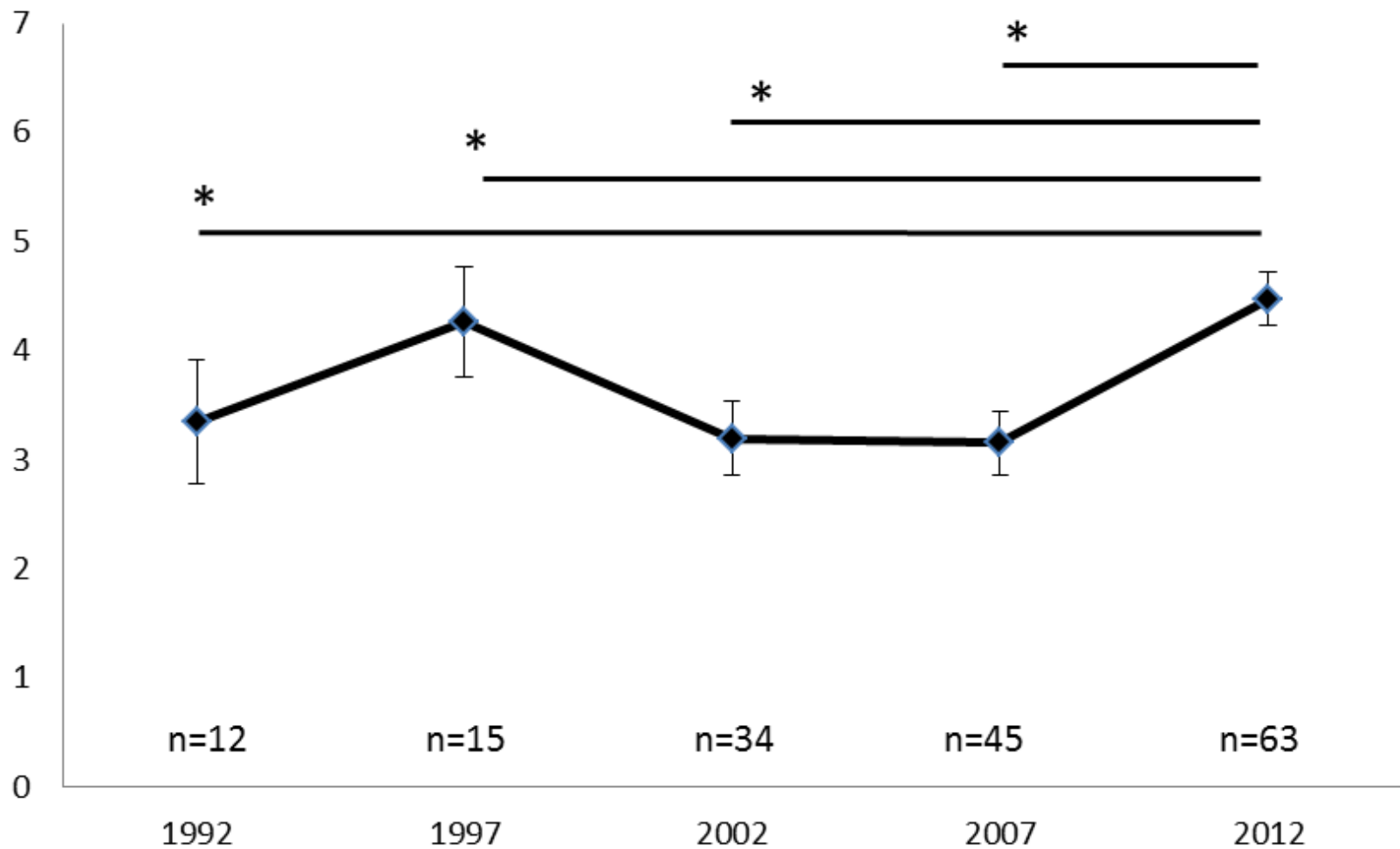
Cholecystectomy wait time (months)



* p < 0.05

Results

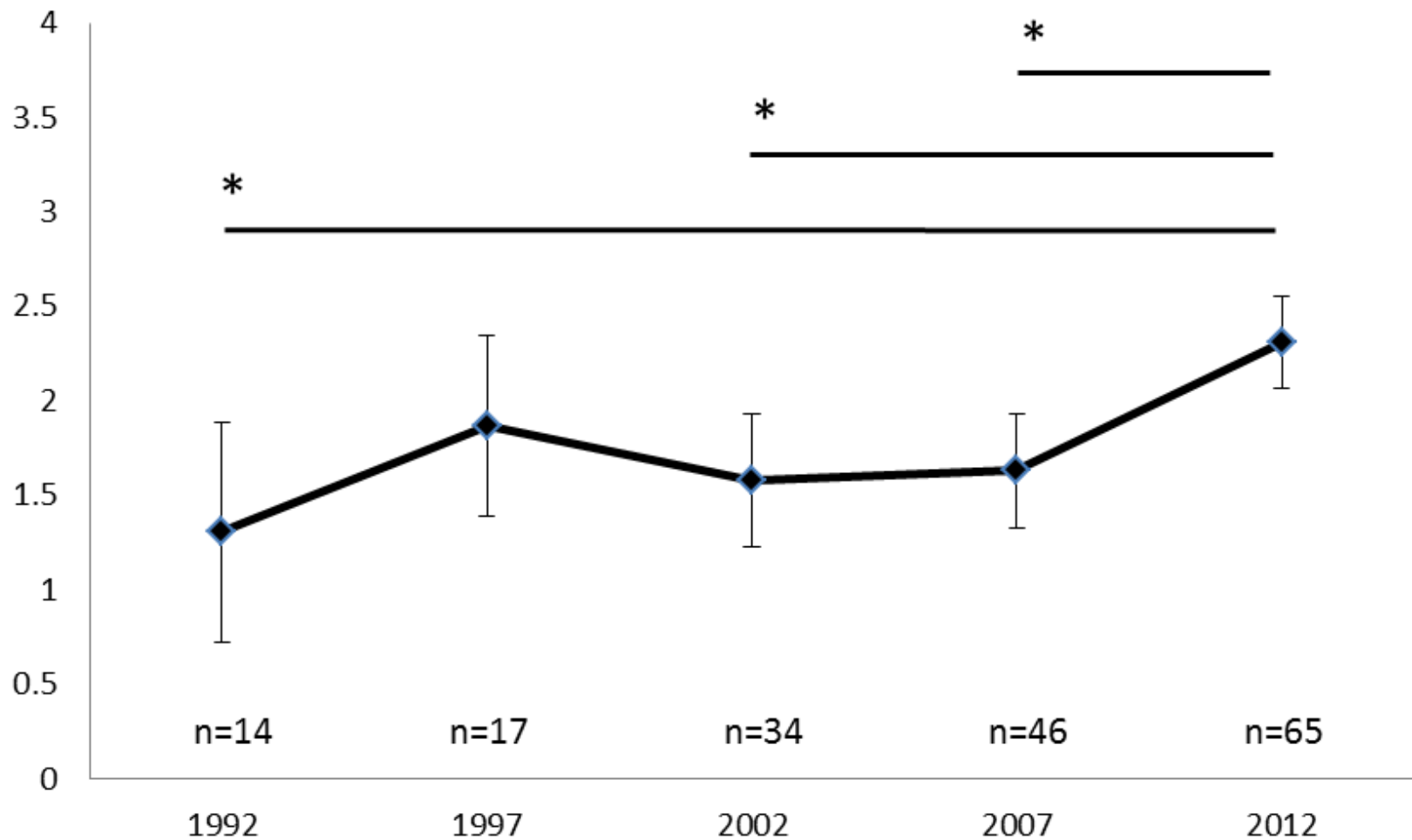
Inguinal hernia wait time (months)



* p < 0.05

Results

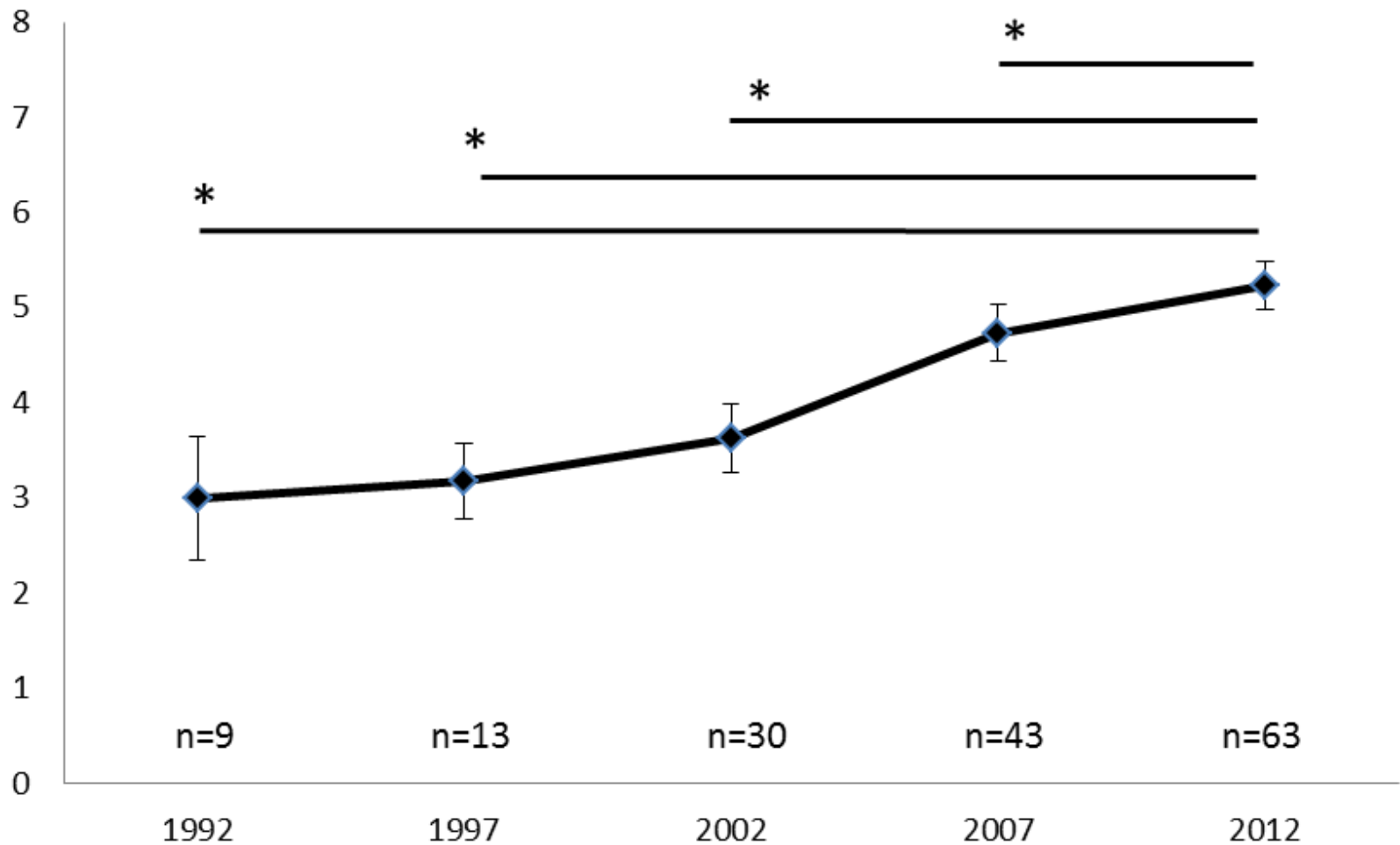
Bowel resection wait time (months)



* $p < 0.05$

Results

Colonoscopy wait time (months)



* $p < 0.05$

Results

- BC compares poorly with 4 other provinces with similar surgical wait times websites
- BC health authorities have the longest wait times for 4 common procedures with only one exception
- Colonoscopy not reported

<http://www.health.gov.bc.ca/swt/>

<http://www.health.gov.on.ca/en/public/programs/waittimes/>

<http://waittimes.alberta.ca>

<http://www1.gnb.ca/0217/SurgicalWaitTimes>

<http://gov.ns.ca/health/waittimes/>

Results

	Hernia	Cholecystectomy	Intestinal Surgery	Mastectomy
BC	32.2	24.0	13.0	6.7
VCHA	35.8	25.9	15.6	7.7
FHA	29.7	22.8	11.4	8.1
IHA	36.0	26.1	13.0	5.2
NHA	18.7	18.4	6.3	7.1
VIHA	33.7	24.9	9.7	5.9
Ontario	15.9	14.1	6.1	5.3
Alberta	28	20	28	8
New Brunswick	19.1	12.1	8.7	4.0
Nova Scotia	18.1	13.1	6.9	5.7

(90% of patients receiving surgery, in weeks, Aug - Oct 2012)

Results

- 39 (52%) respondents offered written responses
 - 9 inadequate OR time to meet increasing demands
 - 7 higher cancer workload and fixed OR time resulting in longer wait times
 - 6 increasing workload in general
 - 6 long endoscopy wait lists
 - 5 longer wait times for cancer patients
 - 5 frustration with bureaucracy

Results

- Other comments
 - 3 increasing wait times from GP referral to office consult
 - 3 long wait lists have altered referral patterns to send patients to neighboring communities
 - 2 losing OR time to other specialties
 - 1 compromising patient care due to long wait lists

Results

- Other comments
 - 1 diminishing workload in small rural community making practice non-viable
 - 1 no issues with wait lists or resources

Discussion

- The main limitation of this study is the survey format
- We assumed the responses were representative of the entire group

Discussion

- Provision of surgical care in BC is complex, poorly studied and poorly planned
- Benchmarks for joint replacement or cataracts have managed wait times for those procedures to the detriment of all others, including colorectal and breast cancer surgery

Discussion

- Despite 34% increase in population the amount of OR time for general surgery per hospital was unchanged over 20 years
- The amount of OR time per FTE decreased significantly over 20 years
- Wait times for 4 common procedures increased significantly

Discussion

- 65% of respondents in this study indicated the number one factor preventing recruitment is lack of operating room and endoscopy time, despite a clear need and objective shortfall compared to the Canadian average

Discussion

“Every month we struggle to find OR time for our cancer cases, with only doing elective non-cancer cases if there are open time slots left. Due to this issue, recruitment is also at a stand still”

- written comment from general surgeon

Discussion

- CIHI reported that there were 198 general surgeons and 176.76 FTE in 2009/10
- Because the CIHI figures are based purely on a billing based model this does not take into account locum, part time, semi-retired or surgeons who only do surgical assists
- Thus the effective number of FTE surgeons is overestimated

Discussion

- The per capita health expenditure for those aged 65+ is 3.4 to 3.9 times that of those less than 65
- One major contributing factor is cancer
- age is the greatest risk factor
- The population 65+ will increase 42% in the next ten years

Discussion

Health Authority	Population 65+ 2012	Population 65+ 2022	% increase
Vancouver Coastal	158 032	227 626	44%
Fraser	240 432	346 091	44%
Interior	146 865	197 859	35%
Northern	35 332	56 007	59%
Vancouver Island	149 402	209 879	40%
Total BC	730 063	1 036 688	42%

Discussion

- General surgeons are involved with nine of sixteen most common cancers
 - Breast
 - Colorectal
 - Lymphoma
 - Thyroid
 - Melanoma
 - Pancreas
 - Stomach
 - Liver
 - Esophagus

Discussion

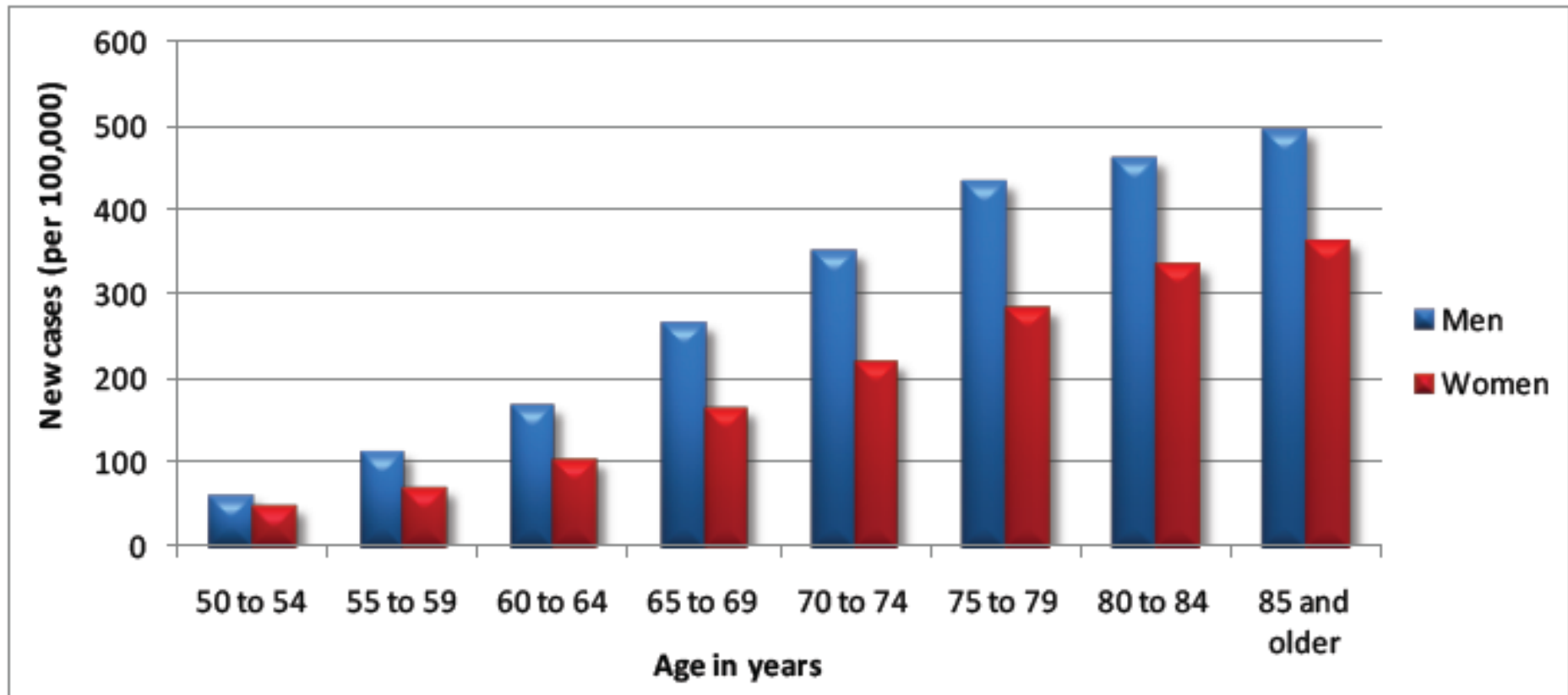
- The four most common cancers
 - Prostate 26,500 new cases per year
 - Resection rate 10%
 - Lung 25,600 new cases per year
 - Resection rate 10%
 - Colorectal 23,300 new cases per year
 - Resection rate 67%
 - Breast 22,900 new cases per year
 - Resection rate 84%

Discussion

- The increased number of cancer cases requiring surgical resection can be estimated
 - Percentage of cases requiring resection
 - Population growth by 5 year cohorts
 - Incidence per 100,000 by 5 year cohorts

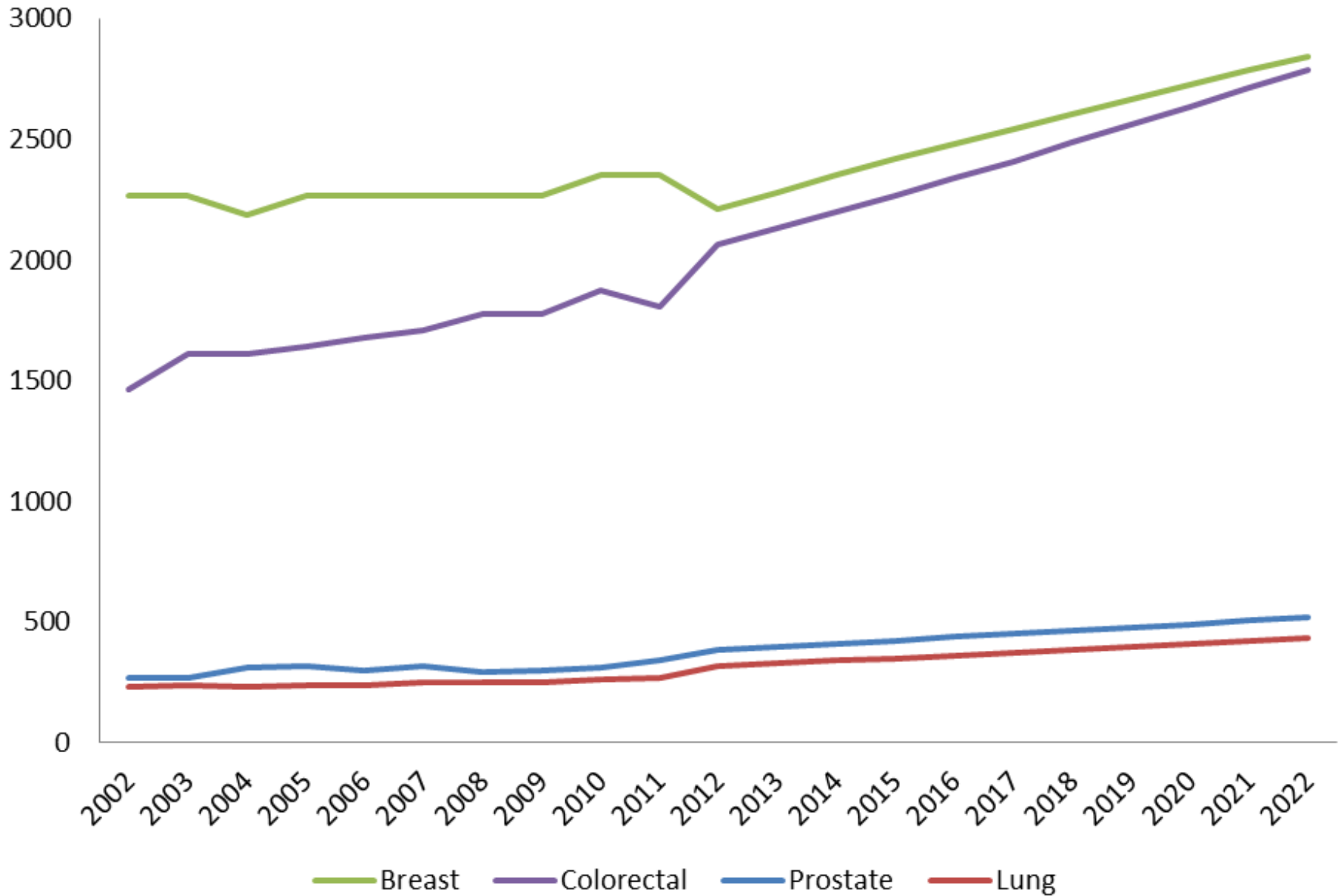
Discussion

Chart 5: Colorectal cancer, incidence rates per 100,000, by age group and sex, Canada, 2007



Source: Statistics Canada, Canadian Cancer Registry (CCR) Database (July 2011 file) (CANSIM table 103-0550). Rates for ICD-O-3 primary sites of cancer, by age group and sex, Canada, provinces and territories, annual.

BC Annual surgical cases



Discussion

- In 2022, there will be 325,000 more people 65+ in BC so will expect an additional 634 breast cancer and 726 colorectal cancer cases per year
- This is roughly 2720 hours of additional cancer surgery per year
- Equivalent of 7 full OR days per week over and above what is currently performed in BC
- Does not include thyroid, melanoma, etc

Discussion



Discussion

- According to the provincial surgical registry between January and August 2012 only 68.9% of general surgery procedures in BC were performed within the target wait time
- 77.3% for cancer cases
- Definitely room for improvement
- Increased demand will worsen these figures

Discussion

“There is a global need for more OR time at our institution. We have just started using the [resource allocation management] methodology but it only allocates based on the OR time we currently have and redistributes it between surgeons. There will be no new OR time created so the overall shortage will continue.”

- written comment from general surgeon

Discussion

- Priority setting scoring systems do not address the fundamental problem of inadequate OR time
- Without providing adequate OR and endoscopy time to keep up with population growth increasing the 'head count' of general surgeons merely divides the same pie into smaller slices

Discussion

- BC currently has 158 FTE general surgeons, 74 short of the 232 needed to equal the Canadian average
- The major impediment to recruitment is not remuneration but resource allocation, specifically OR time and endoscopy time

Discussion

Health Authority	Population 2012	FTE General Surgeons	FTE Needed 2012	Population 2022	General Surgeons needed 2022
Vancouver Coastal	1 161 809	35	58	1 278 617	64
Fraser	1 662 540	44	83	1 942 161	97
Interior	749 027	36	37	813 042	41
Northern	292 030	14	14	307 370	15
Vancouver Island	774 171	29	39	849 612	43
Total BC	4 639 577	158	232	5 190 802	260

Conclusions

- In BC, hospital resources and FTE general surgeons over the last 20 years have not matched the 34% increase in population
- The result is increasing wait times to unacceptable levels
- In the face of a growing and aging population, who will need surgical care of cancer in particular, appropriate resources must be planned and provided to meet the need

Acknowledgements

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Good luck!

