Queensland Colorectal Cancer Audit Report

2016

Queensland

qccat queensland cancer control analysis team

the Partnership queensland cancer control safety and quality partnership

Queensland Government

Queensland Cancer Control Analysis Team

Acknowledgements

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The members of the Colorectal Cancer Subcommittee inpclude: Dr David Theile AO (Chair), Dr David Clark, Dr Mark Doudle, Dr John Hansen, Dr Nicholas Lutton, Dr Pieter Prinsloo and Dr David Taylor.

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Queensland Colorectal Cancer Audit Report 2016

audit of colorectal cancer care in Queensland public and private hospitals 2012

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Foreword

It is well recognized that study of both process measures and risk adjusted outcomes can be agents for health improvement. Audits conducted by individual clinicians, units, hospitals and health systems all provide varying dimensions of critical appraisal and these can all be productive in guiding improvement. Much published literature exists on various indicators for colorectal cancer surgery however the studies are typically hospital-based or regional with incomplete or uncertain case ascertainment. Complete population-based audits are rare.

The role of The Partnership is to identify where service improvement could enhance the patients experience of the cancer services provided in Queensland. The Partnership has been providing public and private hospitals with specific reports of process and outcome indicators for colorectal cancer surgery for a number of years. Reports are presented to clinical units and to hospital administrators in the belief that improvement is the responsibility of everyone, from focal clinicians input to teams and systems. Comparison of performance by each hospital with de-identified peers has led to practice improvements by clinical units and hospital administration, including case selection that better suits hospital capability.

The Partnership does not categorically describe issues or prescribe actions but believes strongly that the initiative for improvement should remain in the hands of the clinical care providers.

Questions that arise sometimes expose incompleteness of recorded data. This can lead to equivocating acceptance by units or hospitals of results and comparisons. Thus a comprehensive state-wide audit of colorectal cancer surgery for the year 2012 was conducted with complete capture of demographic data, pathological descriptors and staging.

Surgical resection is the definitive treatment for colorectal cancer. The primary considerations in ensuring Queenslanders receive the best possible care are access and the best quality resectional surgery. The immediate indicators of quality of surgery are surgical survival and oncologic adequacy of resection. The details required for validity of comparisons include patient characteristics and cancer staging.

The quality of surgical resection is the mainstay of this audit which gives an assessment for national and international comparisons and a baseline for future results.

Future improvement rests significantly with multidisciplinary decision making and care and the ideal instrument for this is MDTs.

Clinicians are the strongest advocates for service improvement and we encourage you all to join with us in Queensland's cancer control safety and quality program and to develop within your hospital strategies for continued improvement.

Professor David E Theile AO
Chair
Queensland Cancer Control Safety and Quality Partnership
(The Partnership)

Why develop the Queensland Colorectal Cancer Audit (The Colorectal Audit)?

Colorectal cancer is a major cause of illness, disability and death in Queensland and is the most common cancer in men and women. In 2016 an estimated 3,225 Queenslanders will be diagnosed with colorectal cancer and 1,150 will die from colorectal cancer. Major resection for colorectal cancer is a relatively common surgical procedure and the management of patients undergoing the surgery is often complex. Patients require care from a multidisciplinary team to ensure they receive the appropriate treatment that will lead to the best outcomes.

The Queensland Colorectal Cancer Audit was instigated to better understand the variation in diagnosis, management and outcomes of patients diagnosed with colorectal cancer between Queensland hospitals. This report reveals differences between individual hospitals which may not be obvious in daily clinical practice but become clear with this type of analysis.

The Colorectal Audit is the first comprehensive population wide report for Queensland and in Australia. Preparing this report is an important first step in raising awareness amongst individual hospitals on the patterns of surgery and outcomes for Queenslanders with colorectal cancer.

Colorectal cancer will continue to be monitored by The Partnership with a focus on guiding best practice to ensure the best possible outcomes for Queensland patients.

The Partnership

The Colorectal Audit is an initiative of The Colorectal Subcommittee, a subcommittee of The Queensland Cancer Control Safety and Quality Partnership (The Partnership), a gazetted quality assurance committee under Part 6, Division 1 of the Hospital and Health Boards Act 2011 in 2004. A key role of The Partnership is to provide cancer clinicians, Hospital and Health Services (HHS), Hospitals and Queensland health with cancer information and tools to deliver the best patient care. The Partnership is supported by the Colorectal Cancer Sub-committee: Professor David E Theile AO (Chair), David Clark, Mark Doudle, John Hansen, Nicholas Lutton, Pieter Prinsloo, David Taylor and the Queensland Cancer Control Analysis Team (QCCAT) who have worked together to develop a suite of quality indicators for colorectal cancer surgery and to prepare this report.

The Partnership and the Colorectal Subcommittee encourages you to consider how this information will inform colorectal cancer management in your jurisdiction in Queensland.

What is the Colorectal Audit?

The Colorectal Audit has been developed for public and private cancer services in Queensland. It tracks Queensland's progress delivering safe, quality colorectal cancer surgery care, highlights areas for improvement and identifies the areas where colorectal cancer surgery services are performing well.

This first version of The Colorectal Audit aims to measure the safety and quality of care and outcomes for patients with colorectal cancer in Qld. The Colorectal Audit includes data on all 2,788 colorectal cancer

patients diagnosed in 2012. The Colorectal Audit is a tool for reviewing, comparing and sharing information on the safety and quality of colorectal cancer surgery treatments and outcomes. It provides an important baseline for future monitoring of colorectal cancer surgical care and changes in clinical practice.

The Partnership has prepared The Colorectal Audit to assist cancer clinicians and administrators to improve patient care. In some cases it may prompt a change in the delivery and organisation of colorectal cancer services to improve health outcomes and performance.

Where has the data come from?

Since 2004 QCCAT have compiled and analysed a vast amount of information about cancer incidence, mortality, survival, surgery and other treatments.

Key to QCCAT's program of work is the ability to match and link population based cancer information on an individual patient basis. This matched and linked data is housed in the Queensland Oncology Repository (QOR), a resource managed by QCCAT. This centralised repository compiles and collates data from a range of source systems including the Queensland Cancer Registry, hospital admissions data, death data, treatment systems, public and private pathology, hospital clinical data systems and Queensland Oncology On-Line (QOOL). QOR contains approximately 40 million records between 1982 and 2013. Our matching and linking processes provide the 350,000+ matched and linked records of cancer patients between 2004 and 2013, which provide the data for The Colorectal Audit.

QCCAT, with support from the specialist surgeons of the Colorectal Cancer Sub-committee, reviewed all 2,193 major resections and their patient pathology reports to extract pathological stage, lymph nodes and margin data. This was incorporated with QOR data and is used in The Colorectal Audit.

MDTs, QOOL and audit

An important function of The Partnership is to provide web-based multidisciplinary meeting software known as Queensland Oncology On Line (QOOL), to support MDTs in the public and private sector.

Ideal management of patients with cancer requires optimal decision making and implementation at every step of the journey – investigation, diagnosis, definitive treatments, support and follow-up. Each step requires multidisciplinary involvement. QOOL supports the management of MDTs with electronic integration of timely clinically relevant information and the capture of cancer stage and other prognostic variables. Colorectal surgeons are able to use QOOL to complete the Colorectal Surgical Society of Australia and New Zealand (CSSANZ) audit and contribute to the Bi National Colorectal Cancer Audit (BCCA). All hospitals are encouraged to provide multidisciplinary cancer care for patients with colorectal cancer and to use the systems and tools provided by The Partnership.

Quality measures used

Measures for colorectal cancer management have been drawn from published literature, national and international audits and the expert advice of the colorectal cancer subcommittee. The report focuses on the timeliness of colorectal cancer surgery, neo-adjuvant radiotherapy for rectal cancer, multidisciplinary team management, length of stay, lymph nodes examined/positive, margins, pathological stage, mortality, and survival outcomes.

How comparisons are made between patient, geographical and hospital groups

Patients are all different and factors such as age, casemix and hospital capability will vary between different hospitals and geographical regions. In order to compare hospitals in as fair way as possible the audit utilises the Australian hospital peer groups classification developed by The Australian Institute of Health and Welfare (AIHW). AIHW groups public and private hospitals that share similar characteristics, providing a basis for meaningful comparisons. There are thirty peer groups, ten of which are relevant to this report. Geographical areas are reported using the Australian Standard Geographical Classification (ASGC). Peer groups definitions and groupings used in this report are defined in Appendix A.

Privacy and confidentiality

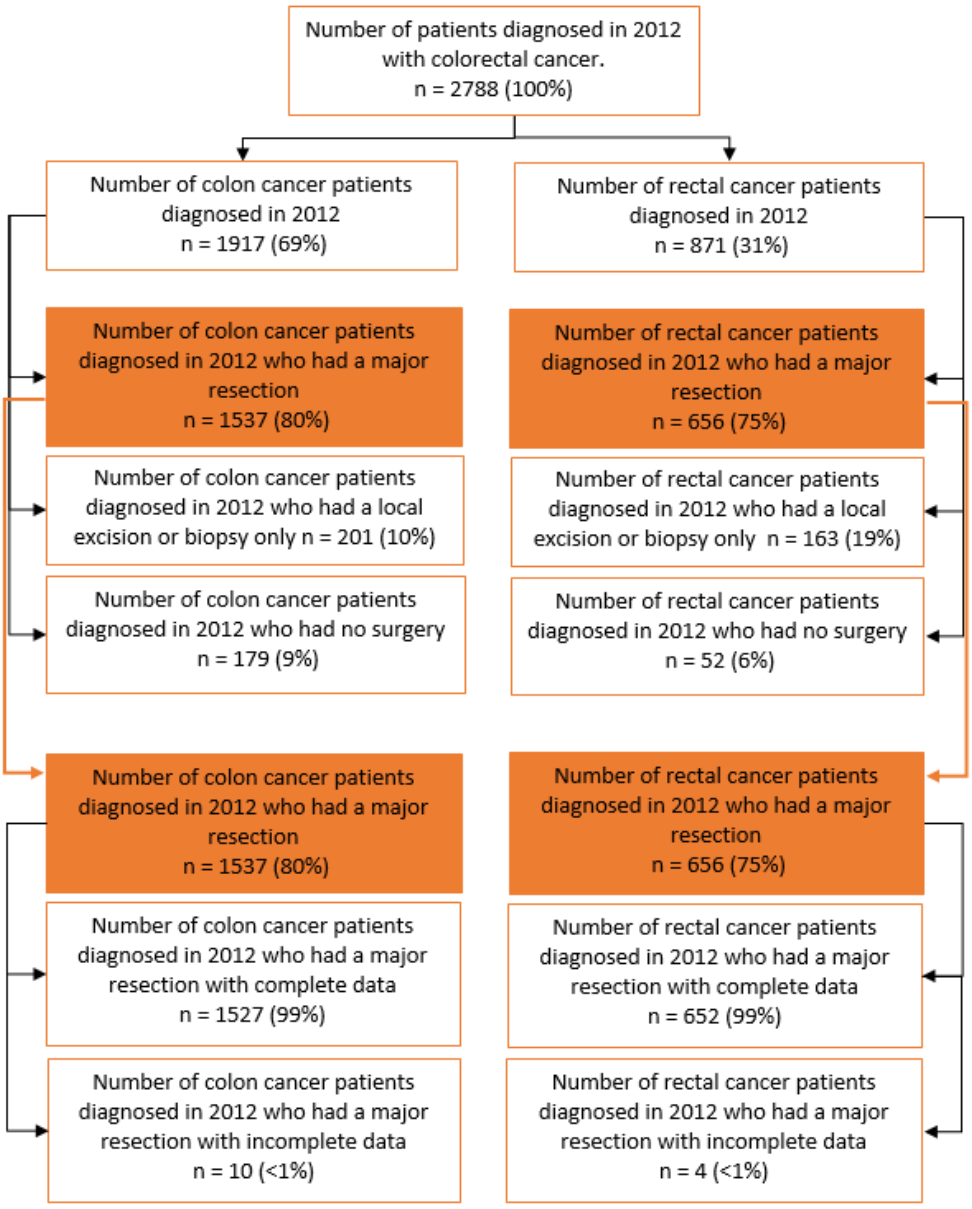
Reports generated on behalf of The Partnership will contain aggregate and de-identified data and maintain the confidentiality of the person receiving the health service and the individual provider.

What has been included in The Colorectal Audit?

The focus of this report is patients who underwent a major resection for colon or rectal cancer. The members of the colorectal subcommittee reviewed the pathology reports of all 2,193 major resections and extracted TNM stage, the number of lymph nodes examined, the number of lymph nodes positive and surgical margin distance. 2,179 major resections cases had complete data containing all four data items. Complete data was collected for >99% of cases.

This is a point of difference between the Queensland Colorectal Audit and other national or international audits where data contributions are often voluntary and participation and capture rates vary from 10%[1] (BCCA) to approximately 80%[2] (UK Colorectal Audit) of colorectal cancer incidence.

Patients who did not receive a major resection may not have complete clinical and pathological information. This group includes people with early cancers undergoing a local excision or biopsy and those people with too much disease or comorbidity for a major resection.



[1] The Bi-National Colorectal Cancer Audit Report, 2015. Bi-National Colorectal Cancer Audit
[2] National Bowel Cancer Audit Annual Report, 2013. The National Bowel Cancer Audit (UK)

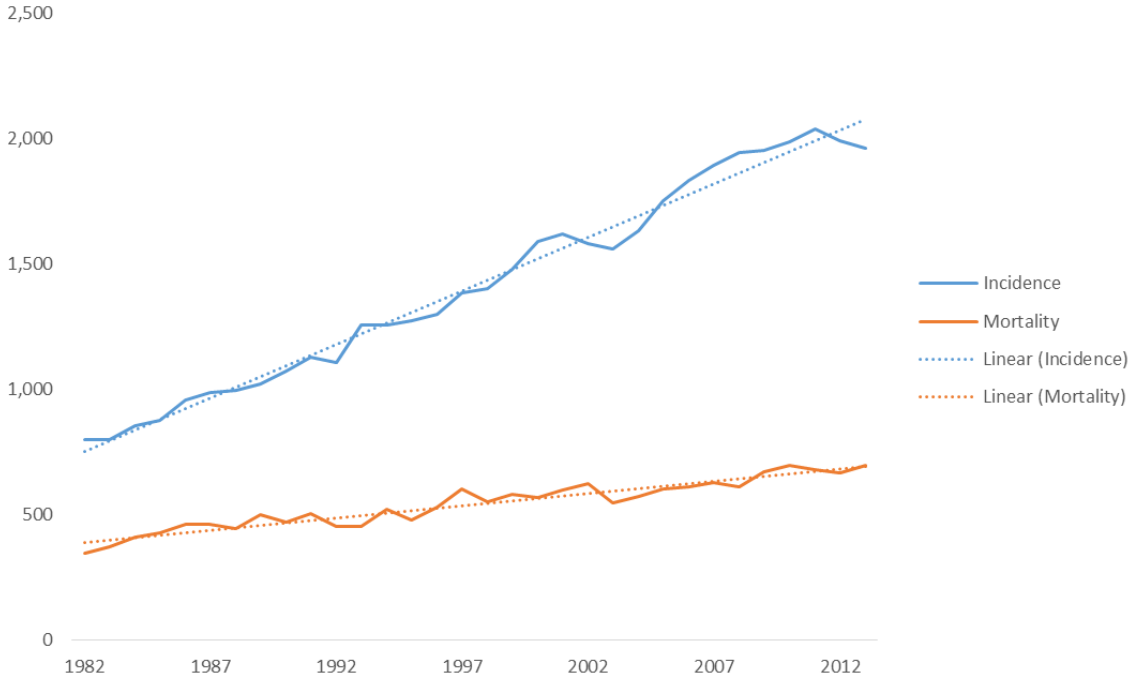
Key findings

- All 2,788 colorectal cancers diagnosed in Queensland in 2012 are included in the Colorectal Audit.
- The available information for all 2,193 cases of major resection were reviewed by specialist colorectal surgeons.
- 21% of patients with colorectal cancer do not have a major resection.
- 82% of colon and 88% of rectal cancer patients are living two years following major resection.
- Patients who do not receive surgery tend to be older than patients who receive surgery.
- 75% of colon cancer patients and 39% of rectal cancer patients receive a major resection within 30 days of diagnosis. However, there is a large variation between the public and private sector (patients may require other treatments prior to surgery which may influence timelines).
- Only 31% of colon and 40% of rectal patients have a record of being reviewed in a multidisciplinary setting. Many formal colorectal multidisciplinary meetings have been established in Queensland.
- As guidelines for best practice treatment planning evolve, it is recommended that all patients with colon and rectal cancer be reviewed by a multidisciplinary team.
- 77% of colon cancer patients who had a major resection and 69% of rectal cancer patients who had a major resection have 12 or more lymph nodes examined. The number of nodes examined is an indicator of the combined quality of surgical excision and pathologic examination.
- 2,211 pathology reports from major resection were reviewed for key information on lymph nodes and surgical margins. Many pathology reports were missing key information or were very difficult to interpret. Synoptic reporting of histopathology reports would allow for consistent interpretation.
- 4% of colorectal cancer patients who had major resection have involved surgical margins.
- Postoperative mortality is associated with increasing age and comorbidities.
- Postoperative mortality rates following major resection for colorectal cancer in Queensland are among the best in the world.

1.0 Incidence and Mortality

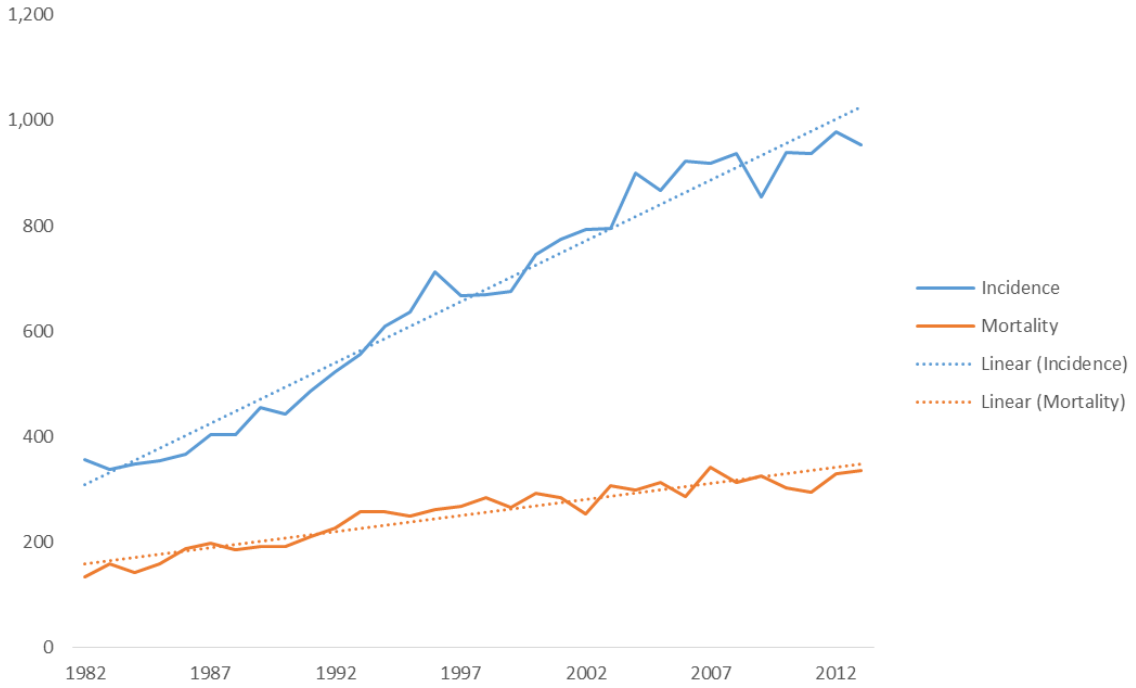
COLON CANCER; YEAR OF DIAGNOSIS 1982-2013

Figure 1.0a: Queensland colon cancer incidence and mortality trend 1982-2013



RECTAL CANCER; YEAR OF DIAGNOSIS 1982-2013

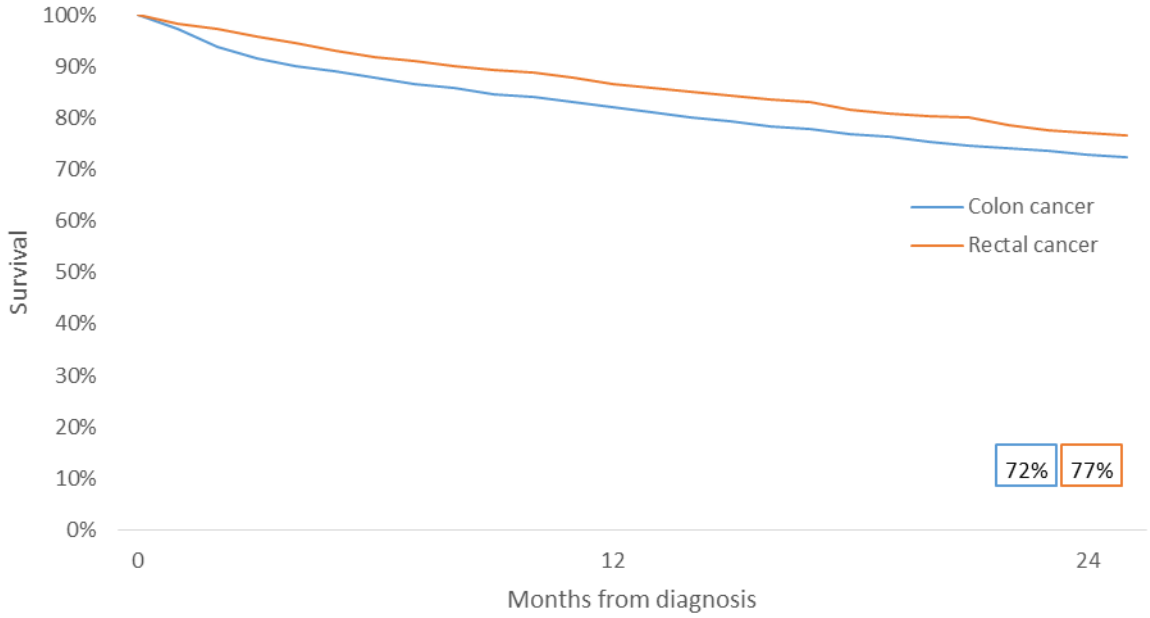
Figure 1.0b: Queensland rectal cancer incidence and mortality trend 1982-2013



1.1 Survival

COLON & RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 1.1a: What percentage of patients are living two years after their diagnosis?

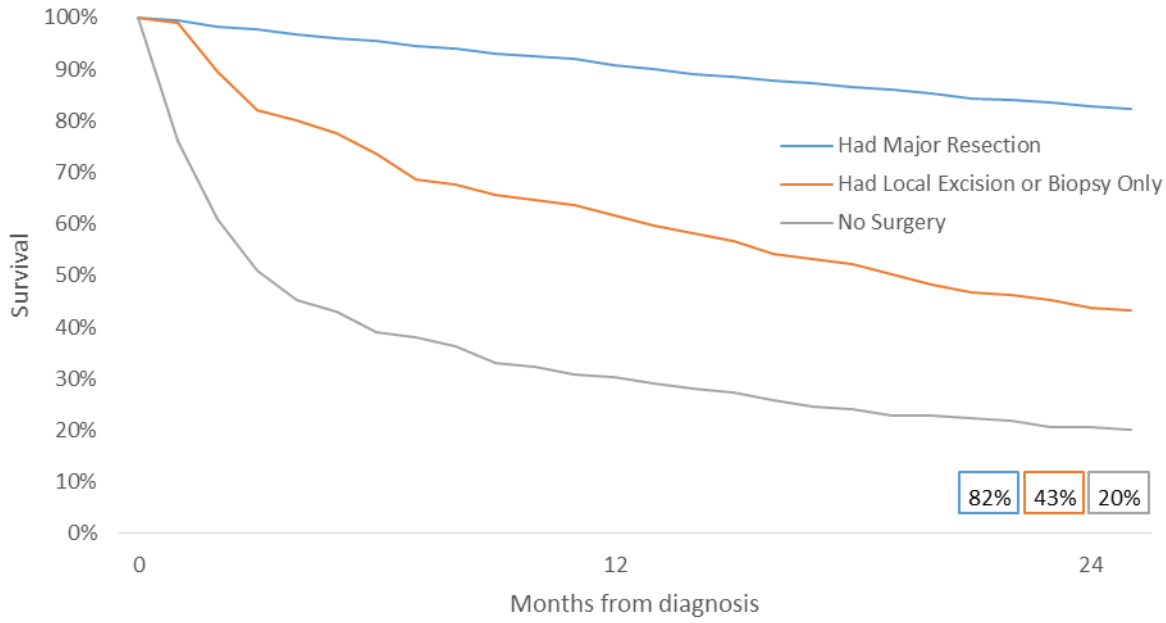


Colon cancer (n/N)	1388	1917
Rectal cancer (n/N)	667	871
Total (n/N)	**2055**	**2788**

Colorectal cancer is the second most common cancer diagnosed among both males and females in Queensland – after melanoma. It is the second leading cause of cancer death – after lung cancer.

COLON CANCER; YEAR OF DIAGNOSIS 2012

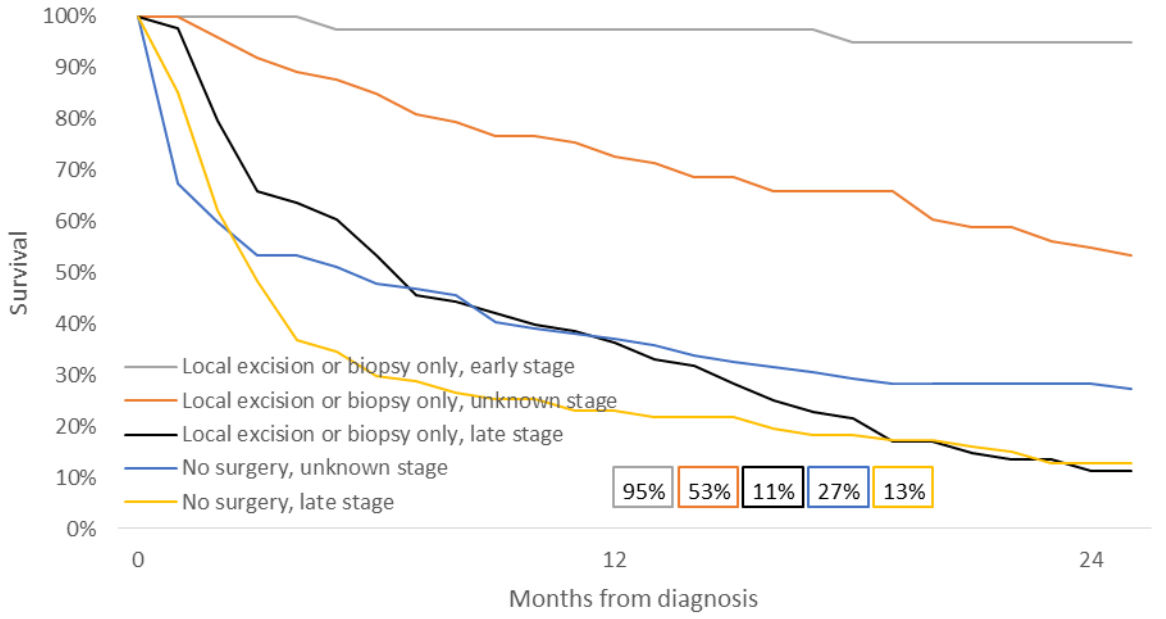
Figure 1.1b: What percentage of colon cancer patients are living two years after their diagnosis by surgery type?



Had Major Resection (n/N)	1265	1537
Had Local Excision or Biopsy Only (n/N)	87	201
No Surgery (n/N)	36	179
Total (n/N)	**1388**	**1917**

COLON CANCER; YEAR OF DIAGNOSIS 2012

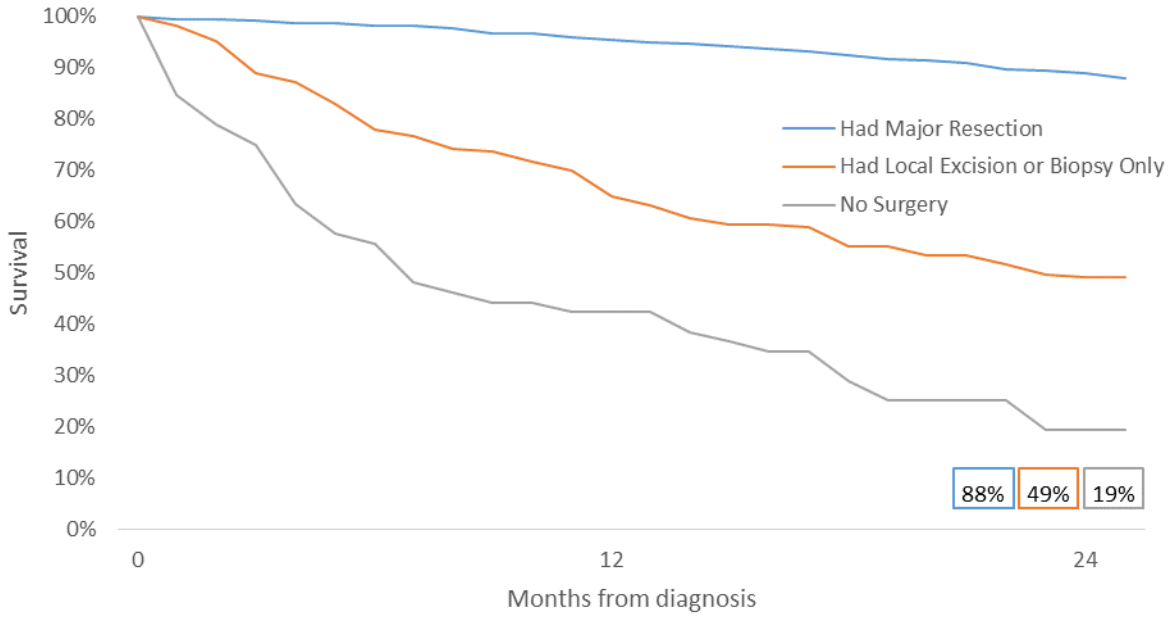
Figure 1.1c: What percentage of colon cancer patients who did not receive major resection are living two years after their diagnosis by surgery type and stage?



Local excision or biopsy, early stage (n/N)	38	40
Local excision or biopsy, unknown stage (n/N)	39	73
Local excision or biopsy, late stage (n/N)	10	88
No surgery, unknown stage (n/N)	25	92
No surgery, late stage (n/N)	11	87
Total (n/N)	**123**	**380**

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

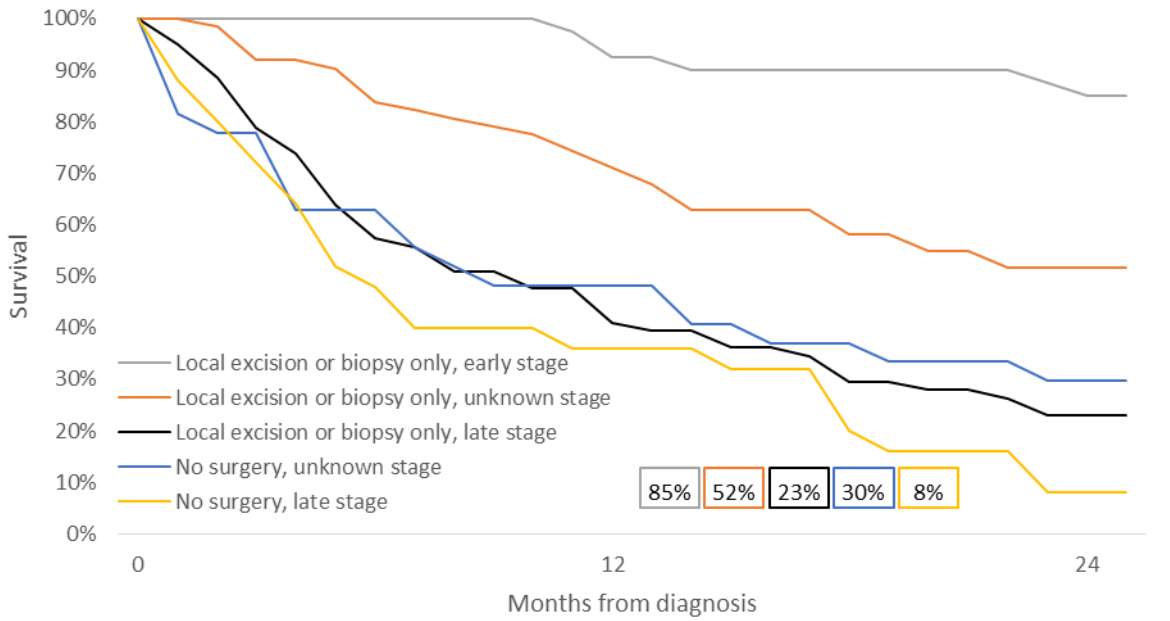
Figure 1.1d: What percentage of rectal cancer patients are living two years after their diagnosis by surgery type?



Had Major Resection (n/N)	577	656
Had Local Excision or Biopsy Only (n/N)	80	163
No Surgery (n/N)	10	52
Total (n/N)	**667**	**871**

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 1.1e: What percentage of rectal cancer patients who did not receive major resection are living two years after their diagnosis by surgery type and stage?



Local excision or biopsy, early stage (n/N)	34	40
Local excision or biopsy, unknown stage (n/N)	32	62
Local excision or biopsy, late stage (n/N)	14	61
No surgery, unknown stage (n/N)	8	27
No surgery, late stage (n/N)	2	25
Total (n/N)	**90**	**215**

2.0 Primary Surgical Procedure

COLON CANCER; YEAR OF DIAGNOSIS 2012

What are the characteristics of colon cancer patients?

	Colon cancer	Had major resection	Local excision or biopsy only	No surgery
Queensland	**1917**	**1537**	**201**	**179**
	100%	**80%**	**10%**	**9%**
Median age at diagnosis	72	72	72	80
% Male	54%	54%	60%	43%
% Indigenous	<1%	<1%	<1%	2%
% Socioeconomically disadvantaged	24%	24%	21%	29%
% Live rural	37%	40%	31%	25%
% With ≥ 1 comorbidity	32%	32%	36%	33%
% Discussed at MDT	28%	31%	18%	12%
% Late stage (III/IV)	43%	43%	44%	49%
2 year crude survival from diagnosis	72%	82%	43%	20%

Local excision or biopsy only and no surgery group includes patients with a wide range of staging

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What are the characteristics of rectal cancer patients?

	Rectal cancer	Had major resection	Local excision or biopsy only	No surgery
Queensland	**871**	**656**	**163**	**52**
	100%	**75%**	**19%**	**6%**
Median age at diagnosis	67	65	71	77
% Male	63%	62%	67%	63%
% Indigenous	2%	1%	2%	4%
% Socioeconomically disadvantaged	21%	20%	25%	25%
% Live rural	38%	38%	40%	21%
% With ≥ 1 comorbidity	28%	27%	31%	31%
% Discussed at MDT	36%	40%	28%	17%
% Late stage (III/IV)	42%	43%	37%	48%
2 year crude survival from diagnosis	77%	88%	49%	19%

Local excision or biopsy only and no surgery group includes patients with a wide range of staging

2.1 Residence Summary

COLON CANCER; YEAR OF DIAGNOSIS 2012

What are the characteristics of colon cancer patients, by where they live?

	Major City	Inner Regional	Outer Regional	Remote & Very Remote	Queensland
Major resection	**892**	**390**	**225**	**30**	**1537**
Median age at diagnosis	72	72	71	72	72
% Male	52%	57%	57%	57%	54%
% Indigenous	<1%	1%	<1%	0%	<1%
% Socioeconomically disadvantaged	14%	42%	32%	30%	24%
% With ≥ 1 comorbidity	32%	36%	28%	13%	32%
% ASA ≥ 3	40%	47%	40%	50%	42%
% Discussed at MDT	32%	32%	25%	30%	31%
% Days from diagnosis to surgery ≤ 30	77%	74%	70%	70%	75%
% Had neo-adjuvant XRT	0%	1%	0%	0%	0%
% Travelled outside HHS of residence	9%	21%	16%	63%	14%
% Late stage (III/IV)	42%	44%	41%	57%	43%
Mean length of stay	10	10	10	9	10
Mean number of lymph nodes examined	18	18	18	17	18
% With ≥ 12 lymph nodes examined	80%	74%	76%	70%	77%
% With positive lymph nodes	37%	37%	37%	57%	38%
% With involved surgical margins	2%	5%	5%	3%	4%
1 year surgical survival	91%	87%	88%	93%	90%
2 year crude survival from diagnosis	83%	82%	82%	77%	82%
In-hospital mortality	1.7%	1.8%	2.2%	0.0%	1.8%
30 day mortality	1.8%	2.6%	2.2%	3.3%	2.1%
90 day mortality	2.9%	3.8%	5.3%	10.0%	3.6%
Local excision, polypectomy	**131**	**41**	**21**	**8**	**201**

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What are the characteristics of rectal cancer patients, by where they live?

	Major City	Inner Regional	Outer Regional	Remote & Very Remote	Queensland
Major resection	**385**	**154**	**103**	**14**	**656**
Median age at diagnosis	66	66	64	64	65
% Male	61%	58%	71%	71%	62%
% Indigenous	<1%	<1%	3%	7%	1%
% Socioeconomically disadvantaged	12%	31%	31%	36%	20%
% With ≥ 1 comorbidity	29%	28%	19%	36%	27%
% ASA ≥ 3	31%	34%	35%	14%	32%
% Discussed at MDT	41%	42%	31%	36%	40%
% Days from diagnosis to surgery ≤ 30	44%	34%	35%	21%	39%
% Had neo-adjuvant XRT	35%	42%	48%	36%	39%
% Travelled outside HHS of residence	11%	52%	40%	79%	27%
% Late stage (III/IV)	40%	45%	48%	43%	43%
Mean length of stay	11	11	10	7	11
Mean number of lymph nodes examined	16	15	16	16	16
% With ≥ 12 lymph nodes examined	71%	66%	66%	71%	69%
% With positive lymph nodes	32%	34%	35%	29%	33%
% With involved surgical margins	3%	5%	6%	7%	4%
1 year surgical survival	95%	93%	90%	93%	93%
2 year crude survival from diagnosis	89%	90%	84%	79%	88%
In-hospital mortality	1.3%	0.0%	1.0%	0.0%	0.9%
30 day mortality	1.3%	0.0%	1.0%	0.0%	0.9%
90 day mortality	3.1%	0.6%	3.9%	0.0%	2.6%
Local excision, polypectomy	**95**	**41**	**23**	**4**	**163**

3.1 Hospital Summary

COLON CANCER; YEAR OF DIAGNOSIS 2012

What are the characteristics of colon cancer patients who received a major resection, by hospital type?

	Hospital Type						
	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland	Public Hospitals	Private Hospitals
Major Resection	**279**	**909**	**218**	**131**	**1537**	**776**	**761**
Median age at diagnosis	70	72	73	72	72	71	73
% Male	55%	55%	48%	58%	54%	55%	53%
% Indigenous	0%	0%	0%	0%	<1%	1%	<1%
% Socioeconomically disadvantaged	19%	24%	32%	26%	24%	31%	18%
% Live rural	20%	38%	57%	62%	40%	43%	37%
% With ≥ 1 comorbidity	37%	31%	36%	24%	32%	33%	31%
% ASA ≥ 3	40%	46%	32%	32%	42%	45%	39%
% Discussed at MDT	68%	26%	20%	5%	31%	60%	1%
% Days from diagnosis to surgery ≤ 30	59%	77%	78%	92%	75%	62%	89%
% Had neo-adjuvant XRT	1%	1%	0%	0%	0%	1%	0%
% Late stage (III/IV)	48%	44%	37%	31%	43%	48%	37%
Mean length of stay	10	10	10	8	10	11	9
Mean number of lymph nodes examined	20	18	17	17	18	19	17
% With ≥ 12 lymph nodes examined	86%	77%	72%	69%	77%	81%	73%
% With positive lymph nodes	40%	39%	35%	26%	38%	42%	34%
% With involved surgical margins	5%	3%	5%	4%	4%	5%	2%
1 year surgical survival	88%	89%	89%	93%	90%	88%	91%
2 year crude survival from diagnosis	80%	82%	86%	86%	82%	80%	85%
Local excision, polypectomy	**29**	**92**	**18**	**62**	**201**	**87**	**114**

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What are the characteristics of rectal cancer patients who received a major resection, by hospital type?

	Hospital Type						
	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland	Public Hospitals	Private Hospitals
Major Resection	**199**	**351**	**70**	**36**	**656**	**338**	**318**
Median age at diagnosis	65	65	68	64	65	66	65
% Male	65%	61%	61%	56%	62%	63%	61%
% Indigenous	0	0%	0%	0%	1%	2%	<1%
% Socioeconomically disadvantaged	20%	21%	21%	14%	20%	27%	13%
% Live rural	32%	38%	56%	47%	38%	39%	37%
% With ≥ 1 comorbidity	28%	27%	36%	17%	27%	28%	26%
% ASA ≥ 3	30%	34%	31%	28%	32%	32%	32%
% Discussed at MDT	81%	25%	19%	3%	40%	74%	3%
% Days from diagnosis to surgery ≤ 30	16%	49%	46%	67%	39%	22%	58%
% Had neo-adjuvant XRT	56%	33%	24%	31%	39%	48%	29%
% Late stage (III/IV)	51%	38%	41%	44%	43%	46%	40%
Mean length of stay	10	12	9	10	11	11	11
Mean number of lymph nodes examined	16	16	13	12	16	16	16
% With ≥ 12 lymph nodes examined	72%	72%	61%	42%	69%	71%	67%
% With positive lymph nodes	38%	28%	37%	39%	33%	33%	33%
% With involved surgical margins	3%	5%	7%	0%	4%	4%	5%
1 year surgical survival	95%	93%	91%	94%	93%	93%	93%
2 year crude survival from diagnosis	91%	87%	83%	86%	88%	89%	87%
Local excision, polypectomy	**18**	**80**	**20**	**45**	**163**	**71**	**92**

4.1 Timeliness

COLON CANCER; YEAR OF DIAGNOSIS 2012

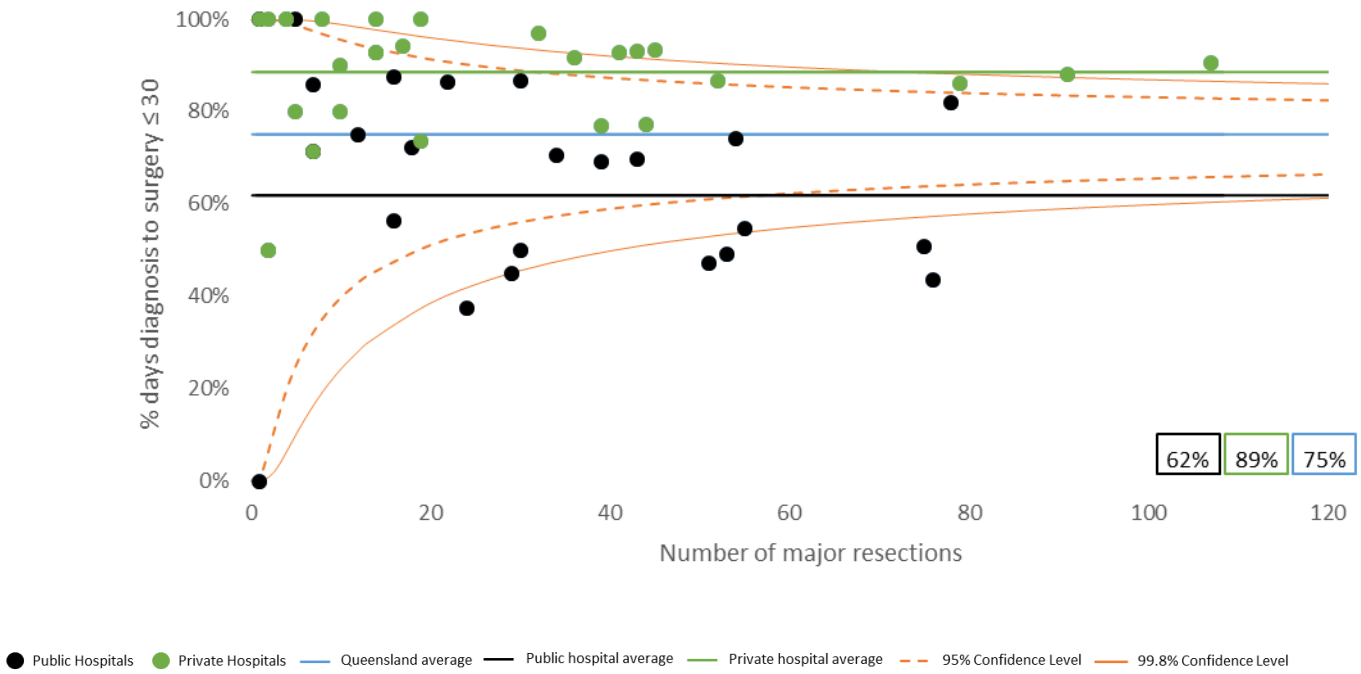
What is the time between diagnosis and major resection?

(Some patients require other treatment prior to surgery, which may influence timelines)

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
Median days to surgery	23	13	13	9	14
% Days from diagnosis to surgery ≤ 30	59%	77%	78%	92%	75%
% Days from diagnosis to surgery 31-90	31%	20%	19%	8%	21%
% Days from diagnosis to surgery 91+	9%	3%	3%	0%	4%

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 4.1a: % of colon cancer patients who had major resection within 30 days of diagnosis by hospital volume



There is variation in days from diagnosis to major resection between public and private hospitals.

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 4.1b: characteristics of colon cancer patients who had major resection by time intervals

Days from diagnosis to major resection 0-30

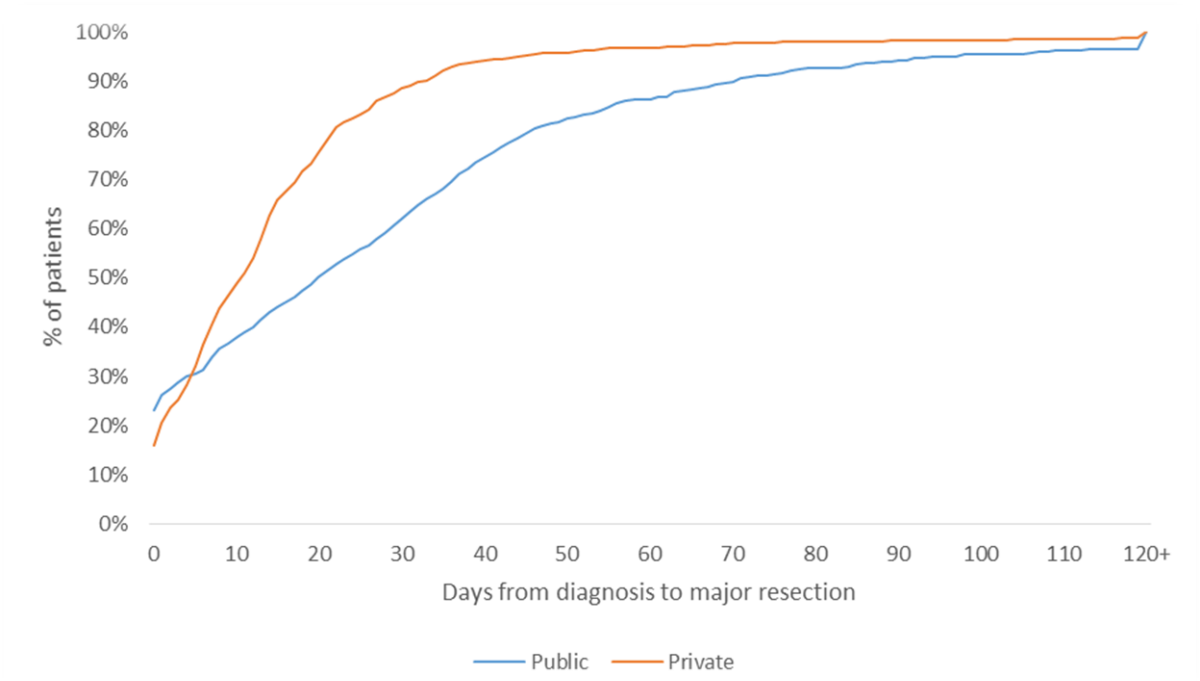
	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	166	698	170	120	1154
Median age at diagnosis	70	72	73	72	72
% Male	54%	54%	49%	56%	54%
% Indigenous	1%	<1%	0%	0%	<1%
% Disadvantaged	13%	22%	32%	26%	22%
% Live rural	16%	35%	62%	63%	39%
% Travelled outside HHS of residence	16%	16%	9%	6%	14%
% With ≥ 1 comorbidity	34%	29%	35%	25%	30%
% Discussed at MDT	69%	19%	15%	4%	24%
% Had neo-adjuvant XRT	0%	0%	0%	0%	0%
% Late stage (III/IV)	52%	45%	40%	33%	44%
2 year crude survival from diagnosis	79%	80%	84%	86%	81%

Days from diagnosis to major resection			31-90		
	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	87	186	42	11	326
Median age at diagnosis	70	72	73	72	72
% Male	49%	58%	38%	82%	54%
% Indigenous	0%	2%	2%	0%	2%
% Disadvantaged	29%	32%	31%	27%	31%
% Live rural	30%	51%	40%	55%	44%
% Travelled outside HHS of residence	25%	10%	7%	9%	14%
% With ≥ 1 comorbidity	45%	36%	38%	9%	38%
% Discussed at MDT	72%	51%	36%	9%	53%
% Had neo-adjuvant XRT	0%	0%	0%	0%	0%
% Late stage (III/IV)	40%	38%	26%	18%	36%
2 year crude survival from diagnosis	84%	87%	95%	91%	87%

Days from diagnosis to major resection			91+		
	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	26	25	6	-	57
Median age at diagnosis	70	72	73	72	72
% Male	81%	64%	67%	-	72%
% Indigenous	0%	0%	0%	-	0%
% Disadvantaged	27%	24%	33%	-	26%
% Live rural	19%	44%	50%	-	33%
% Travelled outside HHS of residence	31%	24%	17%	-	26%
% With ≥ 1 comorbidity	31%	36%	67%	-	37%
% Discussed at MDT	50%	28%	50%	-	40%
% Had neo-adjuvant XRT	8%	20%	0%	-	12%
% Late stage (III/IV)	50%	52%	33%	-	49%
2 year crude survival from diagnosis	73%	88%	67%	-	79%

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 4.1c: distribution of days from diagnosis to major resection for colon cancer patients by facility type



RECTAL CANCER; YEAR OF DIAGNOSIS 2012

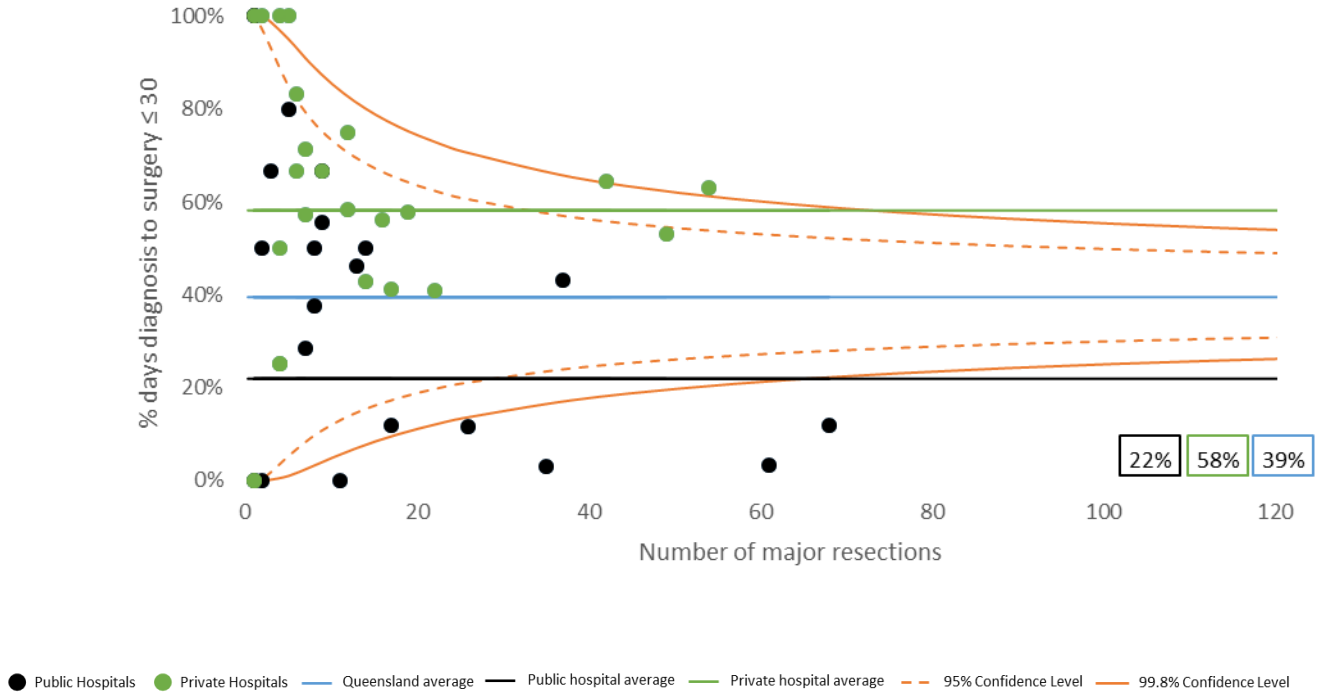
What is the time between diagnosis and major resection?

(Some patients require other treatment prior to surgery, which may influence timelines)

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
Median days to surgery	93	32	35	20	43
% Days from diagnosis to surgery ≤ 30	16%	49%	46%	67%	39%
% Days from diagnosis to surgery 31-90	34%	19%	39%	11%	25%
% Days from diagnosis to surgery 91+	51%	32%	16%	22%	35%

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 4.1d: % of rectal cancer patients who had major resection within 30 days of diagnosis by hospital volume



Some patients require other treatment such as chemotherapy or radiotherapy prior to surgery, which may influence timelines.

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 4.1e: characteristics of rectal cancer patients who had major resection by time intervals

Days from diagnosis to major resection 0-30

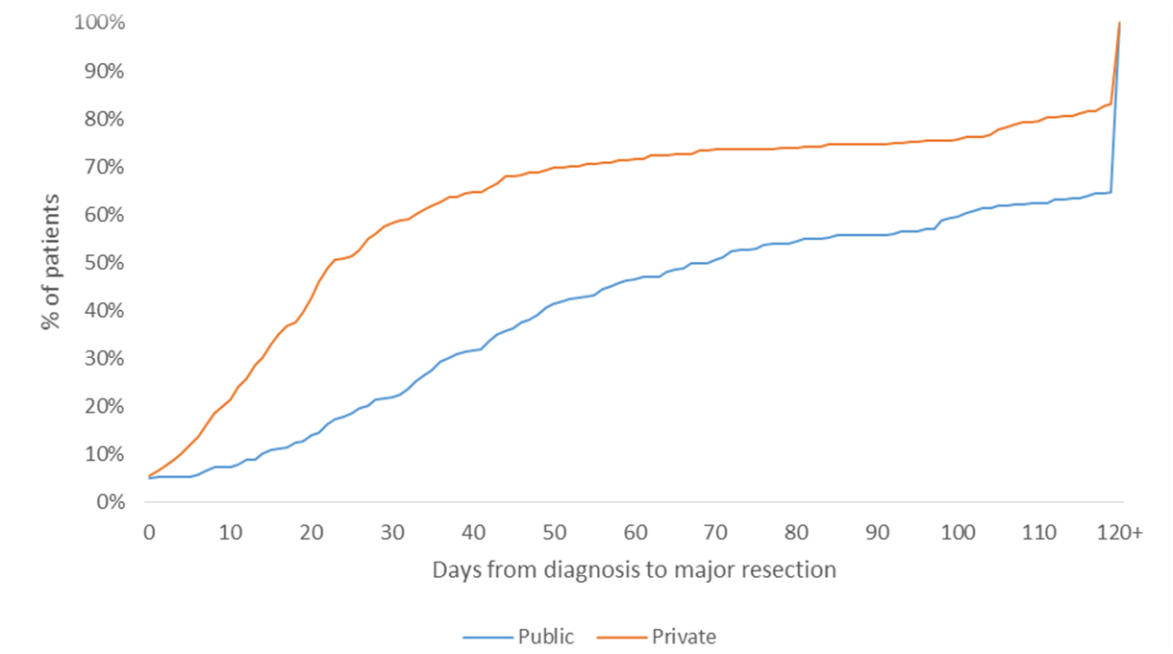
	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	31	172	32	24	259
Median age at diagnosis	66	66	69	64	66
% Male	61%	58%	66%	63%	59%
% Indigenous	3%	1%	0%	0%	1%
% Disadvantaged	13%	19%	28%	13%	19%
% Live rural	3%	34%	50%	38%	32%
% Travelled outside HHS of residence	10%	27%	13%	4%	21%
% With ≥ 1 comorbidity	48%	25%	19%	13%	26%
% Discussed at MDT	77%	8%	13%	0%	16%
% Had neo-adjuvant XRT	0%	2%	6%	4%	2%
% Late stage (III/IV)	52%	35%	44%	50%	40%
2 year crude survival from diagnosis	94%	88%	78%	79%	87%

Days from diagnosis to major resection			31-90		
	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	67	68	27	4	166
Median age at diagnosis	66	66	69	64	66
% Male	64%	62%	59%	0%	61%
% Indigenous	0%	1%	0%	0%	<1%
% Disadvantaged	16%	29%	19%	0%	22%
% Live rural	33%	46%	63%	75%	44%
% Travelled outside HHS of residence	31%	16%	30%	0%	24%
% With ≥ 1 comorbidity	22%	32%	48%	25%	31%
% Discussed at MDT	69%	44%	19%	0%	49%
% Had neo-adjuvant XRT	36%	21%	37%	50%	30%
% Late stage (III/IV)	52%	41%	41%	0%	45%
2 year crude survival from diagnosis	87%	93%	93%	100%	90%

Days from diagnosis to major resection			91+		
	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	101	111	11	8	231
Median age at diagnosis	66	66	69	64	66
% Male	67%	67%	55%	63%	66%
% Indigenous	0%	4%	0%	0%	2%
% Disadvantaged	25%	17%	9%	25%	20%
% Live rural	40%	40%	55%	63%	41%
% Travelled outside HHS of residence	43%	32%	18%	0%	35%
% With ≥ 1 comorbidity	25%	26%	55%	25%	27%
% Discussed at MDT	90%	39%	36%	13%	60%
% Had neo-adjuvant XRT	86%	88%	45%	100%	86%
% Late stage (III/IV)	50%	41%	36%	50%	45%
2 year crude survival from diagnosis	93%	83%	73%	100%	87%

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 4.1f: distribution of days from diagnosis to major resection for rectal cancer patients by facility type



4.2 Neo-adjuvant radiotherapy for rectal cancer

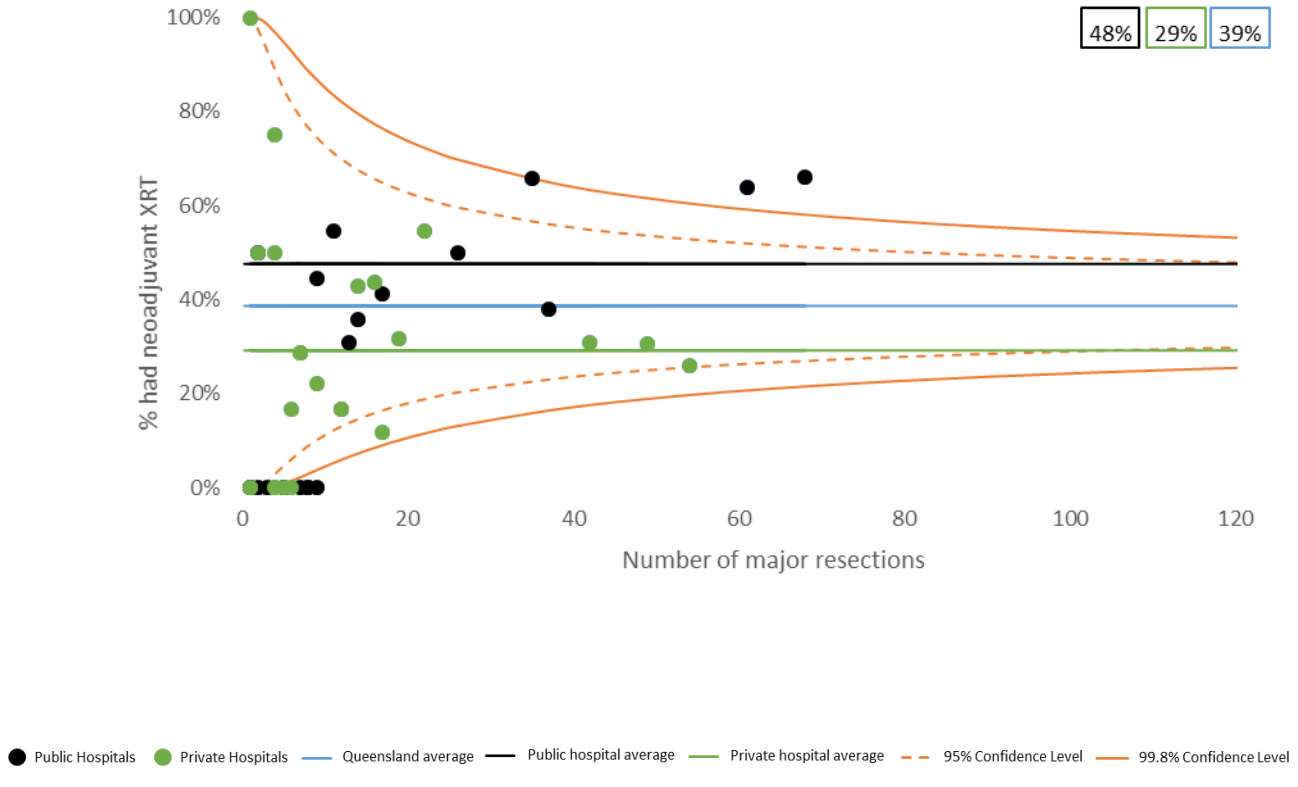
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What is the neo-adjuvant radiotherapy rate for rectal cancer patients who received a major resection?
(As guidelines for best practice treatment planning evolve it is recommended that all patients with rectal cancer be reviewed by a multidisciplinary team)

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
% Had neo-adjuvant XRT	56%	33%	24%	31%	39%

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 4.2a: % of rectal cancer patients who had radiotherapy prior to major resection by hospital volume



Guidelines for neoadjuvant radiotherapy are changing.

It is important that all patients with rectal cancer are reviewed by a multidisciplinary team.

5.1 Multidisciplinary team review

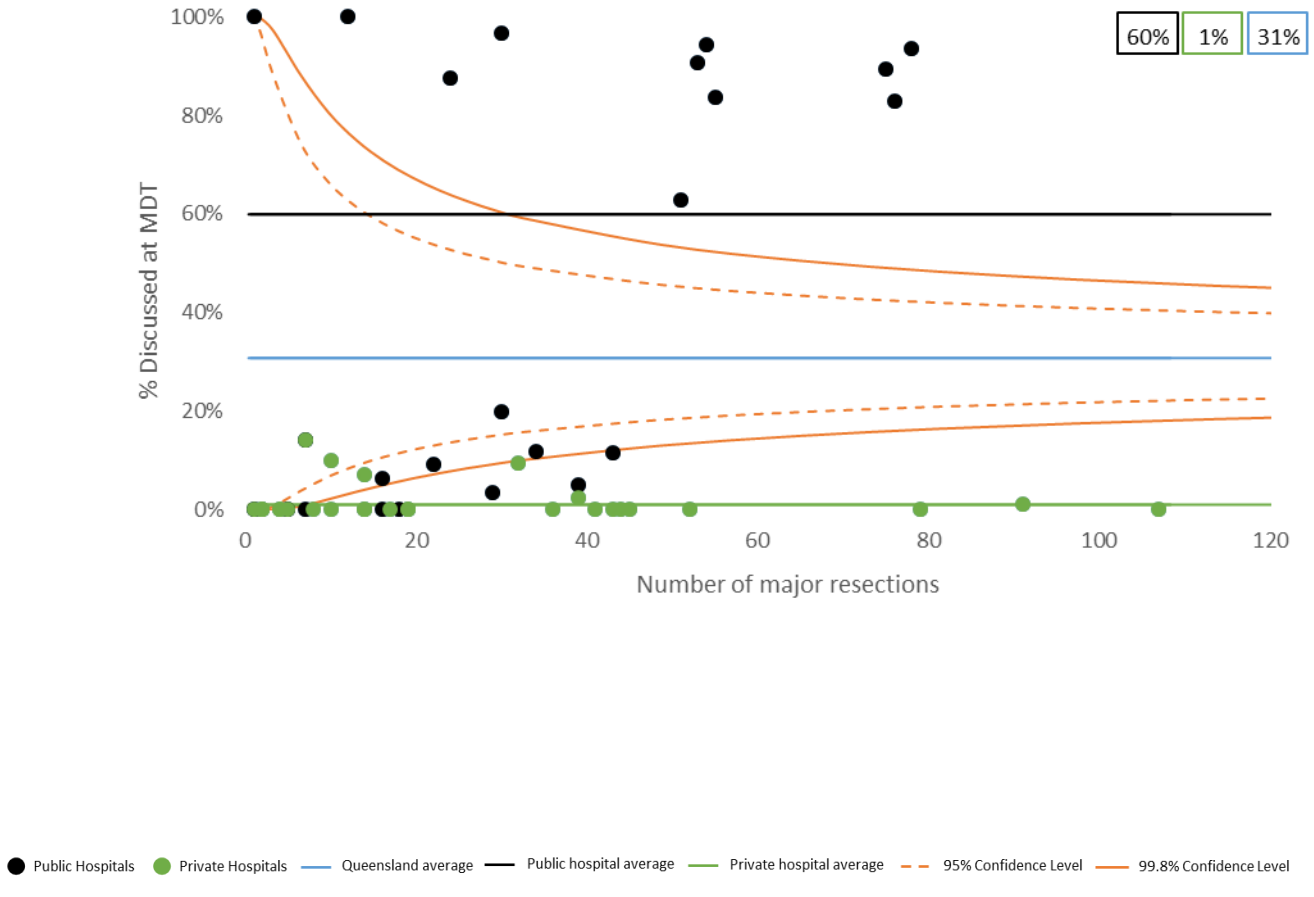
COLON CANCER; YEAR OF DIAGNOSIS 2012

What proportion of colon cancer patients were reviewed by a multidisciplinary team?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
% Discussed at MDT	68%	26%	20%	5%	31%

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 5.1a: % of colon cancer patients who had major resection reviewed by a multidisciplinary team



There are more established multidisciplinary team meetings in public hospitals compared to private hospitals.

People with colorectal cancer treated at public hospitals are more likely to receive a multidisciplinary team review than people treated at private hospitals.

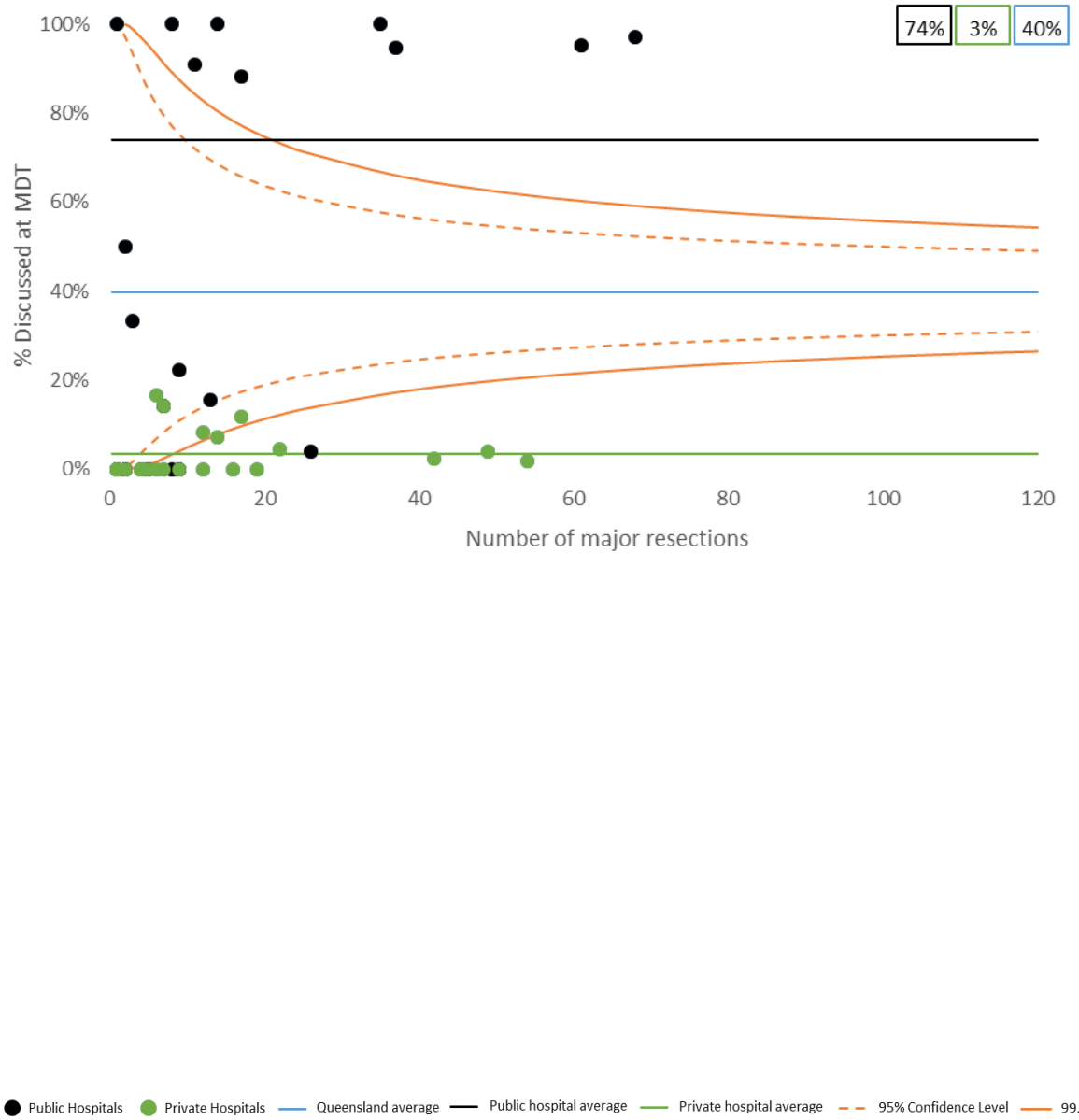
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What proportion of rectal cancer patients were reviewed by a multidisciplinary team?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
% Discussed at MDT	81%	25%	19%	3%	40%

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 5.1b: % of rectal cancer patients who had major resection reviewed by a multidisciplinary team



5.2 Hospital stay

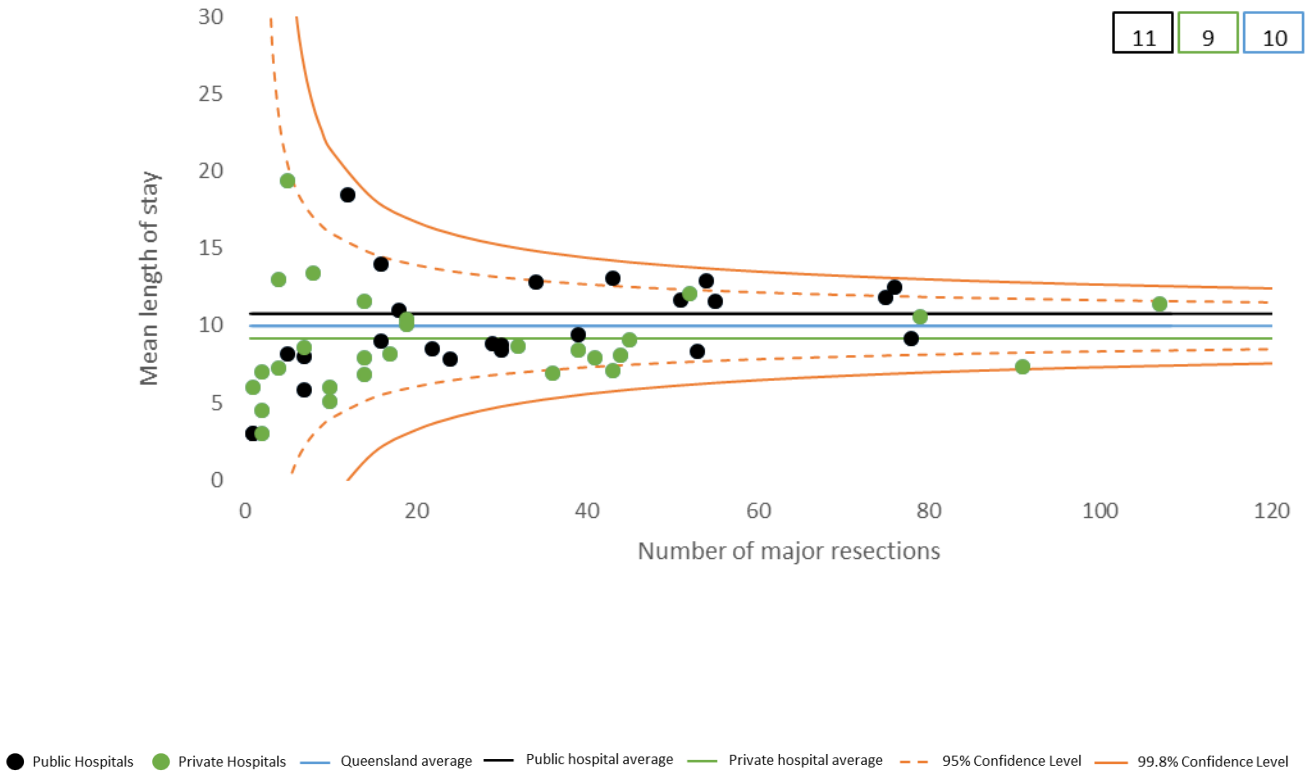
COLON CANCER; YEAR OF DIAGNOSIS 2012

How long do colon cancer patients having major resection stay in hospital?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
Mean length of stay	10	10	10	8	10
Median length of stay	8	7	8	7	7

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 5.2a: Mean length of stay for colon cancer patients receiving a major resection by hospital volume



Patients receiving major resection for colorectal cancer have different lengths of hospital stay.

There is little variation in the length of stay between public and private hospitals.

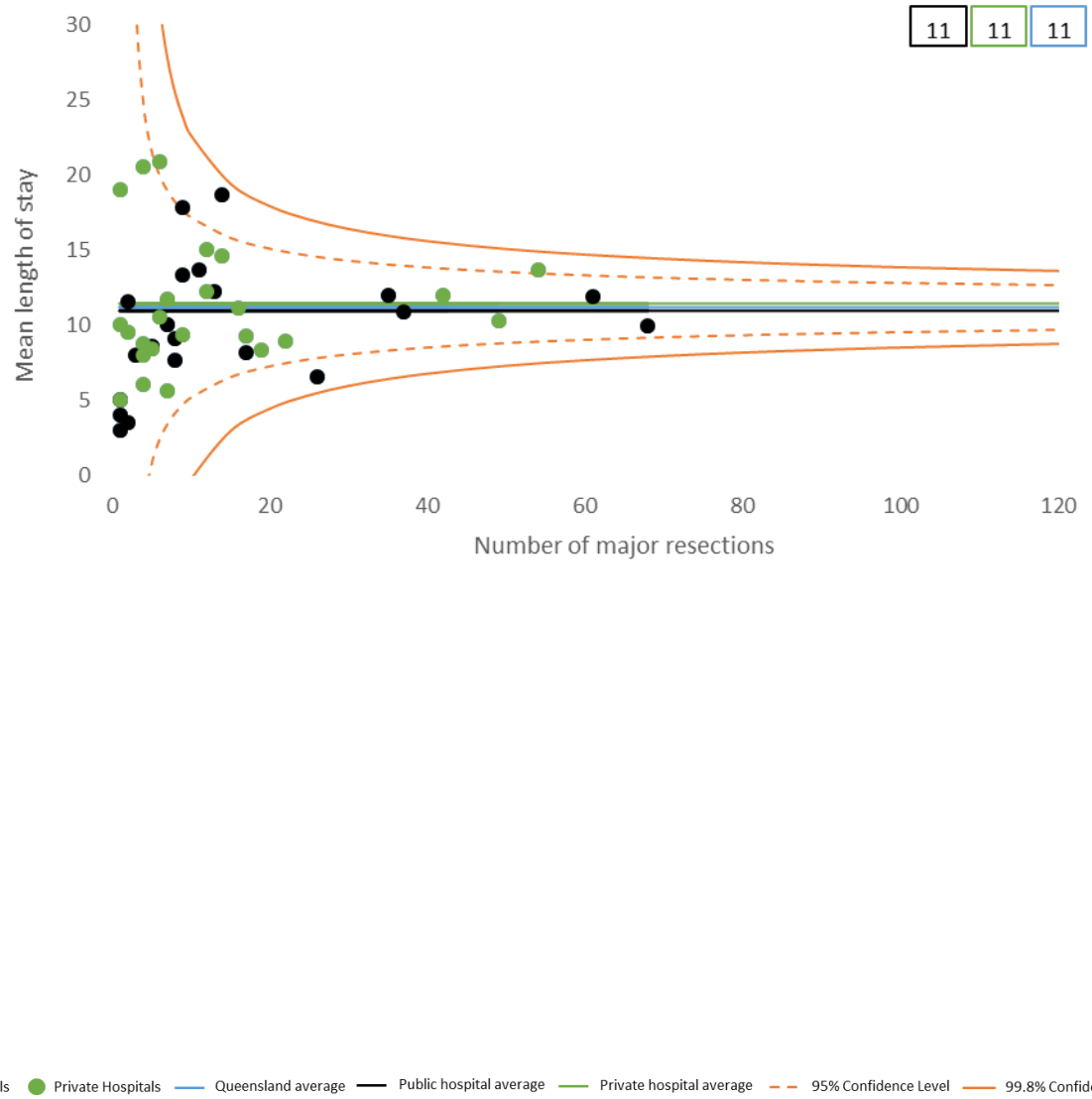
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

How long do rectal cancer patients having major resection stay in hospital?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
Mean length of stay	10	12	9	10	11
Median length of stay	7	8	8	9	8

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 5.2b: Mean length of stay for rectal cancer patients receiving a major resection by hospital volume



6.1 Pathological stage

COLON CANCER; YEAR OF DIAGNOSIS 2012

What is the stage distribution of colon cancer patients at major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
I	44	154	50	26	274
	(16%)	(17%)	(23%)	(20%)	(18%)
II	94	313	77	51	535
	(34%)	(34%)	(35%)	(39%)	(35%)
III	92	277	65	28	462
	(33%)	(30%)	(30%)	(21%)	(30%)
IV	42	123	16	13	194
	(15%)	(14%)	(7%)	(10%)	(13%)
X (T0,N0,M0)	7	36	10	13	66
	(3%)	(4%)	(5%)	(10%)	(4%)
Unknown	0	5	0	0	5
	(0%)	(1%)	(0%)	(0%)	(0%)
Total	279	909	218	131	1537
	(100%)	(100%)	(100%)	(100%)	(100%)

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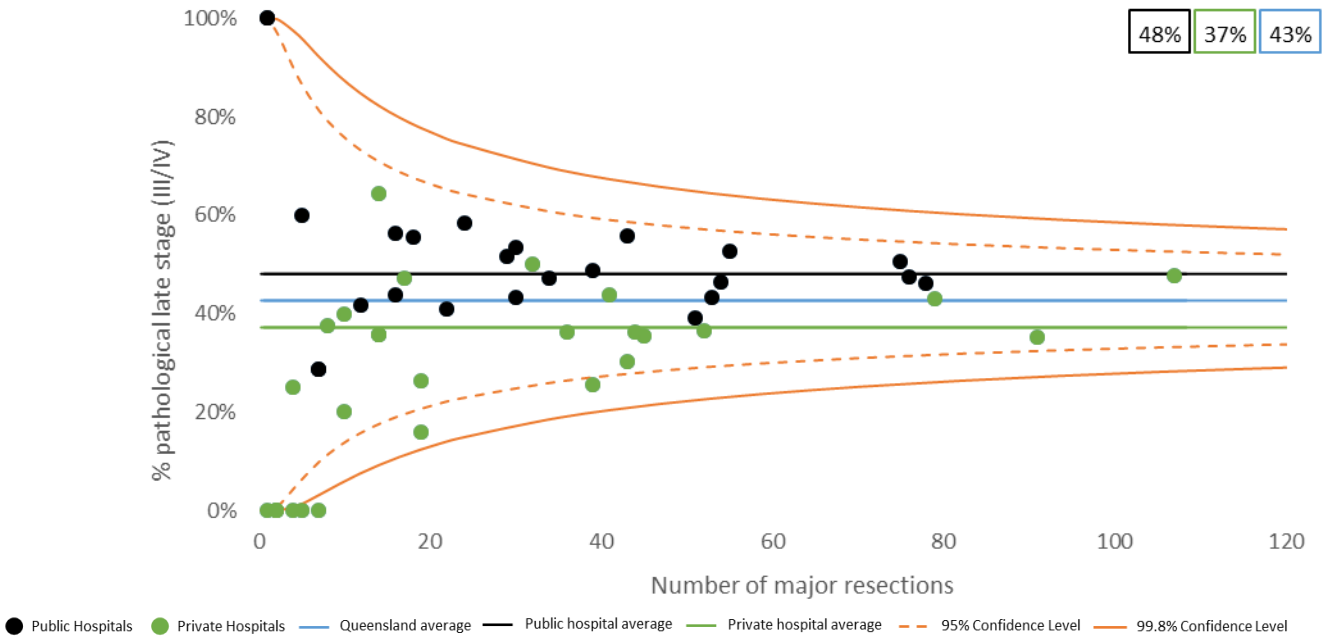
COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.1a: % of colon cancer patients with pathological late stage (III/IV) disease by hospital volume



There is a higher proportion of colon cancer patients with late stage disease treated in public hospitals.

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What is the stage distribution of rectal cancer patients at major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
I	46	94	24	9	173
	(23%)	(27%)	(34%)	(25%)	(26%)
II	45	97	13	5	160
	(23%)	(28%)	(19%)	(14%)	(24%)
III	80	98	21	9	208
	(40%)	(28%)	(30%)	(25%)	(32%)
IV	21	36	8	7	72
	(11%)	(10%)	(11%)	(19%)	(11%)
X (T0,N0,M0)	7	26	4	5	42
	(4%)	(7%)	(6%)	(14%)	(6%)
Unknown	0	0	0	1	1
	(0%)	(0%)	(0%)	(3%)	(0%)
Total	199	351	70	36	656
	(100%)	(100%)	(100%)	(100%)	(100%)

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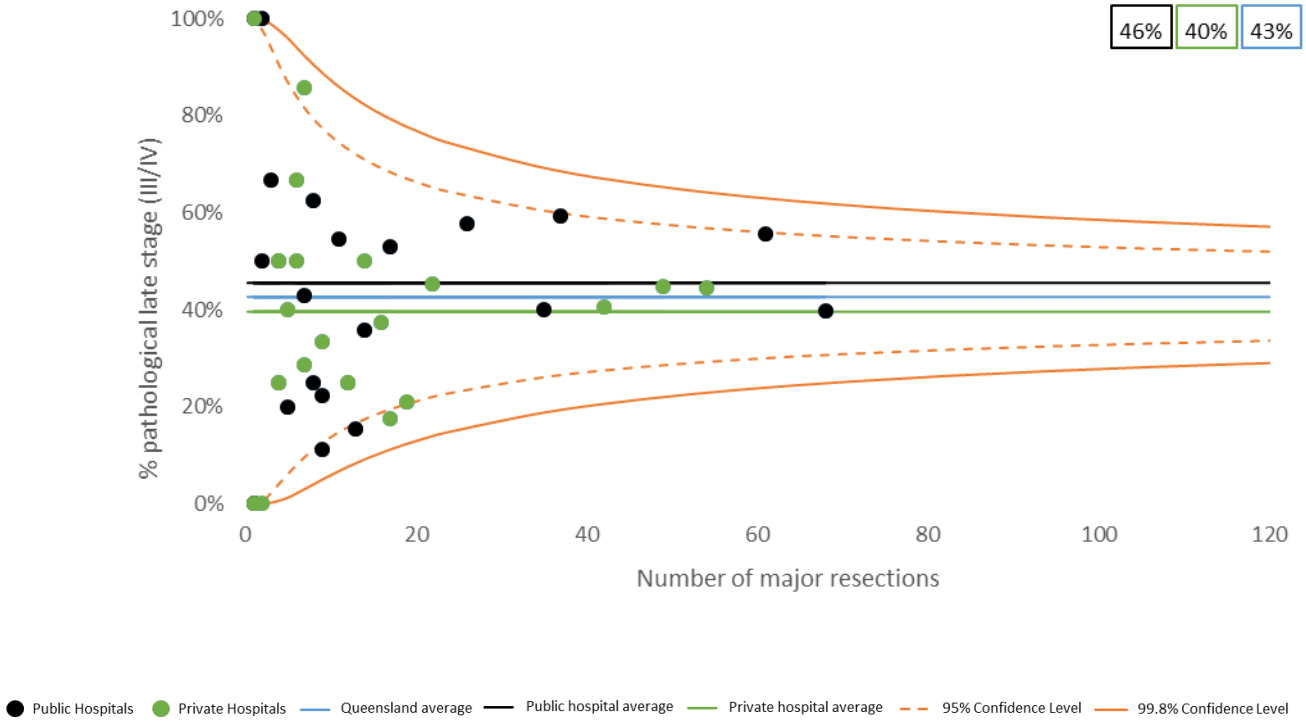
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.1b: % of rectal cancer patients with pathological late stage disease (III/IV) by hospital volume



COLON CANCER; YEAR OF DIAGNOSIS 2012

What percentage of colon cancer patients who received major resection are living two years after diagnosis by stage?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
I	93%	95%	96%	92%	95%
II	88%	90%	94%	92%	90%
III	79%	79%	75%	86%	79%
IV	45%	43%	50%	46%	44%
X (T0,N0,M0)	100%	100%	100%	92%	98%
Unknown	-	80%	-	-	80%
Total	80%	82%	86%	86%	82%

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RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What percentage of rectal cancer patients who received major resection are living two years after diagnosis by stage?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
I	96%	93%	92%	100%	94%
II	93%	89%	100%	100%	91%
III	91%	87%	76%	78%	87%
IV	71%	67%	38%	57%	64%
X (T0,N0,M0)	100%	96%	100%	100%	98%
Unknown	-	-	-	100%	100%
Total	91%	87%	83%	86%	88%

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6.2 Lymph nodes

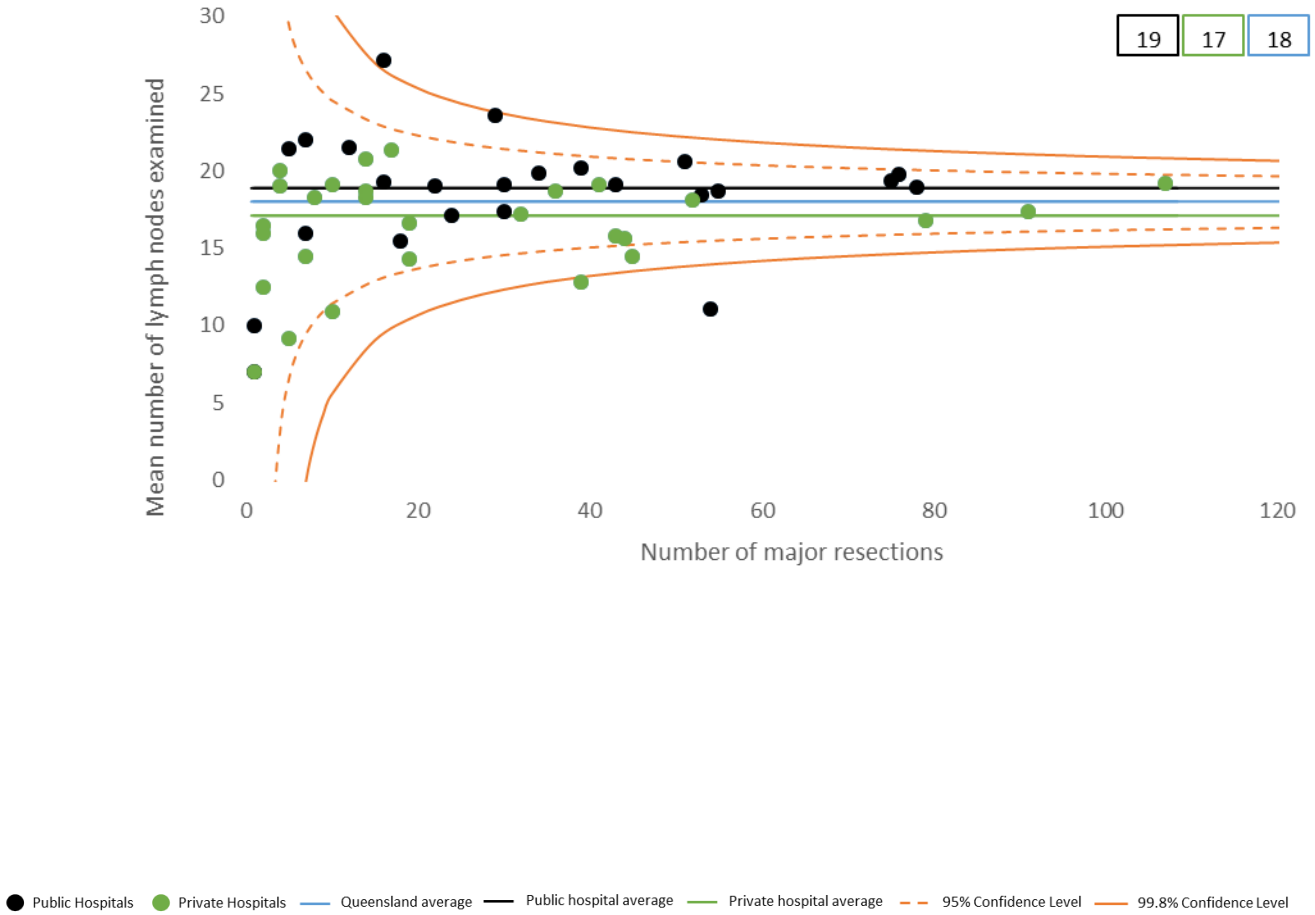
COLON CANCER; YEAR OF DIAGNOSIS 2012

How many lymph nodes were examined in colon cancer patients who had major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
Mean number of lymph nodes examined	20	18	17	17	18
% With ≥ 12 lymph nodes examined	86%	77%	72%	69%	77%
% Positive lymph nodes	40%	39%	35%	26%	38%

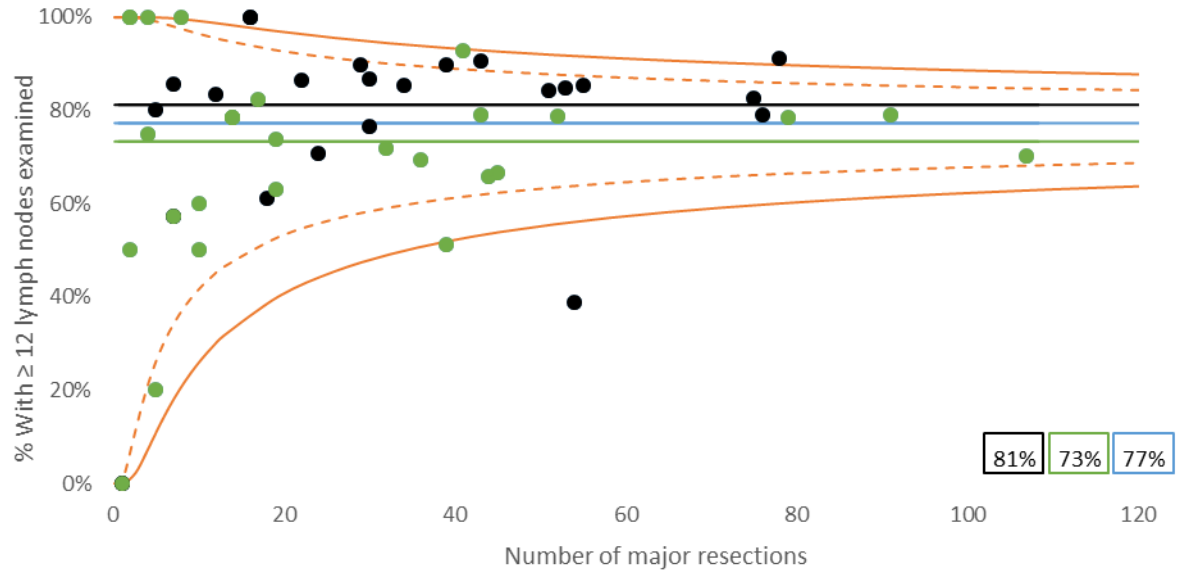
COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.2a: Mean number of lymph nodes examined for colon cancer patients at major resection by hospital volume



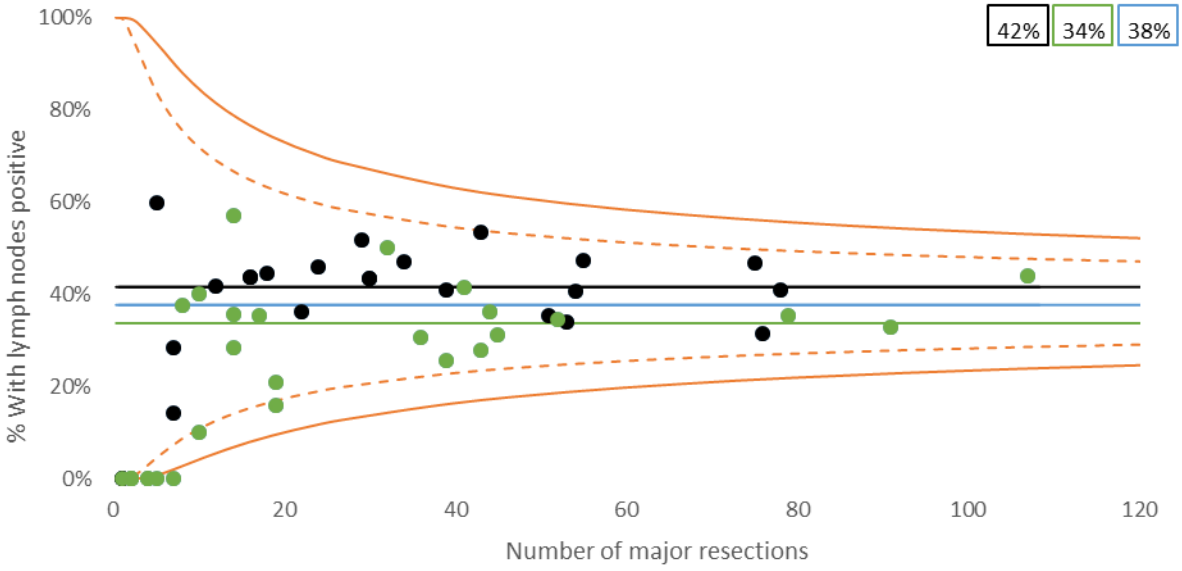
COLON CANCER; YEAR OF DIAGNOSIS 2012

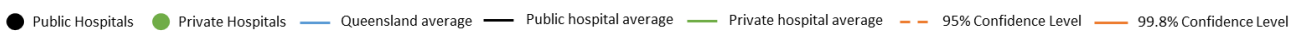
Figure 6.2b: % of colon cancer patients who had ≥ 12 lymph nodes examined at major resection by hospital volume



COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.2c: % of colon cancer patients who had positive lymph nodes at major resection by hospital volume





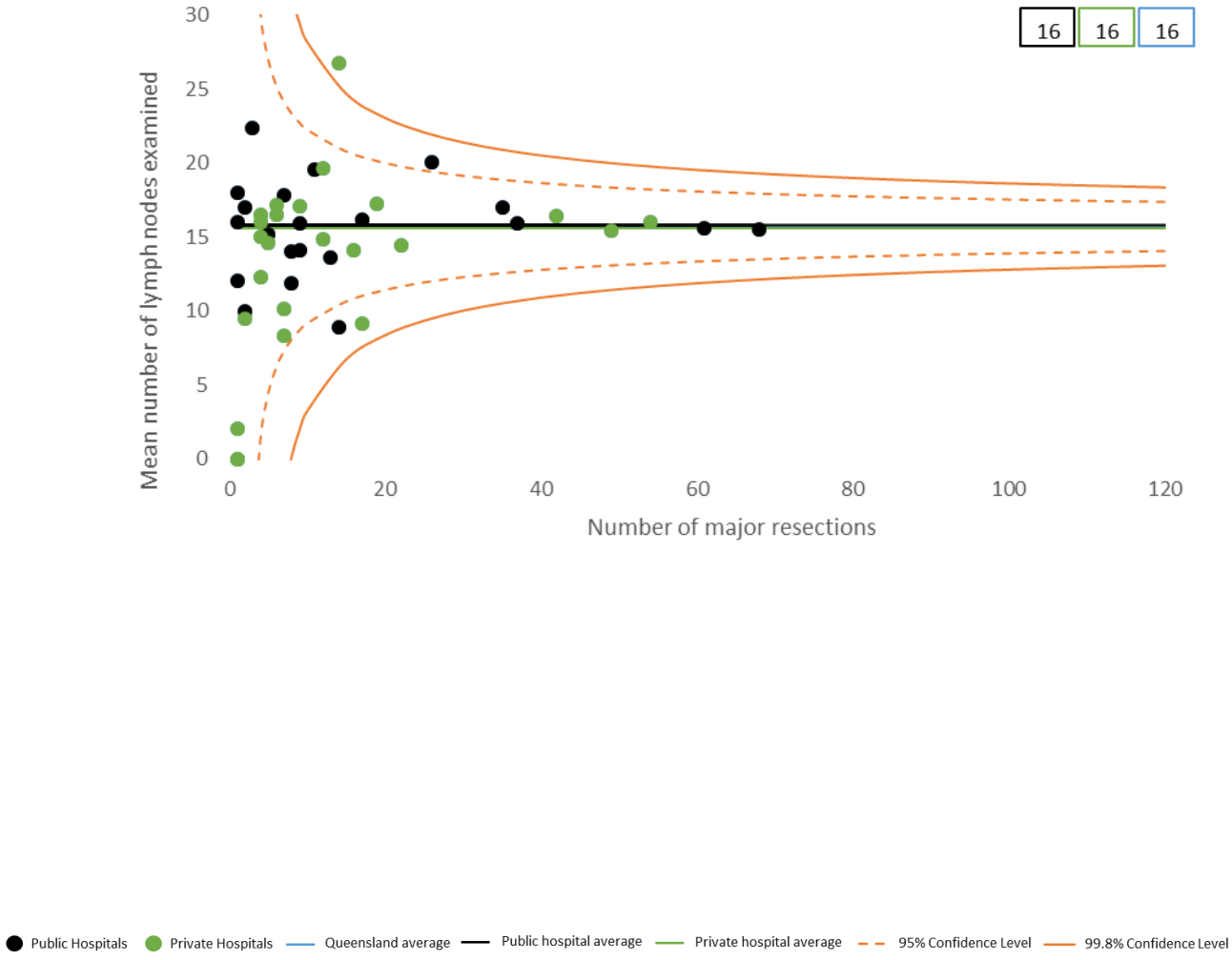
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

How many lymph nodes were examined in rectal cancer patients who had major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
Mean number of lymph nodes examined	16	16	13	12	16
% With ≥ 12 lymph nodes examined	72%	72%	61%	42%	69%
% Positive lymph nodes	38%	28%	37%	39%	33%

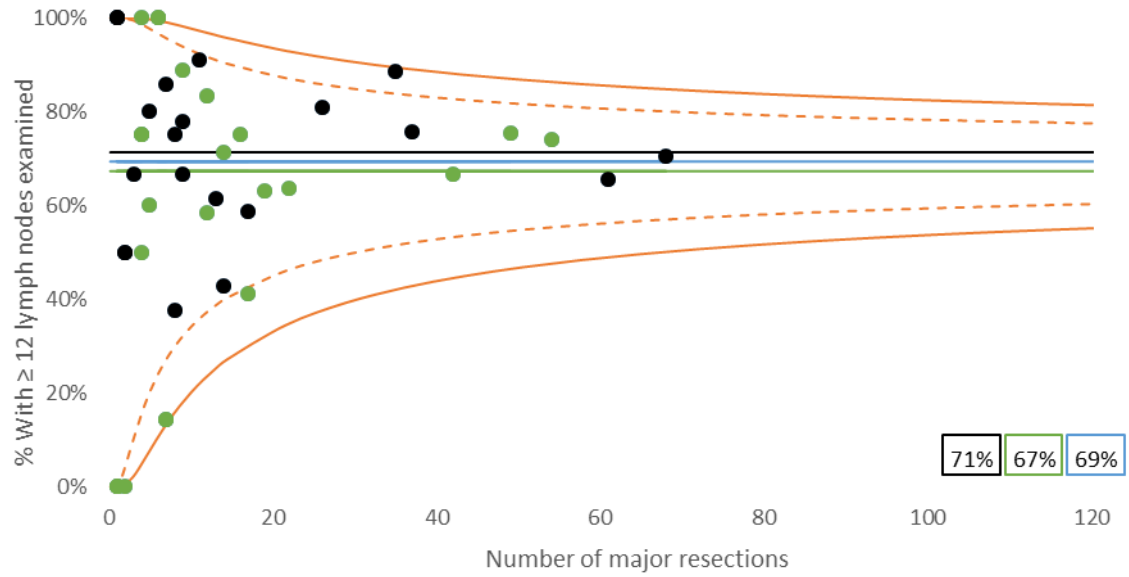
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.2d: Mean number of lymph nodes examined for rectal cancer patients at major resection by hospital volume



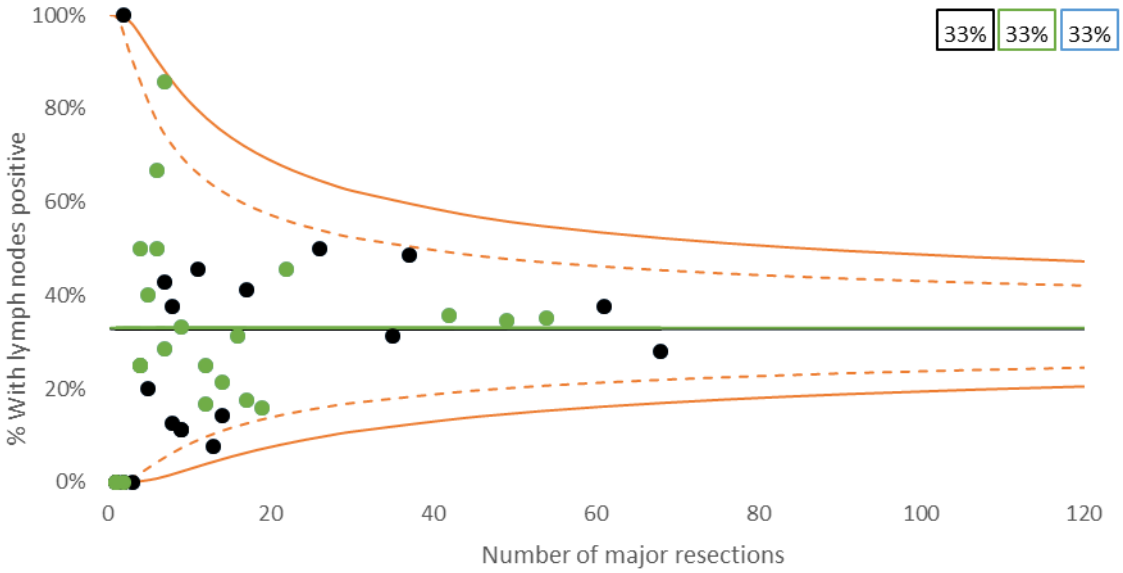
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.2e: % of rectal cancer patients who had ≥ 12 lymph nodes examined at major resection by hospital volume



RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.2f: % of rectal cancer patients who had positive lymph nodes at major resection by hospital volume



Public Hospitals | Private Hospitals | Queensland average | Public hospital average | Private hospital average | 95% Confidence Level | 99.8% Confidence Level

It is recommended that at least 12 lymph nodes be harvested at major resection - and be histologically examined.

6.3 Surgical margins

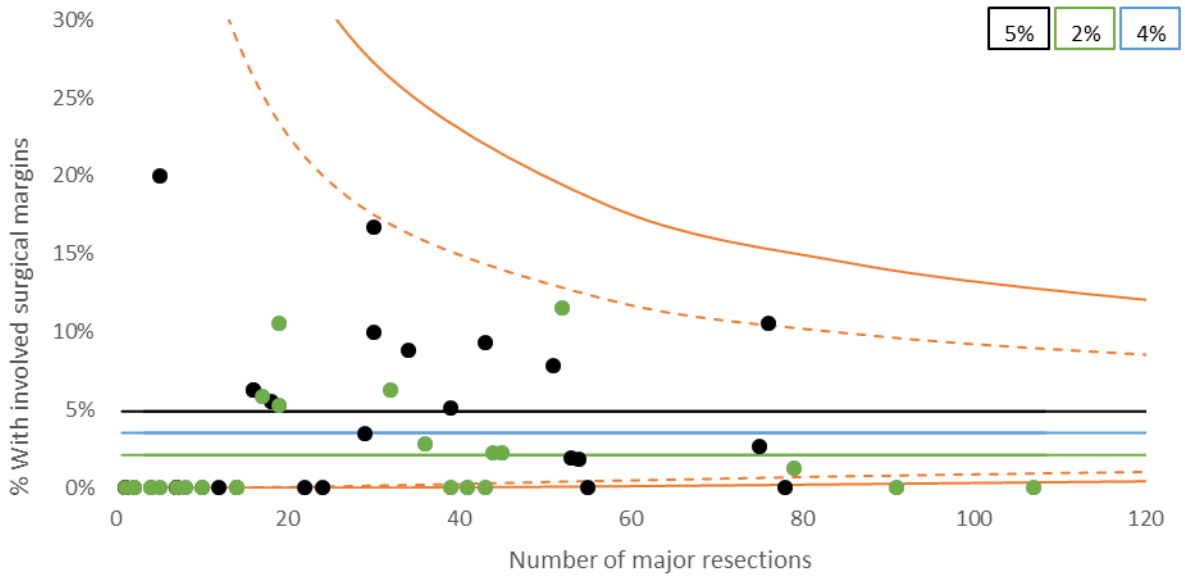
COLON CANCER; YEAR OF DIAGNOSIS 2012

What percentage of colon cancer patients had involved surgical margins at major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
% With involved surgical margins	5%	3%	5%	4%	4%

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.3a: % of colon cancer patients who had involved margins at major resection by hospital volume



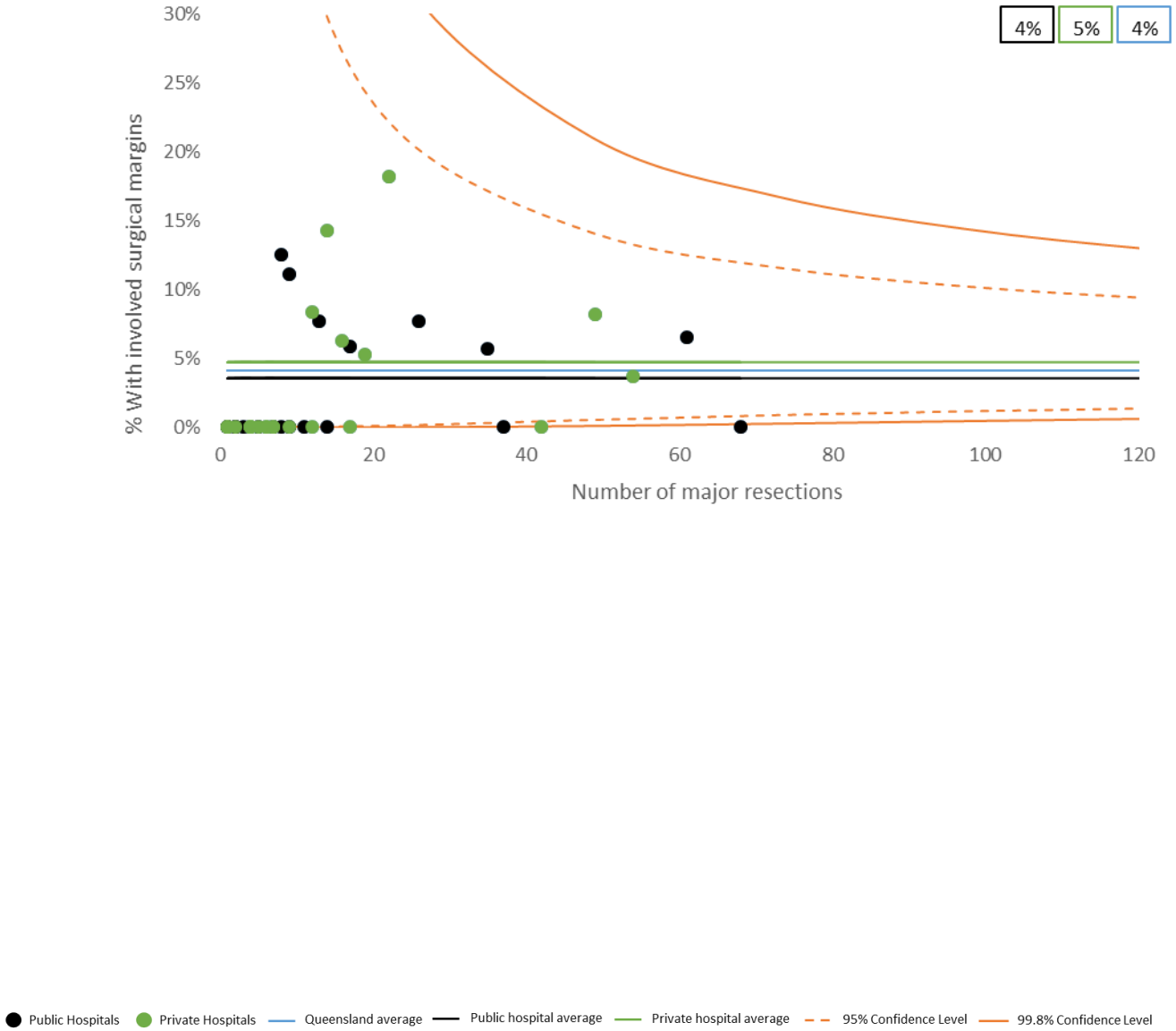
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What percentage of rectal cancer patients had involved surgical margins at major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
% With involved surgical margins	3%	5%	7%	0%	4%

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 6.3b: % of rectal cancer patients who had involved margins at major resection by hospital volume



7.1 Mortality

COLON CANCER; YEAR OF DIAGNOSIS 2012

What percentage of patients die after major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland	Other Countries
Major resection	283	913	216	125	1537	
In-hospital mortality	2.5%	1.9%	0.9%	0.8%	1.8%	
30 day mortality	2.5%	2.1%	1.9%	1.6%	2.1%	8%[1] 5.8%[2]
90 day mortality	4.9%	3.6%	3.2%	1.6%	3.6%	3.8%[3]

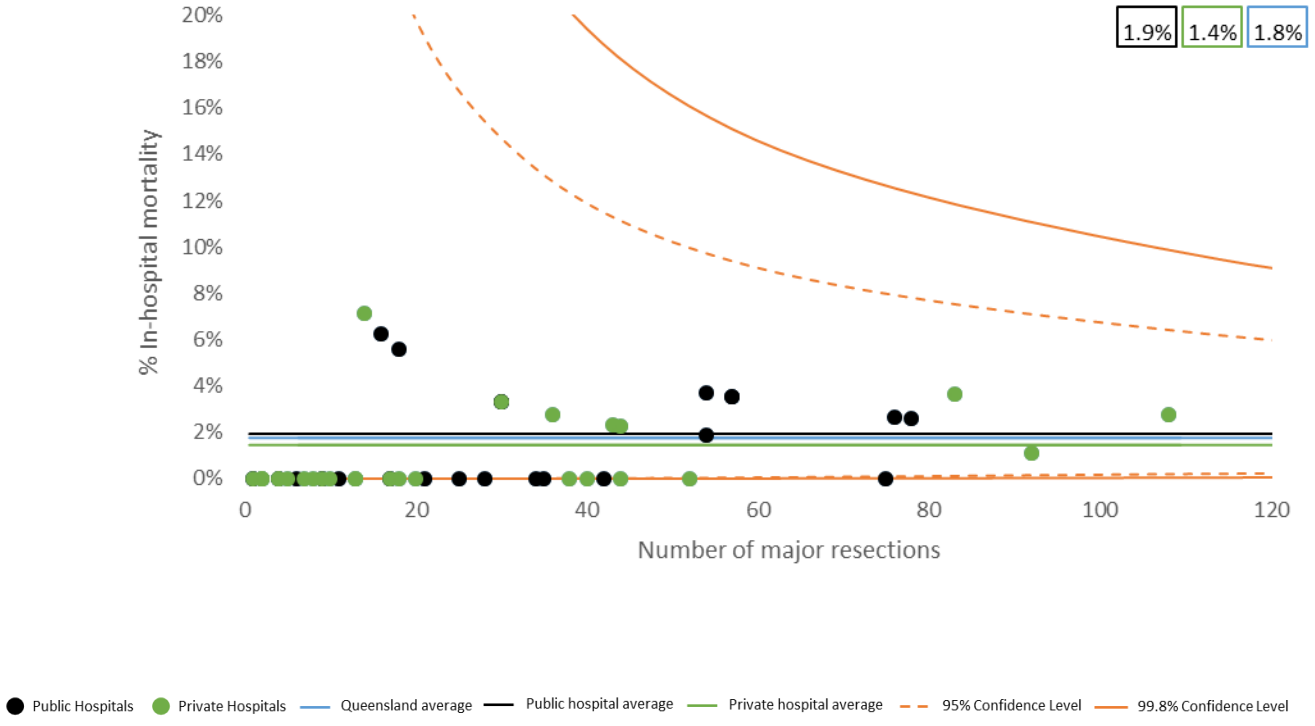
[1] Iverson LH, Aspects of survival from colorectal cancer in Denmark. Dan Med J. 2012 Apr 59(4):B4428

[2] Morris EJ, et al. Thirty-day postoperative mortality after colorectal cancer surgery in England. Gut 2011

[3] Healthcare Quality Improvement Partnership, The national bowel cancer audit 2015. Royal College of Surgeons of England

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 7.1a: In-hospital mortality following major resection by hospital volume for colon cancer



Queensland mortality rates following major resection are among the best in the world.

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 7.1b: 30 day mortality following major resection by hospital volume for colon cancer

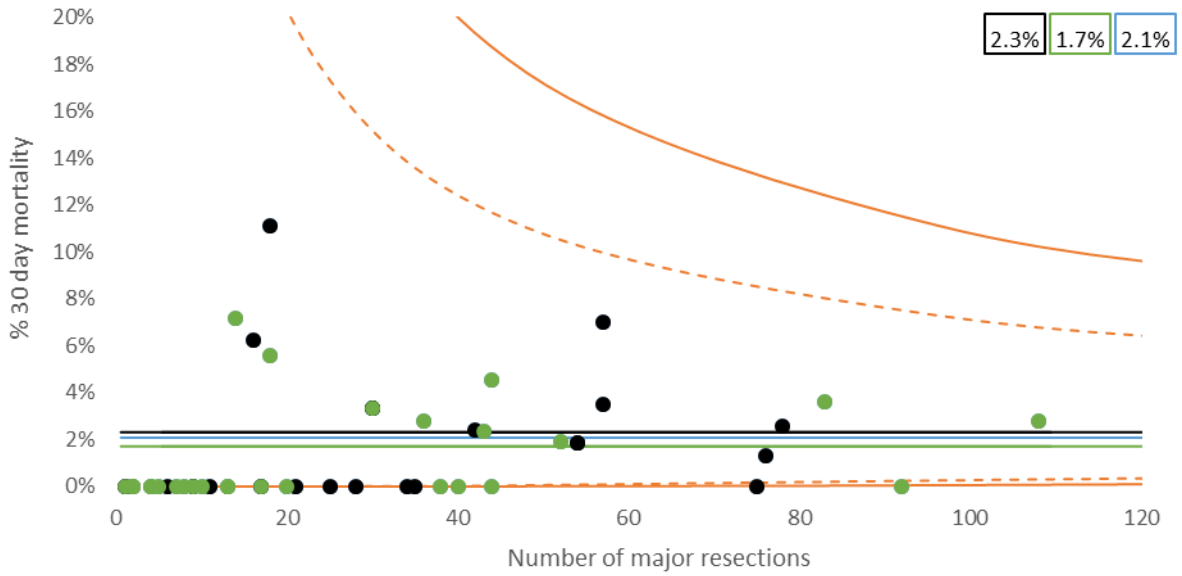
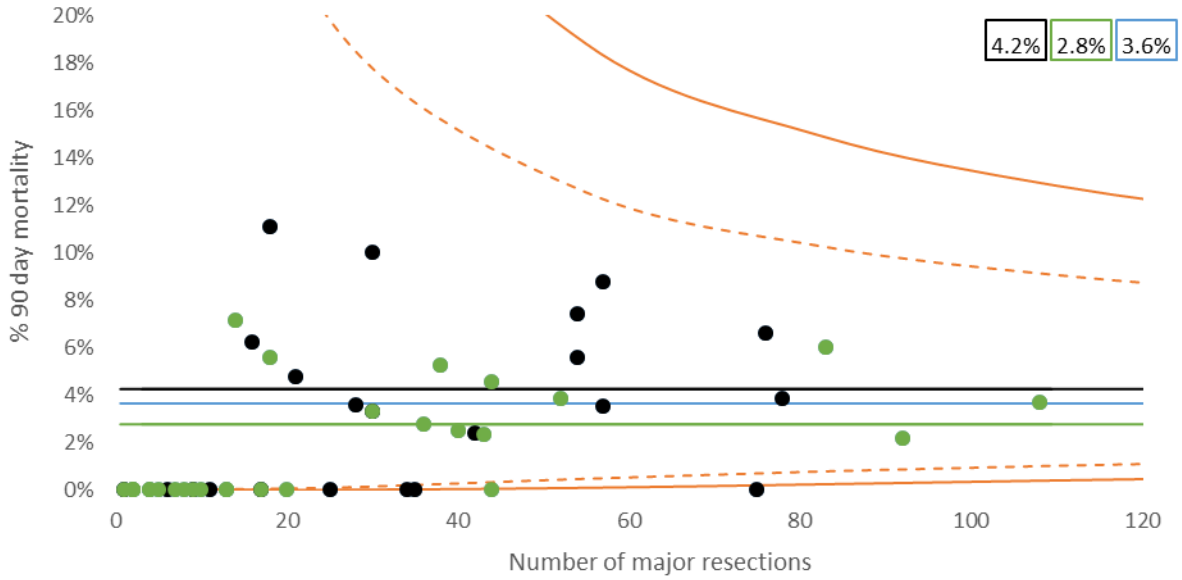


Figure 7.1c: 90 day mortality following major resection by hospital volume for colon cancer



Public Hospitals | Private Hospitals | Queensland average | Public hospital average | Private hospital average | 95% Confidence Level | 99.8% Confidence Level

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 7.1d: Colon cancer patient characteristics and mortality

	Total	In-hospital mortality	30 day mortality	90 day mortality
Number of deaths		27	32	56
Age				
< 65	419	0.2%	0.2%	0.2%
65 - 74	476	0.8%	0.6%	2.7%
75 - 84	455	3.1%	4.4%	6.2%
85 +	187	4.3%	4.3%	7.5%
Sex				
Male	834	1.4%	1.6%	3.4%
Female	703	2.1%	2.7%	4.0%
Comorbidity				
0	1046	0.7%	1.0%	2.0%
1	324	2.5%	2.8%	5.2%
2+	167	7.2%	7.8%	10.8%
Residence				
Major City	892	1.7%	1.8%	2.9%
Inner Regional	390	1.8%	2.6%	3.8%
Outer Regional	225	2.2%	2.2%	5.3%
Remote & Very Remote	30	0.0%	3.3%	10.0%
Socioeconomic status				
Affluent	164	2.4%	3.0%	4.9%
Middle	999	1.7%	1.8%	3.1%
Disadvantaged	374	1.6%	2.4%	4.5%
ASA				
1 - 2	683	0.6%	0.9%	1.5%
≥ 3	654	3.1%	3.1%	6.0%
Unknown	200	1.5%	3.0%	3.5%
Stage				
I	274	1.1%	0.7%	2.6%
II	535	2.1%	2.6%	3.4%
III	462	1.5%	1.9%	3.5%
IV	194	3.1%	3.6%	7.7%
X	66	0.0%	0.0%	0.0%
Unknown	5	0.0%	0.0%	0.0%
Facility Type				
Public	778	1.9%	2.3%	4.2%
Private	759	1.6%	1.8%	3.0%

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

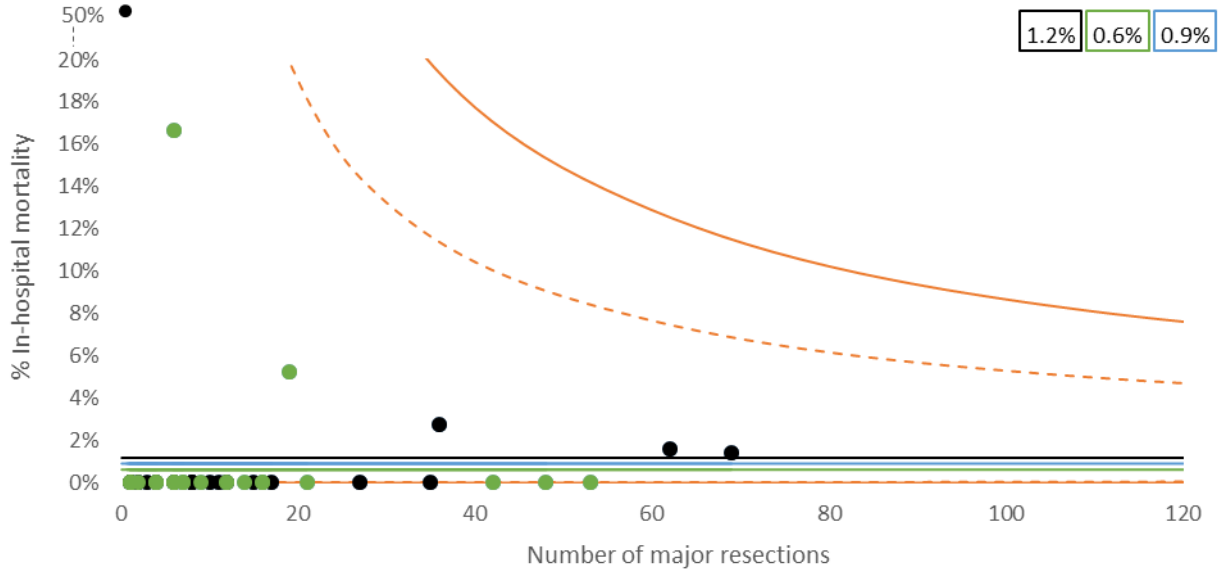
What percentage of rectal cancer patients die after major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland	Other Countries
Major resection	200	347	70	39	656	
In-hospital mortality	1.5%	0.3%	2.9%	0.0%	0.9%	
30 day mortality	1.5%	0.3%	2.9%	0.0%	0.9%	6%[1]
90 day mortality	3.0%	2.0%	5.7%	0.0%	2.6%	

[1] Iverson LH, Aspects of survival from colorectal cancer in Denmark. Dan Med J. 2012 Apr 59(4):B4428

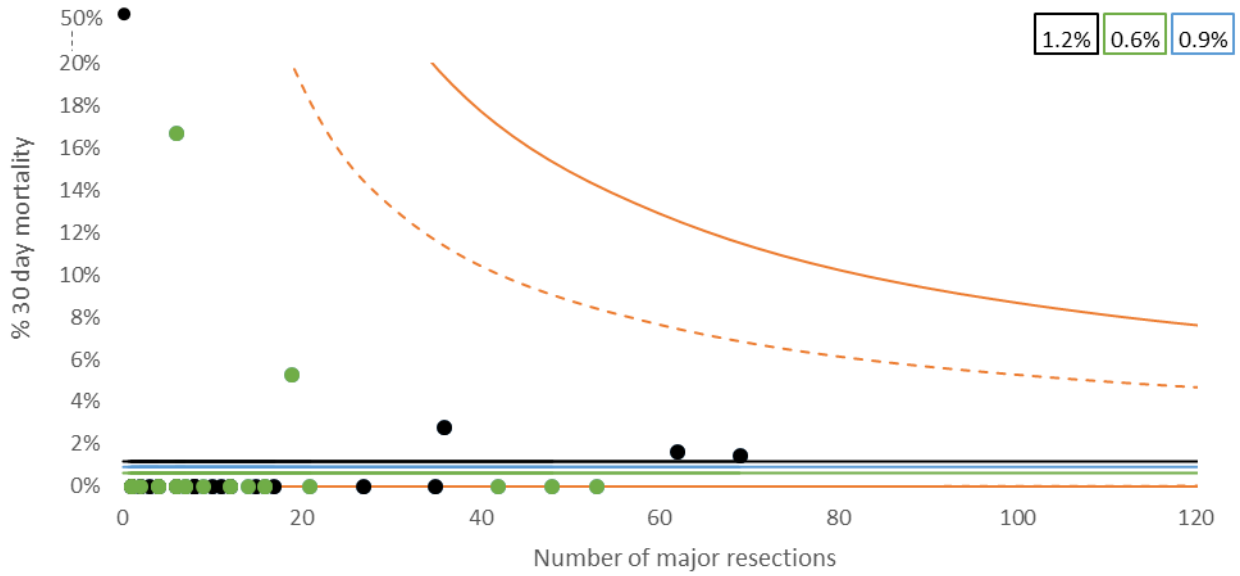
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 7.1e: In-hospital mortality following major resection by hospital volume for rectal cancer



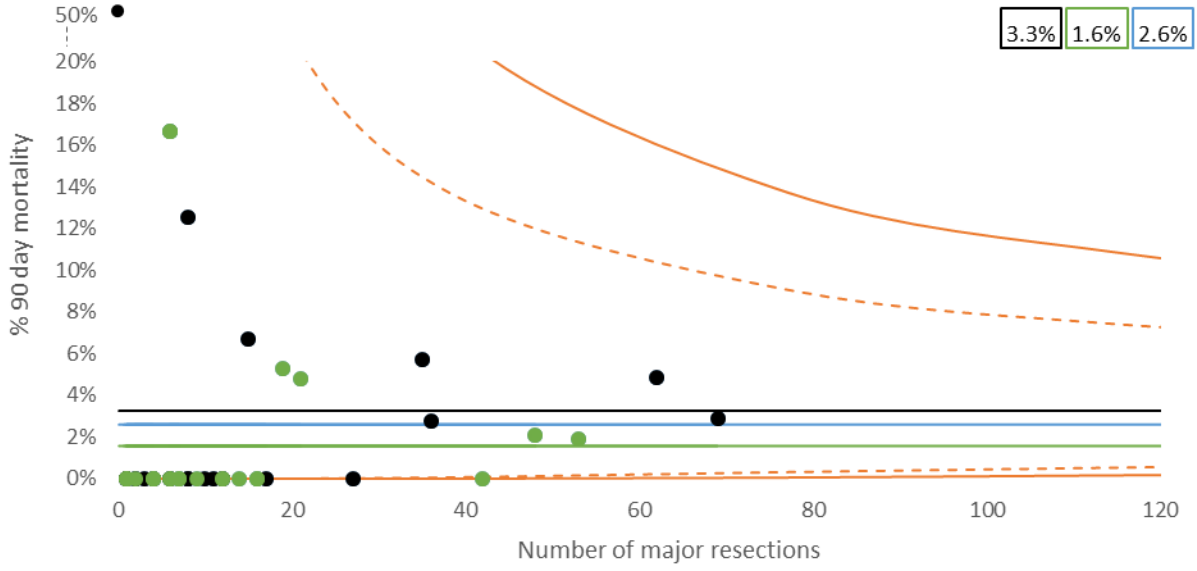
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 7.1f: 30 day mortality following major resection by hospital volume for rectal cancer



RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 7.1g: 90 day mortality following major resection by hospital volume for rectal cancer



Public Hospitals | Private Hospitals | Queensland average | Public hospital average | Private hospital average | 95% Confidence Level | 99.8% Confidence Level

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 7.1h: Rectal cancer patient characteristics and mortality

	Total	In-hospital mortality	30 day mortality	90 day mortality
Number of deaths		6	6	17
Age				
< 65	295	0.7%	0.7%	1.0%
65 - 74	190	0.5%	0.5%	2.6%
75 - 84	138	0.7%	0.7%	3.6%
85 +	33	6.1%	6.1%	12.1%
Sex				
Male	408	1.0%	1.0%	2.2%
Female	248	0.8%	0.8%	3.2%
Comorbidity				
0	476	0.4%	0.4%	1.3%
1	126	0.8%	0.8%	4.0%
2+	54	5.6%	5.6%	11.1%
Residence				
Major City	385	1.3%	1.3%	3.1%
Inner Regional	154	0.0%	0.0%	0.6%
Outer Regional	103	1.0%	1.0%	3.9%
Remote & Very Remote	14	0.0%	0.0%	0.0%
Socioeconomic status				
Affluent	80	0.0%	0.0%	1.3%
Middle	444	0.9%	0.9%	2.7%
Disadvantaged	132	1.5%	1.5%	3.0%
ASA				
1 - 2	360	0.0%	0.0%	0.3%
≥ 3	220	1.8%	1.8%	5.9%
Unknown	76	2.6%	2.6%	3.9%
Stage				
I	173	0.6%	0.6%	1.2%
II	160	1.3%	1.3%	2.5%
III	208	1.0%	1.0%	2.4%
IV	72	1.4%	1.4%	8.3%
X	42	0.0%	0.0%	0.0%
Unknown	1	0.0%	0.0%	0.0%
Facility Type				
Public	338	1.2%	1.2%	3.3%
Private	318	0.6%	0.6%	1.9%

8.1 Surgical Survival

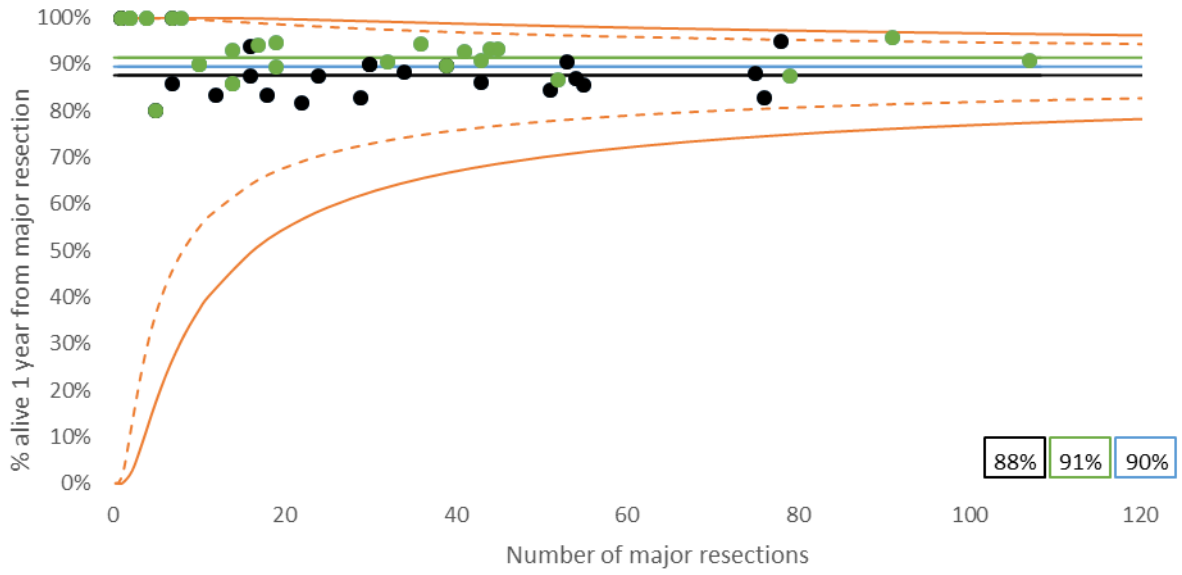
COLON CANCER; YEAR OF DIAGNOSIS 2012

What percentage of patients are alive after major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
1 year surgical survival	88%	89%	89%	93%	90%
2 year surgical survival	78%	81%	86%	86%	82%

COLON CANCER; YEAR OF DIAGNOSIS 2012

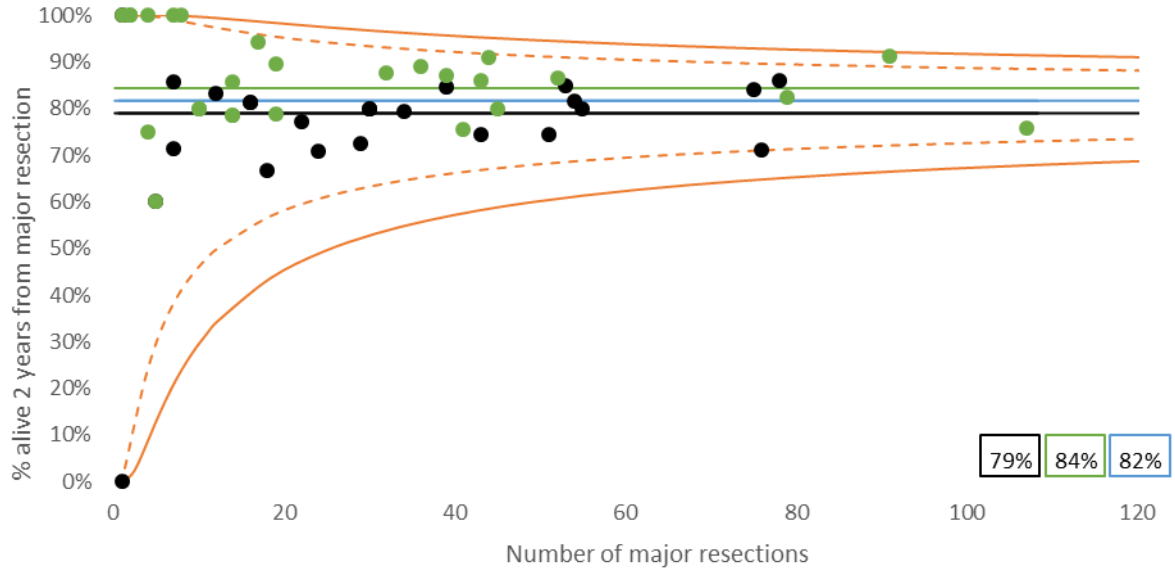
Figure 8.1a: % of colon cancer patient's alive one year after major resection



Public Hospitals Private Hospitals Queensland average Public hospital average Private hospital average 95% Confidence Level 99.8% Confidence Level

COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 8.1b: % of colon cancer patient's alive two years after major resection



Public Hospitals | Private Hospitals | Queensland average | Public hospital average | Private hospital average | 95% Confidence Level | 99.8% Confidence Level

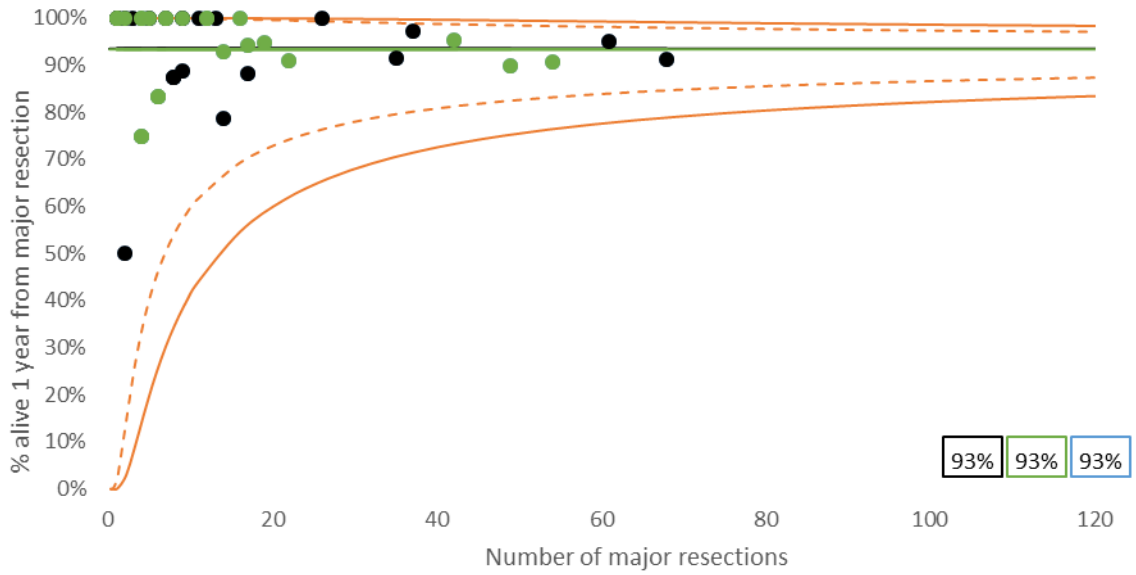
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

What percentage of patients are alive after major resection?

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
1 year surgical survival	95%	93%	91%	94%	93%
2 year surgical survival	86%	87%	83%	81%	86%

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

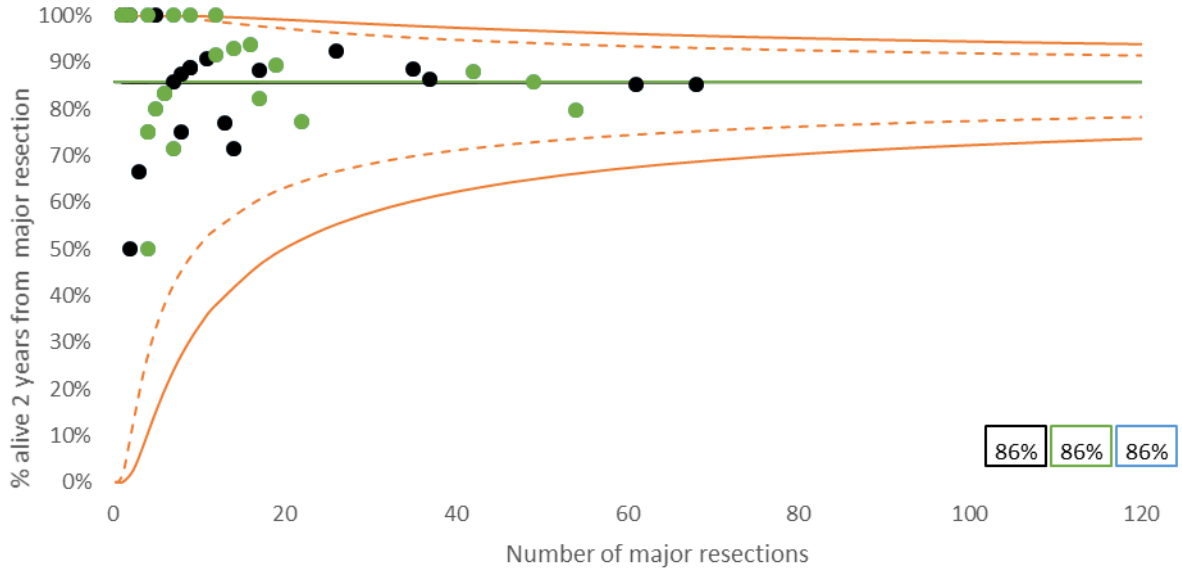
Figure 8.1c: % of rectal cancer patient's alive one year after major resection



Public Hospitals Private Hospitals Queensland average Public hospital average Private hospital average 95% Confidence Level 99.8% Confidence Level

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 8.1b: % of rectal cancer patient's alive two years after major resection



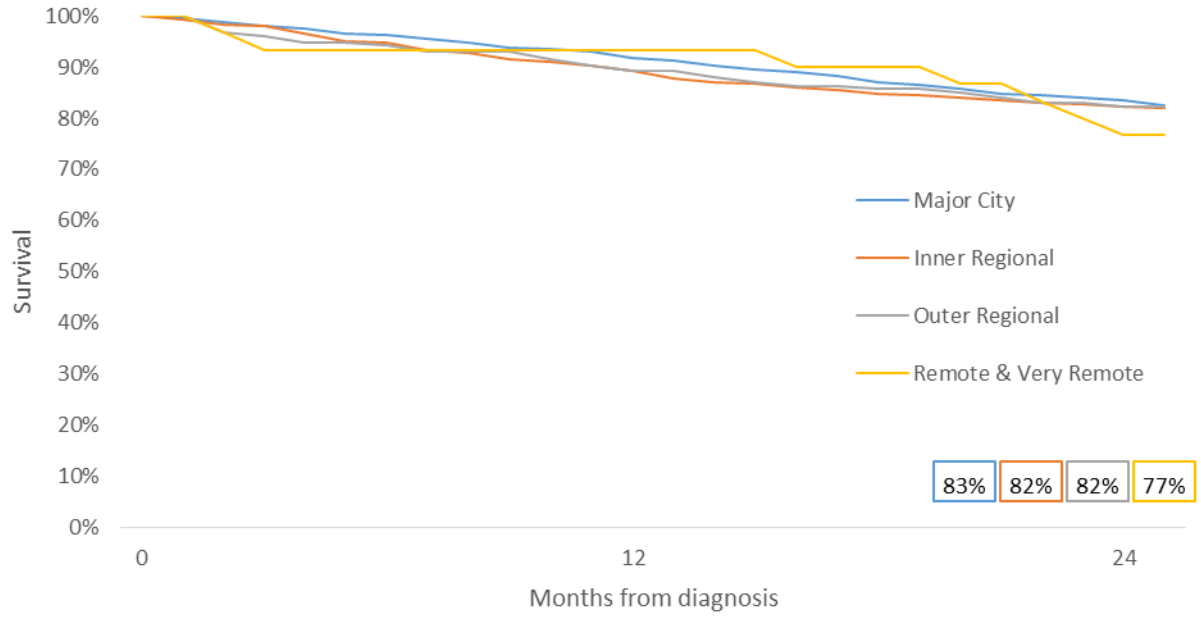
Public Hospitals | Private Hospitals | Queensland average | Public hospital average | Private hospital average | 95% Confidence Level | 99.8% Confidence Level

9.1 Cancer Survival

COLON CANCER; YEAR OF DIAGNOSIS 2012

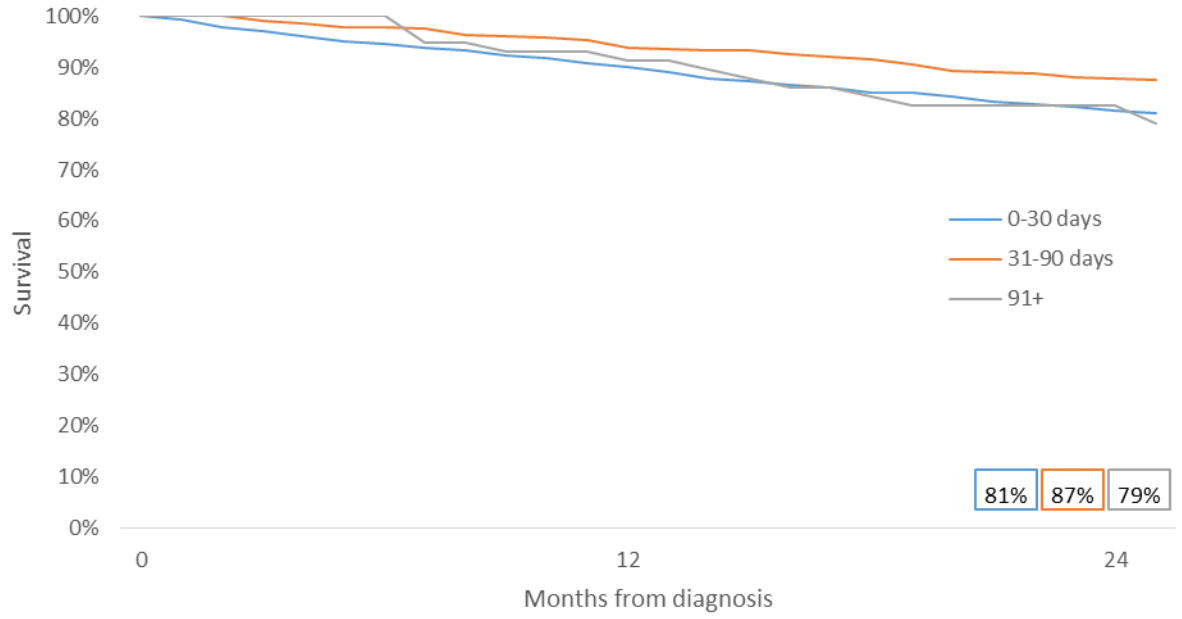
What percentage of patients are alive two years after major resection?

Figure 9.1a: 2 year survival from diagnosis by remoteness of residence



COLON CANCER; YEAR OF DIAGNOSIS 2012

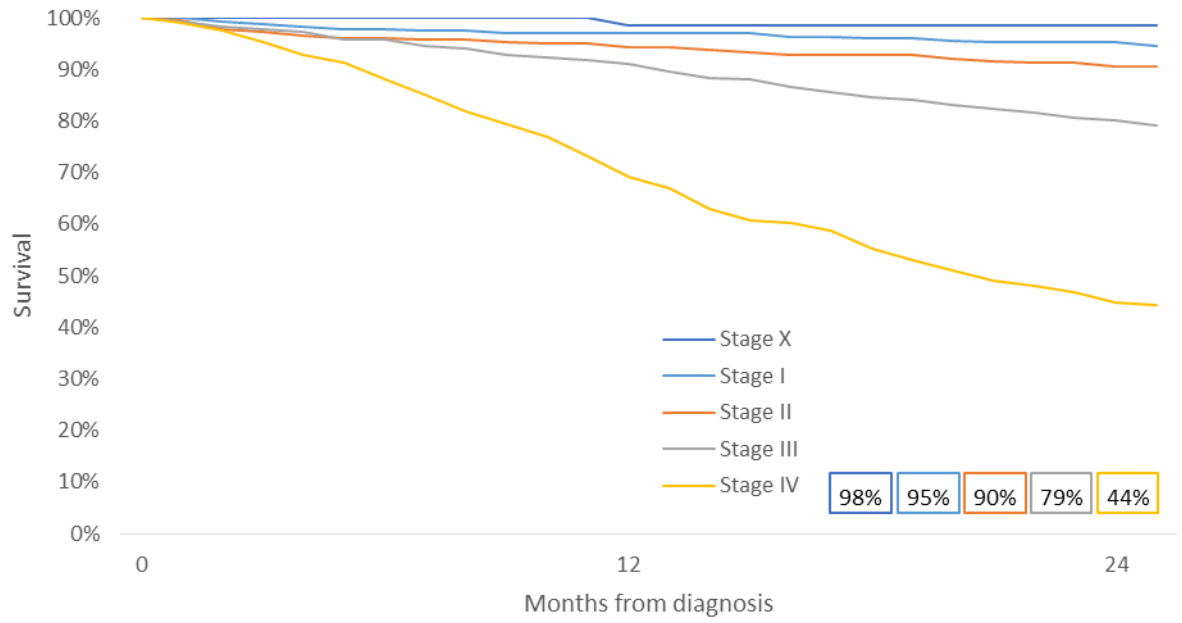
Figure 9.2b: 2 year survival from diagnosis by time to major resection



There is little variation in 2 year survival based on where patients live.

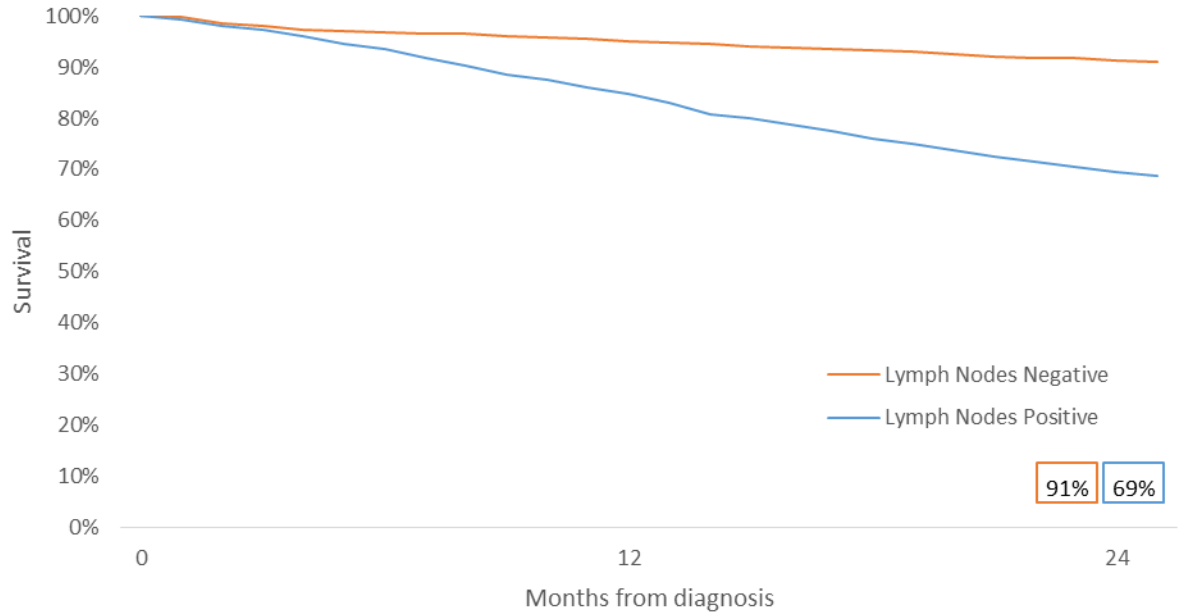
COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 9.2c: 2 year survival from diagnosis by stage



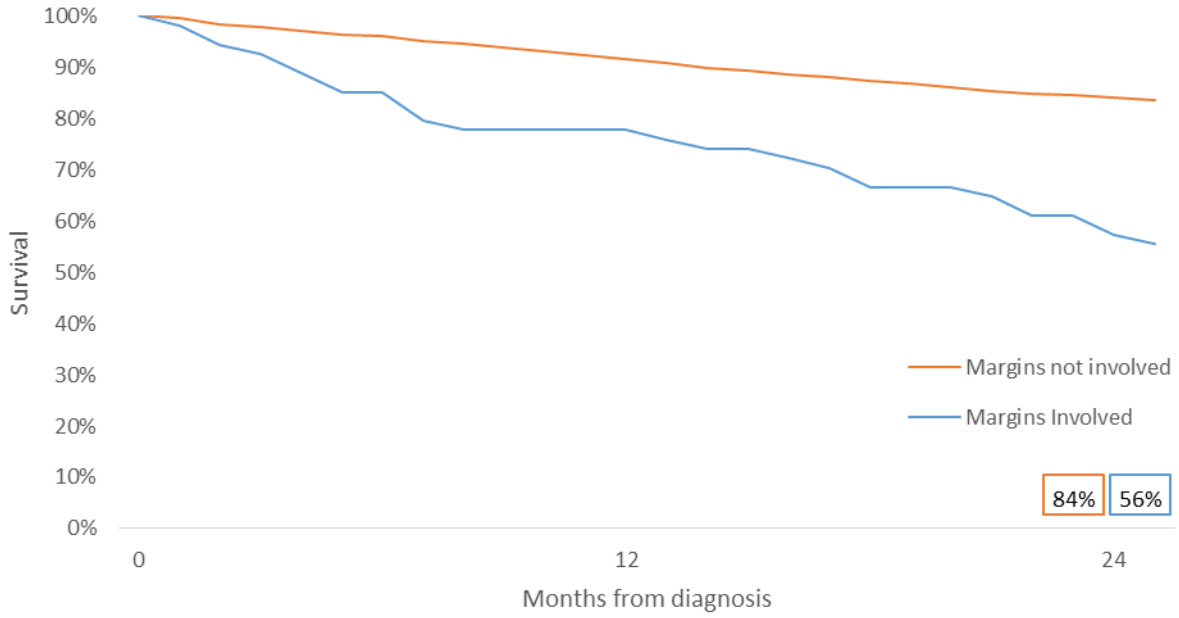
COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 9.2d: 2 year survival from diagnosis by lymph node involvement



COLON CANCER; YEAR OF DIAGNOSIS 2012

Figure 9.3e: 2 year survival from diagnosis by margins involved

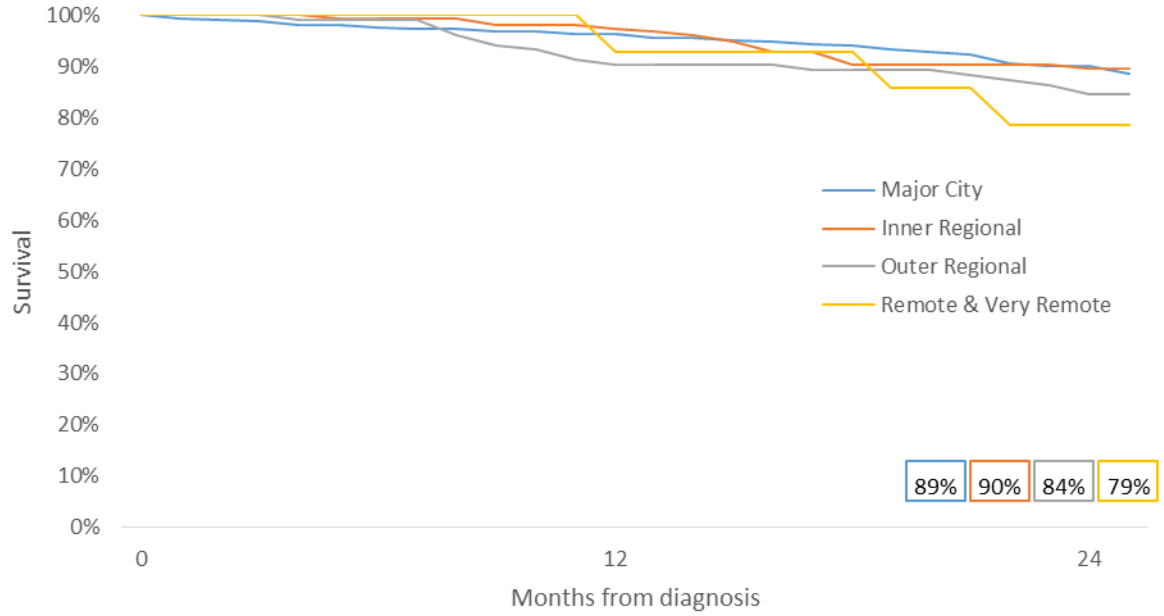


Patients with positive lymph nodes and involved margins have poorer survival.

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

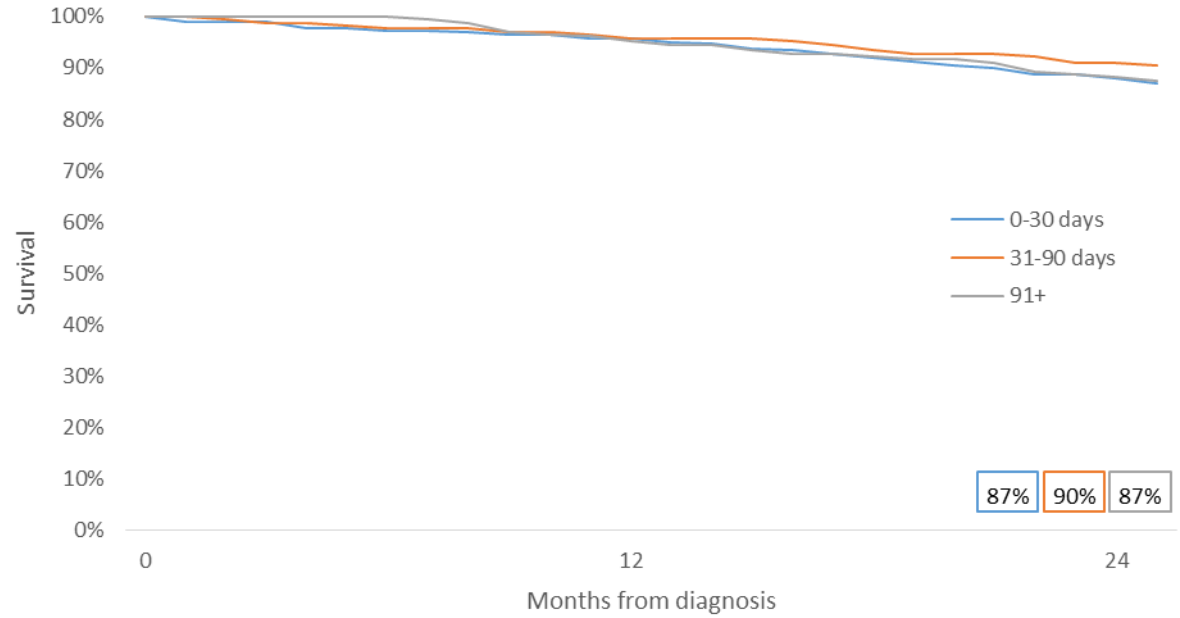
What percentage of patients are alive two years after major resection?

Figure 9.1f: 2 year survival from diagnosis by remoteness of residence



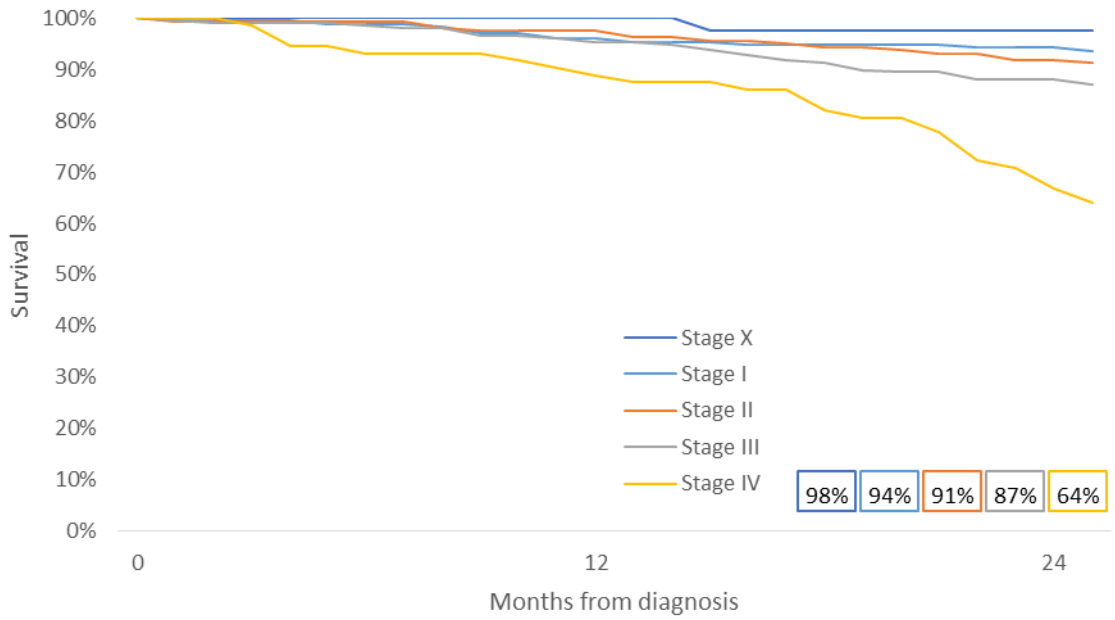
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 9.1g: 2 year survival from diagnosis by time to major resection



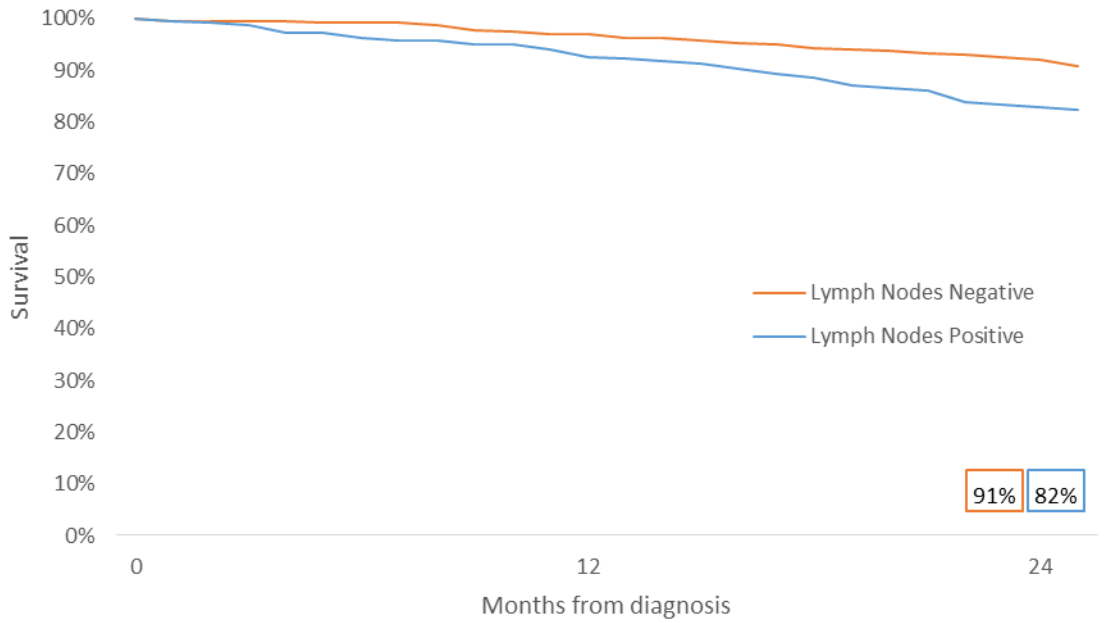
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 9.1h: 2 year survival from diagnosis by stage



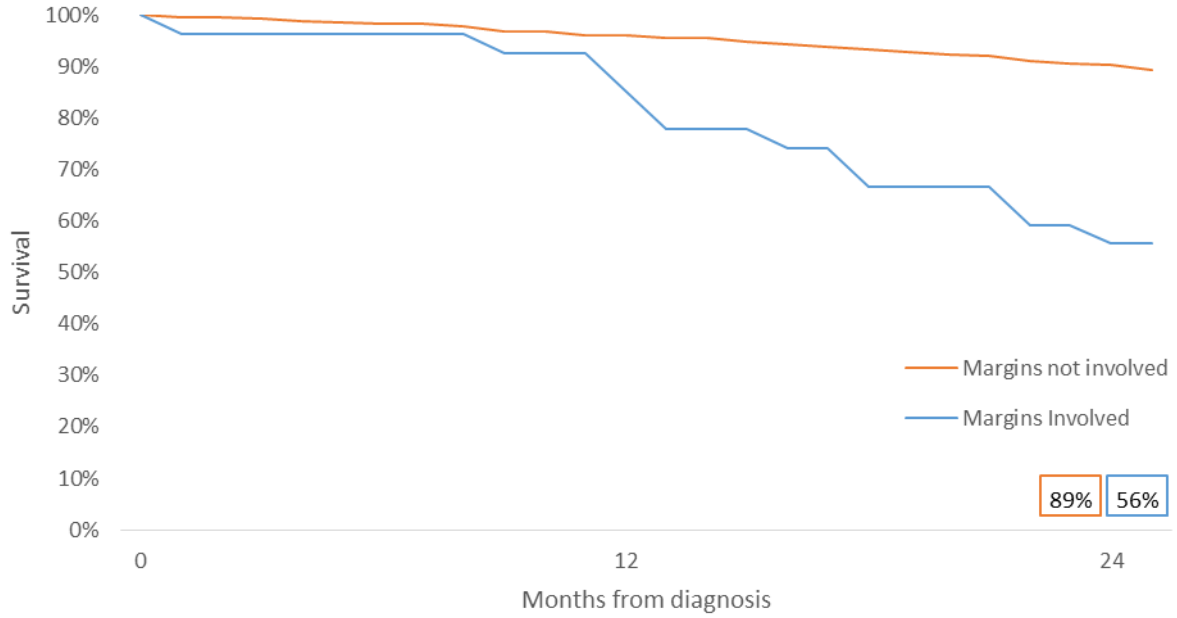
RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 9.1i: 2 year survival from diagnosis by lymph node involvement



RECTAL CANCER; YEAR OF DIAGNOSIS 2012

Figure 9.1j: 2 year survival from diagnosis by margins involved



Appendix 1: Hospital peer group definitions

Source

Australian Institute of Health and Welfare (AIHW) 2015, *Australian hospital peer groups*, Health Services Series No. 66, Cat.No. HSE 170, Canberra: AIHW.

Principal referral hospitals

Principal referral hospitals are public acute hospitals that provide a very broad range of services, have a range of highly specialised service units, and have very large patient volumes. The term 'referral' recognises that these hospitals have specialist facilities not typically found in smaller hospitals.

Public acute group A hospitals (Group A hospitals)

Public acute group A hospitals are public acute hospitals that provide a wide range of services typically including a 24-hour emergency department, intensive care unit, coronary care unit and oncology unit, but do not provide the breadth of services provided by *Principal referral hospitals.*

Private acute group A hospitals (Group A hospitals)

Private acute group A hospitals are private acute hospitals that have a 24-hour emergency department and an intensive care unit, and provide a number of other specialised services such as coronary care, special care nursery, cardiac surgery and neurosurgery.

Public acute group B hospitals (Group B hospitals)

Public acute group B hospitals are those public acute hospitals that do not have the service profile of the *Principal referral hospitals and Group A hospitals,* but do have 24-hour emergency department; they typically provide elective surgery and have specialised service units such as obstetric, paediatric and psychiatric units.

Private acute group B hospitals (Group B hospitals)

Private acute group B hospitals are private acute hospitals that do not have a 24-hour emergency department, but do have an intensive care unit and a number of other specialised services including coronary care, special care nursery, cardiac surgery and neurosurgery.

Public acute group C hospitals (Other hospitals)

Public acute group C hospitals include those public acute hospitals that provide a more limited range of services than *Principal referral hospitals* or *Public acute group A* and *B hospitals*, but do have an obstetric unit,

provide surgical services and/or some form of emergency facility (emergency department, or accident and emergency service).

Private acute group C hospitals (Other hospitals)

Private acute group C hospitals are those private acute hospitals that do not provide emergency department services or have an intensive care unit, but do provide specialised services in a range of clinical specialities.

Public acute group D hospitals (Other hospitals)

Public acute group D hospitals are acute public hospitals that offer a smaller range of services relative to other public acute hospitals, and provide 200 or more separations per year. They are mostly situated in regional and remote areas.

Private acute group D hospitals (Other hospitals)

Private acute group D hospitals are those private acute hospitals that do not provide emergency department services or have an intensive care unit, do not provide specialised services in a range of clinical specialities, but had 200 or more separations.

Women's hospitals (Other hospitals)

Women's hospitals specialise in the treatment of women.

Hospital	AIHW Peer Group	Report Peer Group	Major resection Volume
Gold Coast (University) Hospital	Principal referral hospitals	Principal referral hospitals	
Princess Alexandra Hospital	Principal referral hospitals	Principal referral hospitals	
Royal Brisbane & Women's Hospital	Principal referral hospitals	Principal referral hospitals	50-137
The Prince Charles Hospital	Principal referral hospitals	Principal referral hospitals	
The Townsville Hospital	Principal referral hospitals	Principal referral hospitals	
Allamanda Private Hospital	Private acute group A hospitals	Group A hospitals	
Greenslopes Private Hospital	Private acute group A hospitals	Group A hospitals	
Holy Spirit Northside	Private acute group A hospitals	Group A hospitals	
John Flynn Private Hospital	Private acute group A hospitals	Group A hospitals	
Mater Private Hospital Brisbane	Private acute group A hospitals	Group A hospitals	
Noosa Hospital	Private acute group A hospitals	Group A hospitals	
Pindara Private Hospital	Private acute group A hospitals	Group A hospitals	
St Andrew's War Memorial Hospital	Private acute group A hospitals	Group A hospitals	
The Wesley Hospital	Private acute group A hospitals	Group A hospitals	
Bundaberg Base Hospital	Public acute group A hospitals	Group A hospitals	
Cairns Hospital	Public acute group A hospitals	Group A hospitals	19-149
Hervey Bay Hospital	Public acute group A hospitals	Group A hospitals	
Ipswich Hospital	Public acute group A hospitals	Group A hospitals	
Logan Hospital	Public acute group A hospitals	Group A hospitals	
Mackay Base Hospital	Public acute group A hospitals	Group A hospitals	
Mater Adult Hospital	Public acute group A hospitals	Group A hospitals	
Nambour General Hospital	Public acute group A hospitals	Group A hospitals	
Queen Elizabeth II Jubilee Hospital	Public acute group A hospitals	Group A hospitals	
Redcliffe Hospital	Public acute group A hospitals	Group A hospitals	
Rockhampton Hospital	Public acute group A hospitals	Group A hospitals	
Toowoomba Hospital	Public acute group A hospitals	Group A hospitals	
Friendly Society Private Hospital	Private acute group B hospitals	Group B hospitals	
Mater Hospital Pimlico	Private acute group B hospitals	Group B hospitals	
St Andrew's Toowoomba Hospital	Private acute group B hospitals	Group B hospitals	
St Vincent's Hospital Toowoomba	Private acute group B hospitals	Group B hospitals	
Sunshine Coast University Private Hospital	Private acute group B hospitals	Group B hospitals	
The Sunshine Coast Private Hospital	Private acute group B hospitals	Group B hospitals	1-66
Caboolture Hospital	Public acute group B hospitals	Group B hospitals	
Gladstone Hospital	Public acute group B hospitals	Group B hospitals	
Mount Isa Base Hospital	Public acute group B hospitals	Group B hospitals	
Redland Hospital	Public acute group B hospitals	Group B hospitals	
Robina Hospital	Public acute group B hospitals	Group B hospitals	
Brisbane Private Hospital	Private acute group C hospitals	Other hospitals	
Cairns Private Hospital	Private acute group C hospitals	Other hospitals	
Hillcrest - Rockhampton Private Hospital	Private acute group C hospitals	Other hospitals	
Mater Misericordiae Hospital Gladstone	Private acute group C hospitals	Other hospitals	
Mater Misericordiae Hospital Mackay	Private acute group C hospitals	Other hospitals	
Mater Misericordiae Hospital Rockhampton	Private acute group C hospitals	Other hospitals	
North West Private Hospital	Private acute group C hospitals	Other hospitals	
St Andrew's - Ipswich Private Hospital	Private acute group C hospitals	Other hospitals	1-39
Sunnybank Private Hospital	Private acute group C hospitals	Other hospitals	
Caloundra Private Clinic	Private acute group D hospitals	Other hospitals	
Mater Misericordiae Hospital Bundaberg	Private acute group D hospitals	Other hospitals	
Nambour Selangor Private Hospital	Private acute group D hospitals	Other hospitals	
South Burnett Private Hospital	Private acute group D hospitals	Other hospitals	
St Stephen's Private Hospital Maryborough	Private acute group D hospitals	Other hospitals	
Atherton Hospital	Public acute group C hospitals	Other hospitals	
Mater Mothers' Hospital	Women’s hospitals	Other hospitals	
Total			2193

Appendix 2: Type of surgery

COLON CANCER; YEAR OF DIAGNOSIS 2012

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	279	909	218	131	1537
Abdominalperineal resection	0	0	0	0	0
Anterior Resection	71	206	37	27	341
Colectomy	197	681	173	100	1151
Hartmanns	10	18	8	4	40
Total Proctocolectomy	1	4	0	0	5
Local excision, polypectomy	29	92	18	62	201

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Major resection	199	351	70	36	656
Abdominalperineal resection	40	48	6	6	100
Anterior Resection	149	285	60	28	522
Colectomy	0	4	0	1	5
Hartmanns	9	5	3	1	18
Total Proctocolectomy	1	9	1	0	11
Local excision, polypectomy	18	80	20	45	163

Appendix 3: Morphology – ICD10-AM (9th edition)

COLON CANCER; YEAR OF DIAGNOSIS 2012

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Adenocarcinoma 81403	214	694	169	121	1198
Adenocarcinoma in tubulovillous adenoma 82633	18	85	14	29	146
Mucinous adenocarcinoma 84803	37	108	19	10	174
Adenocarcinoma in adenomatous polyp 82103	27	66	15	16	124
Carcinoma 80103	3	5	2	2	12
Neoplasm, malignant 80003	0	4	0	1	5
Adenocarcinoma in villous adenoma 82613	2	13	7	8	30
Signet ring cell carcinoma 84903	1	8	3	2	14
Carcinoma, undifferentiated 80203	0	3	3	1	7
Large cell neuroendocrine carcinoma 80133	0	4	2	1	7
Mucin-producing adenocarcinoma 84813	4	1	0	0	5
Neuroendocrine carcinoma 82463	1	3	0	0	4
Medullary carcinoma 85103	0	2	1	0	3
Adenocarcinoma with neuroendocrine differentiation 85743	0	1	1	0	2
Mixed adenoneuroendocrine carcinoma 82443	0	1	0	1	2
Adenocarcinoma in adenomatous polyposis coli 82203	0	1	0	0	1
Malignant fibrour histiocytoma 88303	0	0	0	0	0
Papillary adenocarcinoma 82603	0	0	0	1	1
Cribriform carcinoma 82013	1	0	0	0	1
Adenocarcinoma with mixed subtypes 82553	0	1	0	0	1
Carcinosarcoma 89803	0	0	0	0	0
Mixed cell adenocarcinoma 83233	0	1	0	0	1
Total	308	1001	236	193	1738

RECTAL CANCER; YEAR OF DIAGNOSIS 2012

	Principal referral hospitals	Group A hospitals	Group B hospitals	Other hospitals	Queensland
Adenocarcinoma 81403	172	317	64	55	608
Adenocarcinoma in tubulovillous adenoma 82633	24	58	8	14	104
Mucinous adenocarcinoma 84803	12	15	5	0	32
Adenocarcinoma in adenomatous polyp 82103	7	28	8	6	49
Carcinoma 80103	0	3	0	0	3
Neoplasm, malignant 80003	0	0	0	1	1
Adenocarcinoma in villous adenoma 82613	2	7	5	3	17
Signet ring cell carcinoma 84903	0	1	0	1	2
Carcinoma, undifferentiated 80203	0	1	0	0	1
Large cell neuroendocrine carcinoma 80133	0	0	0	0	0
Mucin-producing adenocarcinoma 84813	0	0	0	0	0
Neuroendocrine carcinoma 82463	0	0	0	0	0
Medullary carcinoma 85103	0	0	0	0	0
Adenocarcinoma with neuroendocrine differentiation 85743	0	0	0	0	0
Mixed adenoneuroendocrine carcinoma 82443	0	0	0	0	0
Adenocarcinoma in adenomatous polyposis coli 82203	0	0	0	0	0
Malignant fibrour histiocytoma 88303	0	1	0	0	1
Papillary adenocarcinoma 82603	0	0	0	0	0
Cribriform carcinoma 82013	0	0	0	0	0
Adenocarcinoma with mixed subtypes 82553	0	0	0	0	0
Carcinosarcoma 89803	0	0	0	1	1
Mixed cell adenocarcinoma 83233	0	0	0	0	0
Total	217	431	90	81	819

Appendix 4: List of major resection codes – ICD10-AM (9th edition)

Procedure Code	Procedure Description	Major Resection Group
3203000	Rectosigmoidectomy with formation of stoma (Hartmanns)	Hartmanns
3203001	Laparoscopic rectosigmoidectomy with formation of stoma (Hartmanns)	Hartmanns
3203900	Abdominoperineal proctectomy	Abdominoperineal Resection
3202400	High anterior resection of rectum	Anterior Resection
3202500	Low anterior resection of rectum	Anterior Resection
3202600	Ultra low anterior resection of rectum	Anterior Resection
3202800	Ultra low anterior resection of rectum with hand sutured coloanal anastomosis	Anterior Resection
9220800	Anterior resection of rectum, level unspecified	Anterior Resection
3201201	Laparoscopic total colectomy with ileorectal anastomosis	Colectomy
3201200	Total colectomy with ileorectal anastomosis	Colectomy
3200901	Laparoscopic total colectomy with ileostomy	Colectomy
3200900	Total colectomy with ileostomy	Colectomy
3200603	Laparoscopic left hemicolectomy with formation of stoma	Colectomy
3200602	Laparoscopic left hemicolectomy with anastomosis	Colectomy
3200601	Left hemicolectomy with formation of stoma	Colectomy
3200600	Left hemicolectomy with anastomosis	Colectomy
3200503	Laparoscopic extended right hemicolectomy with anastomosis	Colectomy
3200502	Laparoscopic subtotal colectomy with anastomosis	Colectomy
3200501	Extended right hemicolectomy with anastomosis	Colectomy
3200500	Subtotal colectomy with anastomosis	Colectomy
3200403	Laparoscopic extended right hemicolectomy with formation of stoma	Colectomy
3200402	Laparoscopic subtotal colectomy with formation of stoma	Colectomy
3200401	Extended right hemicolectomy with formation of stoma	Colectomy
3200400	Subtotal colectomy with formation of stoma	Colectomy
3200303	Laparoscopic right hemicolectomy with anastomosis	Colectomy
3200302	Laparoscopic limited excision of large intestine with anastomosis	Colectomy
3200301	Right hemicolectomy with anastomosis	Colectomy
3200300	Limited excision of large intestine with anastomosis	Colectomy
3200003	Laparoscopic right hemicolectomy with formation of stoma	Colectomy
3200002	Laparoscopic limited excision of large intestine with formation of stoma	Colectomy
3200001	Right hemicolectomy with formation of stoma	Colectomy
3200000	Limited excision of large intestine with formation of stoma	Colectomy
3056600	Resection of small intestine with anastomosis	Colectomy
3056500	Resection of small intestine with formation of stoma	Colectomy
3051506	Laparoscopic ileocolic resection with formation of stoma	Colectomy
3051505	Ileocolic resection with formation of stoma	Colectomy
3051504	Laparoscopic ileocolic resection with anastomosis	Colectomy
3051503	Ileocolic resection with anastomosis	Colectomy
3201500	Total proctocolectomy with ileostomy	Total Proctocolectomy
3205100	Total proctocolectomy with ileo-anal anastomosis	Total Proctocolectomy
3205101	Total proctocolectomy with ileo-anal anastomosis & formation of temp. ileostomy	Total Proctocolectomy

Appendix 5: List of local excision or biopsy codes – ICD10-AM (9th edition)

Procedure Code	Procedure Description	Local excision group
3007513	Biopsy of small intestine	Local Excision, Polypectomy
3007514	Biopsy of large intestine	Local Excision, Polypectomy
3207501	Rigid sigmoidoscopy with biopsy	Local Excision, Polypectomy
3207800	Rigid sigmoidoscopy with polypectomy involving removal of <= 9 polyps	Local Excision, Polypectomy
3208100	Rigid sigmoidoscopy with polypectomy involving removal of >= 10 polyps	Local Excision, Polypectomy
3208401	Fibreoptic colonoscopy to hepatic flexure, with biopsy	Local Excision, Polypectomy
3208700	Fibreoptic colonoscopy to hepatic flexure, with polypectomy	Local Excision, Polypectomy
3209001	Fibreoptic colonoscopy to caecum, with biopsy	Local Excision, Polypectomy
3209300	Fibreoptic colonoscopy to caecum, with polypectomy	Local Excision, Polypectomy
9029702	Endoscopic mucosal resection of large intestine	Local Excision, Polypectomy
9095900	Excision of other lesion of large intestine	Local Excision, Polypectomy
3209600	Full thickness biopsy of rectum	Local Excision, Polypectomy
3007534	Biopsy of anus	Local Excision, Polypectomy
3209900	Per anal submucosal excision of lesion of tissue of rectum	Local Excision, Polypectomy
3210300	Per anal excision of lesion or tissue of rectum via stereoscopic rectoscopy	Local Excision, Polypectomy
3210800	Trans-sphincteric excision of lesion or tissue of rectum	Local Excision, Polypectomy
9034100	Other excision of lesion of rectum	Local Excision, Polypectomy
3214201	Excision of anal polyp	Local Excision, Polypectomy
3210500	Per anal full thickness excision of anorectal lesion or tissue	Local Excision, Polypectomy
9031500	Endoscopic excision of lesion or tissue of anus	Local Excision, Polypectomy
9031501	Excision of other lesion or tissue of anus	Local Excision, Polypectomy

Method

Assigning a surgery record to a person

To assign a surgery record to a person with cancer the earliest diagnosis in the cancer group is used. For example, if a person was diagnosed with cancer in the rectum in 2012 and cancer in the rectosigmoid junction in 2014, then the surgery record that is linked to the cancer in the rectum diagnosed in 2012 will be reported.

Each cancer diagnosis in a calendar year was matched and linked to one or many surgery records. This produces a list of all the surgeries performed for each cancer diagnosis. The surgeries are then categorised according to clinically developed rules which are specific to each indicator and measure. Therefore a single cancer incidence and surgeries may be counted in a number of ways. For example a person diagnosed with colon cancer in 2012 had a colectomy in 2012 and an anterior resection in 2013. The colectomy would be used for a different group of indicators than the anterior resection.

Diagnosis year

This report is structured around diagnosis years as reported by the Queensland Cancer Registry, the latest incident year being 2013. Only patients diagnosed in 2012 will be included in this report. Patients that had surgery in 2012 but were diagnosed in an earlier year are excluded from the report. Diagnosis refers to histological confirmation of diagnosis.

Funnel plots

Funnel plots have been created by plotting the observed result for each hospital result against the surgical volume of the hospital. Confidence limit intervals of 95% (~2 standard deviations) and 99.8% (~3 standard deviations) have been superimposed around the overall Queensland result.

Multidisciplinary meeting

Queensland Oncology Online (QOOL) is a web-based tool that supports multidisciplinary teams in Queensland. It is currently used in 1 private and 16 public hospitals. The data from QOOL was matched and linked to our patient cohort according to clinically developed rules.

Neo-adjuvant radiotherapy

Radiotherapy data from all public and private providers was matched and linked to our patient cohort. A patient had neo-adjuvant radiotherapy if a radiotherapy record was found where the start date of the radiotherapy was between the patient's diagnosis date and major resection date.

Glossary

1 year surgical survival

All-cause crude survival: the percentage of cases still alive one year after surgery.

2 years surgical survival

All-cause crude survival: the percentage of cases still alive two years after surgery.

ASA score

American Society of Anaesthetic (ASA) physical status classification system for assessing the fitness of a patient prior to surgery.

Hierarchies by ASA Group

- Normal/Mild Disease: ASA 1-2
- Severe Disease: ASA 3-6

When two or more different ASA scores are coded on the same date in the admissions data, only one ASA score is chosen. The choice of the ASA score is based on the type of anaesthesia in the following order of selection: General > Sedation > Neuraxial > Regional > Intravenous Regional > Infiltration > Local.

For example, if General Anaesthesia ASA 2 and Sedation ASA 3, are coded on the same date, the General Anaesthesia score of 2 is chosen.

Cancer Survival

All-cause crude survival: the percentage of cases still alive two years after diagnosis.

Confidence interval (CI)

The confidence interval represents the probability that a population parameter will fall between two set values. A very wide interval may indicate that more data should be collected before anything definitive can be concluded about the parameter.

Comorbidity

A clinical condition that has the potential to significantly affect a cancer patient's prognosis.

Comorbidity is derived from hospital admissions data following the Quan algorithm1 for classifying ICD-10 coded conditions, modified to exclude metastasis, which is represented by a separate and distinct metastasis dimension.

Comorbidity is limited to conditions coded in any admission episode between 12 months before and 12 months after the date of cancer diagnosis.

For any given cancer diagnosis, comorbidity is restricted to conditions other than the primary cancer. E.g. A rectal cancer can be a comorbidity to a colon cancer diagnosis and vice versa, if they are diagnosed within 12 months of each other.

Benign tumours are not considered comorbidities.

Co-morbidity list:

AIDS	Acute myocardial infarction	Cancer
Cerebrovascular disease	Congestive heart failure	Chronic obstructive pulmonary disease
Dementia	Diabetes	Diabetes + complications
Hemiplegia or Paraplegia	Mild liver disease	Moderate/severe liver disease
Peptic ulcer	Peripheral vascular disease	Renal disease
Rheumatoid disease		

Days from diagnosis to surgery

Patients (as a percentage) whose time from earliest histological confirmed diagnosis to surgery (which is a major resection) is ≤ 30 days, or 31-90 days, or 91+ days.

Hospital peer groups

Australian Institute of Health and Welfare (AIHW) 2015, *Australian hospital peer groups*, Health Services Series No. 66, Cat.No. HSE 170, Canberra: AIHW.

The peer groups group public and private hospitals that share similar characteristics, providing a basis for meaningful comparisons. There are thirty peer groups, ten of which are relevant to this report. Peer group definitions, and the peer groups used in this report, are detailed at Appendix 1.

Indigenous status

A measure of whether a person identifies as being of Aboriginal or Torres Strait Islander origin.

Local excision or biopsy

Includes Queensland residents of all ages diagnosed with colorectal cancer in the time period who underwent local excision or biopsy. See Appendix X for full list of included procedures.

Major resection

Includes Queensland residents of all ages diagnosed with colorectal cancer in the time period who underwent one of the following surgical procedures: Abdominoperineal resection, Anterior Resection, Colectomy, Hartmanns, or Total Proctocolectomy. See Appendix 3 for a list of major resection codes, and a list of local excision or biopsy codes.

Median age (yrs)

The age that divides a population into two halves: one older than the median, the other younger than the median

Median days

The days that divides a population into two halves: one greater than the median, the other less than the median

Mortality

Inpatient mortality: The percentage of patients that die in hospital following their major resection.

30 day mortality: The percentage of patients that die within 30 days following their major resection.

90 day mortality: The percentage of patients that die within 90 days following their major resection.

Residence

The relative remoteness of residence at time of diagnosis, based on the Australian Standard Geographical Classification (ASGC). In this report, residence is classified into four groups: Major City, Inner Regional, Outer Regional and Remote & Very Remote. Rural is classified as Outer Regional and Remote & Very Remote.

Sex

Refers to the biological and physiological characteristics that define men and women.

Socioeconomic status

Socioeconomic status is based on the Socio-Economic Indexes for Areas (SEIFA), a census-based measure of social and economic well-being developed by the Australian Bureau of Statistics (ABS) and aggregated at the level of Statistical Local Areas (SLA).

The ABS uses SEIFA scores to rank regions into ten groups or deciles numbered one to ten, with one being the most disadvantaged and ten being the most affluent group. This ranking is useful at the national level, but the number of people in each decile often becomes too small for meaningful comparisons when applied to a subset of the population. For this reason, this document further aggregates SEIFA deciles into 3 socioeconomic groups.

SEIFA Group	Decile	Percentage of population (approximate)
Affluent	1-2	20%

Middle	3-8	60%
Disadvantaged	9-10	20%

The proportion of cases in each group will vary depending on the subset of the population being examined. For example, the proportion in the Disadvantaged group may be higher than 20% when the data is limited to cancers that are more common in poor compared to rich people.

FOR MORE INFORMATION

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