Queensland Lung Cancer Quality Index

Indicators of safe, quality cancer care

Lung cancer care in public and private hospitals

2011-2016

cancer alliance queensland
the Partnership
qccat
qcr
Queensland Government

Acknowledgements

The Queensland Lung Cancer Quality Index has been developed under the auspices of the Queensland Cancer Control Safety and Quality Partnership (The Partnership). The members of The Partnership include Professor Joanne Aitken, Dr John Bashford, Aniko Cooper, Bethany Crowe, Dr Hazel Harden, Associate Professor Lindy Jeffree, Associate Professor Glen Kennedy, Dr Penny Mackenzie, Professor Keith McNeil, Shoni Philpot, Professor Mark Smithers AM, Associate Professor Peter Steadman, Professor David E Theile AO (Chair), Dr Rick Walker, Professor Euan Walpole, and Associate Professor David Wyld.

The Lung Cancer Sub-committee was established in 2013 as a Sub-committee of The Partnership to examine and improve outcomes for cancer patients who have been diagnosed with lung cancer across Queensland.

We wish to thank members of the Lung Cancer Sub-committee for their valuable comments and leadership: Morgan Windsor (Chair), Margot Lehman, Jasotha Sanmugarajah.

We gratefully acknowledge the assistance of Professor David E Theile, AO, and Fergus Robbins in the preparation of the patient-level dataset.

This report was prepared by Danica Cossio, Theresa Negrello, Neal Rawson, Nancy Tran, Nathan Dunn, Tracey Guan, John Harrington, Georgina Novak, Gary Francois, and the Queensland Cancer Control Analysis Team (QCCAT), under the direction of Shoni Philpot.

Suggested citation:
Queensland Government. Queensland Lung Cancer Quality Index, Indicators of safe, quality cancer care, Lung cancer care in public and private hospitals, 2011-2016. Queensland Health, Brisbane, 2020.

ISBN: 978-0-6481487-9-1
Date published: July 2020

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Message from the Chair

As Chair of the Lung Cancer Sub-committee of the Queensland Cancer Control Safety and Quality Partnership, I am pleased to introduce the **Queensland Lung Cancer Quality Index - Indicators of safe, quality cancer care, Lung cancer care in public and private hospitals, 2011-2016** report.

Population lung cancer staging data have long been beyond the reach of cancer studies in Australia. This report builds on the Queensland Lung Surgery Quality Index 2005-2014 to include stage as well as radiation and intra-venous systemic therapy treatments, providing the first population-wide review of lung cancer diagnosis, staging, multimodal treatment, and survival in Queensland.

Lung cancer is the leading cause of cancer death in both Queensland males and females and is the 6th highest incident cancer. The management of patients with lung cancer is complex, requiring multidisciplinary care to ensure that patients receive treatment that will lead to the best outcomes. Many factors influence the clinician and patient's choice of treatment, including where treatment is best provided. By presenting information on treatments and outcomes, this report helps guide these decisions.

I am pleased to see improvements in five-year relative survival and post-treatment mortality and survival. This report also reveals variation in outcomes between treatment facilities, which may not be evident in daily clinical practice but becomes evident with this type of analysis. This study documents continued too long wait times for some patients to receive their first treatment. As well, treatment accessibility and quality varied by age, sex, socioeconomic status, and Aboriginal and Torres Strait Islander status. I encourage you to consider how this information will inform how lung cancer is managed in your facility. Treatment of lung cancer in Queensland will continue to be monitored with a focus on ensuring the best possible outcomes for all our patients.

I wish to acknowledge the commitment of the members of The Queensland Cancer Control Analysis Team in providing the information, analysis, statistics, and engaging the clinicians that led to this report. It is also essential to recognise the clinicians involved in the discussion and development of recommendations in the management of lung cancer.

Finally, we invite your feedback on the value and benefits of this report. We hope that this information can make a positive contribution to the future of lung cancer in Queensland.

Morgan Windsor
Chair, Lung Cancer Sub-committee
Queensland Cancer Control Safety and Quality Partnership

Key findings

Lung cancer causes more deaths than any other cancer in Queensland and is the sixth most diagnosed invasive cancer (excluding basal and squamous cell carcinomas of the skin). In the six years 2011-2016, 10,958 Queenslanders were diagnosed with non-small cell lung cancer (hereafter referred to as lung cancer), 6,582 in males, and 4,376 in females. For the same period, 10,745 Queenslanders died from lung cancer (diagnosed at any time) (Section 0.1).

Lung cancers high mortality results from both a high incidence rate and low survival, with only 26% of those diagnosed surviving 3 years after diagnosis. The poor survival is due, at least in part, to the high proportion of cases diagnosed at an advanced stage. In Queensland in 2011-2016, 46% of cases were diagnosed at stage IV.

This report provides, for the first time, a comprehensive picture of statewide data on lung cancer by stage at diagnosis in Queensland. Staging assists clinicians to plan appropriate treatment and determine the likely outcome or course of the disease[1]. Aggregate staging information can be used by healthcare providers, researchers, and policymakers to identify trends in diagnosis by population subgroups and to evaluate the effectiveness of early detection programs.

New indicators in this Quality Index arise from the Cancer Council Australia's *Clinical Practice Guidelines for the treatment of lung cancer*[2] and report on guideline-concordant care. Queensland's cancer services, as a whole, are providing lung cancer care well compared with other jurisdictions nationally and internationally. This report identifies bright spots and opportunities to help further focus efforts in improving the quality of care delivery for people with lung cancer.

The incidence rate of lung cancer continues to fall in males and rise in females

- Between 1982 and 2016, the number of new lung cancer cases increased markedly in both sexes, due to population growth and ageing. However, when the age structure and size of the population are considered, the incidence rate decreased in males by 44% and increased in females by 121% (Section 0.1; Appendix A). The different patterns of incidence rates in males and females reflect historical differences in smoking behaviour.

Relative survival is improving

- Overall 5-year relative survival has improved, increasing to 19% for 2012-2016, up from 15% in 2007-2011 (Section 0.3).

Almost half of patients are diagnosed at stage IV

- Just under one quarter (24%) of patients were diagnosed with early-stage disease (stages I or II), while 14% were diagnosed at stage III and 46% at stage IV. For 16% of patients, the stage was unknown (Section 1.2).
- 82% of stage I patients were alive two years following diagnosis, falling to 64% for stage II, 38% for stage III, and 11% for stage IV (Section 1.2).

Guideline-concordant treatment summary

- Surgery, through pneumonectomy, lobectomy, or wedge resection, was performed in 20% of all patients; and 68% of patients with stage I or stage II disease (Section 1.2).
- 77% of patients with inoperable stage I or II disease received radiation therapy (Table IS1).
- Chemoradiotherapy was administered in just under half (48%) of patients with inoperable stage III disease (Section 1.6).
- Radiation therapy (RT), with or without intra-venous (IV) systemic therapy, was administered in half (50%) of patients with stage IV disease (Section 1.2). Radiation therapy is the recommended

treatment for cancer that has spread (metastasised) to the bone and is causing pain, without other complications, as seen often in stage IV[2].

Half of patients are reviewed at MDT

- A multidisciplinary team review (MDT) is the gold standard for determining a patient's diagnosis, cancer staging, and subsequent treatment plan[3]. More than half (55%) of patients were reviewed at MDT (Section 1.2).
- The use of MDTs has increased in the public system with 7 lung MDTs using QOOL to support their MDT processes and data collection. Statewide coverage of MDT data is not available, with known missing data in areas such as the private sector and Townsville prior to 2017.

Post-surgical mortality and 1- and 2-year survival compare favourably to other jurisdictions domestically and internationally

- Surgical mortality at 90-days was low at 1.9% for 2011-2016 (Section 3.3). These rates are lower than those observed in other jurisdictions domestically and internationally (Appendix B).
- Multivariate modelling confirmed the role of age in 90-day surgical mortality, with those in younger age groups at lower risk of dying (p=.007). Males were more likely to die within 90-days of surgery compared to females (RR=3.10, p<0.001).
- Two-year surgical survival was 84% for the period 2011-2016 (Section 6.2).

Prolonged length of stay has fallen

- The median length of stay was around 6-7 days for both 2011-2013 and 2014-2016 (Section 2.1) and is similar for public and private hospitals (Section 2.1).
- Fewer patients are experiencing prolonged length of stay of ≥ 12 days (17% in 2011-2013; 12% in 2014-2016) (Section 3.4).

Treatment timeliness varied across population groups and public and private providers

- The median days from diagnosis to first treatment was 30 days for surgery, 32 days for systemic therapy, and 36 days for radiation therapy (Appendix A). This is in-line with the timeliness target of 6 weeks stipulated in Cancer Council Australia's Optimal care pathway for people with lung cancer[4].
- Just under half (46%) of patients received their first treatment within 30 days of diagnosis. After adjustment for socio-clinical factors:
    - there was no disadvantage for those residing in remote compared to urban locations (RR=1.05, ns)
    - patients treated in public facilities were about 38% less likely to receive timely treatment than patients treated in private facilities (RR=0.62, p<0.001)
    - patients residing in socioeconomically middle and disadvantaged locations were less likely to receive timely treatment compared to those in affluent locations (RR=0.84 and RR=0.78, p<0.001, respectively) (Section 4.1).
- Stage IV patients were the most likely to receive their first treatment within 30 days (56%), with rates decreasing across stages I through III (42%, 37%, and 28%, respectively). This finding persisted after adjustment for socio-clinical factors (Section 4.1).

Patient flows: half of patients underwent surgery outside of the region where they live

- 46% of surgical patients received surgery outside of their HHS, with most patients receiving surgery in Metro North, Metro South, Townsville, and Gold Coast (Sections 5.4–5.5).
- 32% of radiation therapy patients received radiation therapy outside of their HHS.
- 19% of IV systemic therapy patients received IV systemic therapy outside of their HHS.

Indicator summary of treatment rates by TNM stage at diagnosis

Diagnosis years 2011-2016

Table IS1: Section 1 summary TNM stage at diagnosis by treatment, Queensland.

	Queensland
Section 1	
1.3 | Surgery rate in patients with stage I & II disease	
Stage I	**72%** (1311/1829)
Stage II	**59%** (493/841)
All stages	**20%** (2206/10958)
1.4 | Adjuvant IV systemic therapy rate in patients with operable stage II disease	
Stage II	**50%** (245/493)
1.5 | Radiation therapy rate in patients with inoperable stage I & II disease	
Stage I	**77%** (401/518)
Stage II	**77%** (268/348)
1.6 | Concurrent chemoradiotherapy rate in patients with inoperable stage III disease	
Chemoradiotherapy (CRT)	**48%** (614/1277)
Concurrent chemoradiotherapy	**39%** (501/1277)
Sequential chemoradiotherapy	**9%** (113/1277)

Notes:
Adjuvant IV systemic therapy is defined as occurring within 90 days of surgery.
Operable/inoperable status is not available at a statewide level. As a proxy, patients are deemed to be inoperable where they did not receive surgery.
A patient is counted as having concurrent chemoradiotherapy where they receive radiation therapy while receiving intravenous systemic therapy or vice versa. The second treatment must start before the end of the first treatment. A patient is counted as having sequential chemoradiotherapy where they receive intravenous systemic therapy within 45 days of completing radiation therapy, or vice versa.

Diagnosis years 2011-2016

Table IS2: Sections 2-6 summary, AIHW peer groups, facility type, Queensland.

	Principal referral hospitals	Group A & B hospitals	Public	Private	**Queensland**
Section 2 | Efficient					
2.1 | Length of stay (days)	6 (5-8)	7 (5-10)	6 (5-8)	7 (6-10)	**7 (5-9)**
2.2 | 30 day emergency readmission rate	10% (123/1199)	5% (50/1007)	10% (125/1235)	4.9% (48/971)	**7.8% (173/2206)**
Section 3 | Safe					
3.1 | In-Hospital mortality	0.4% (5/1199)	0.8% (8/1007)	0.5% (6/1235)	0.7% (7/971)	**0.6% (13/2206)**
3.2 | 30-day mortality	0.5% (6/1199)	1% (10/1007)	0.6% (7/1235)	0.9% (9/971)	**0.7% (16/2206)**
3.3 | 90-day mortality	1.6% (19/1199)	2.3% (23/1007)	1.7% (21/1235)	2.2% (21/971)	**1.9% (42/2206)**
3.4 | Prolonged length of stay ≥12 days	9.8% (118/1199)	20% (201/1007)	9.9% (122/1235)	20% (197/971)	**14% (319/2206)**
3.5 | 30-day mortality following radiation therapy			20% (621/3121)	23% (598/2621)	**21% (1223/5749)**
3.6 | 30-day mortality following IV systemic therapy			24% (784/3251)	24% (404/1664)	**24% (1188/4915)**
Section 4 | Accessible					
4.2 | Received first treatment within 30 days of diagnosis			37% (1758/4788)	60% (1994/3307)	**46% (3755/8101)**
4.3 | Received first surgery within 30 days of diagnosis	36% (417/1143)	74% (699/949)	37% (433/1178)	75% (683/914)	**53% (1116/2092)**
4.4 | Received first radiation therapy within 30 days of diagnosis			38% (847/2233)	50% (771/1554)	**43% (1621/3793)**
4.5 | Received first IV systemic therapy within 30 days of diagnosis			35% (514/1483)	68% (617/903)	**47% (1131/2386)**
Section 5 | Equitable					
5.1 | Received surgery within 30 days for those aged ≥75 years	27% (61/224)	69% (183/266)	26% (61/231)	71% (183/259)	**50% (244/490)**
5.1 | Received radiation therapy within 30 days for those aged ≥75			27% (150/557)	46% (254/558)	**36% (404/1116)**
5.1 | Received IV systemic therapy within 30 days for those aged ≥75			32% (71/221)	68% (161/238)	**51% (232/459)**
5.2 | Received surgery within 30 days for those residing in a disadvantaged location	36% (104/287)	73% (129/176)	36% (106/296)	76% (127/167)	**50% (233/463)**
5.2 | Received radiation therapy within 30 days for those residing in a disadvantaged location			35% (228/651)	43% (154/359)	**38% (382/1012)**
5.2 | Received IV systemic therapy within 30 days for those residing in a disadvantaged location			30% (117/391)	63% (99/157)	**39% (216/548)**
5.3 | Received surgery within 30 days for those residing in a rural or remote location	57% (89/157)	80% (88/110)	57% (90/159)	81% (87/108)	**66% (177/267)**
5.3 | Received radiation therapy within 30 days for those residing in a rural or remote location			46% (105/230)	38% (97/254)	**42% (202/484)**
5.3 | Received IV systemic therapy within 30 days for those residing in a rural or remote location			34% (76/222)	63% (47/75)	**41% (123/297)**
Section 6 | Surgical survival					
6.1 | 1 year surgical survival	92% (1107/1199)	92% (925/1007)	92% (1140/1235)	92% (892/971)	**92% (2032/2206)**
6.2 | 2 year surgical survival	85% (1024/1199)	82% (829/1007)	85% (1055/1235)	82% (798/971)	**84% (1853/2206)**

What is the Queensland Lung Cancer Quality Index?

The Queensland Lung Cancer Quality Index report has been developed for public and private cancer services. It is an initiative of the Lung Cancer sub-committee, part of Cancer Alliance Queensland which brings together the Cancer Control Safety and Quality Partnership (The Partnership), Queensland Cancer Control Analysis Team (QCCAT) and the Queensland Cancer Register (QCR) (https://canceralliance qld.health.qld.gov.au). The report tracks Queensland's progress delivering safe, quality cancer care and will be provided to all relevant public and private hospitals. The Queensland Lung Cancer Quality Index highlights areas for improvement and identifies the areas where cancer services are performing well.

The Queensland Lung Cancer Quality Index reports on 6 years of data from 2011-2016, however there may have been changes more recently that are not captured by the time periods reported. Regardless, the Queensland Lung Cancer Quality Index provides an important tool for monitoring current investments in cancer care and changes in clinical practice. It also enables us to reflect on past improvement programs and to identify areas where a renewed effort or new approach may be required.

Why develop the Queensland Lung Cancer Quality Index?

Performance indicators linked to clinical outcomes that align with national benchmarking is a key service action in the Cancer Care Statewide Health Service Strategy, 2014[(5)]. The Queensland Lung Cancer Quality Index has been developed by the Cancer Alliance Queensland, lead clinicians and relevant persons under the auspices of the Queensland Cancer Control Safety and Quality Partnership (The Partnership). Cancer Alliance Queensland supports a clinician-led, safety and quality program for cancer across Queensland. The Partnership was gazetted as a quality assurance committee under Part 6, Division 1 of the Hospital and Health Boards Act 2011. A key role of the Partnership is to provide cancer clinicians, Hospital and Health Services (HHS), hospitals, treatment facilities and Queensland Health with cancer information and tools to deliver the best patient care.

The Queensland Lung Cancer Quality Index is a tool for reviewing and comparing information on the safety and quality of cancer treatment and outcomes. The Partnership has prepared the Queensland Lung Cancer Quality Index to assist cancer clinicians and administrators to improve patient care. In some cases, it may prompt a change in the delivery and organisation of cancer services to improve health outcomes and performance.

The Queensland Lung Cancer Quality Index includes the following quality dimensions, developed by Cancer Alliance Queensland with clinical leadership[(6)].

Quality Dimension	Description
1 | Effective	Achieving the best outcomes for Queenslanders with cancer
2 | Efficient	Optimally using resources to achieve desired outcomes
3 | Safe	Avoiding and preventing adverse outcomes or injuries caused by healthcare management
4 | Accessible	Making health services available in the most suitable setting in a reasonable time
5 | Equitable	Providing care and ensuring health status does not vary in quality because of personal characteristics
6 | Surgical survival	Understanding the outcomes of oncological surgery

Where has the data come from?

Since 2004 QCCAT have compiled and analysed a vast amount of information about cancer incidence, mortality, treatment, and survival. 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 Register, private and public hospital admissions data, death data, treatment systems, public and private pathology, hospital clinical data systems, and QOOL. QOR contains approximately 50 million records between 1982–2016. Our matching and linking processes provide the 570,000+ matched and linked records of cancer patients between 1982–2016 which provide the data for The Queensland Lung Cancer Quality Index.

The Queensland Lung Cancer Quality Index should be interpreted in the context of the previous publications by The Partnership. To access previous publications, go to https://canceralliancegld.health.qld.gov.au/reports-publications. More information on data sources used in this report is available at Appendix C.

Moving forward

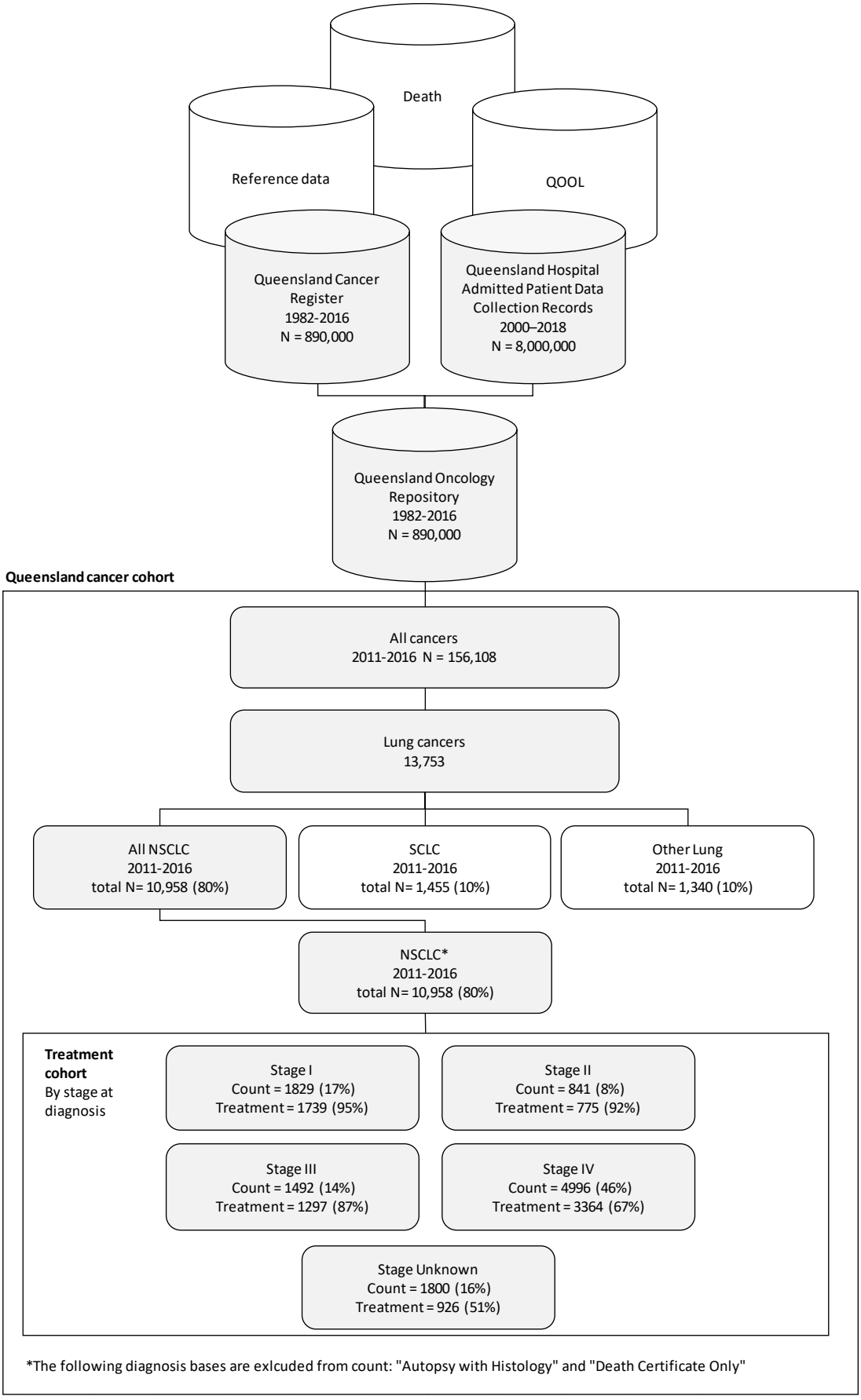
The Queensland Lung Cancer Quality Index provides baseline measurements for the ongoing monitoring of the quality and safety of lung cancer care across the state. The purpose of this report is to review the quality of lung cancer care, to highlight areas for improvement, and to reduce variation in practice. While excellent results were achieved for some indicators, including surgical mortality and survival, other indicators deserve attention, for instance the variation in treatment timeliness. Cancer Alliance Queensland will report on the Lung Cancer Quality Index routinely, enabling ongoing monitoring of these safety and quality indicators.

TNM stage coverage was 84% for 2011-2016 and this rate was attained through the development of Cancer Alliance Queensland-derived rules to impute missing T, N, or M data and through case review. Cancer Alliance Queensland is undertaking several initiatives to streamline the ascertainment of TNM stage information for lung and other cancers for inclusion in future safety and quality reporting, chief among these is the use of QOOL for MDT. QOOL is a web-based tool used by MDT for meeting support, data collection, and co-ordination of cancer care. Using a business intelligence tool, QOOL-Dash aggregates key clinical data collected at MDT such as diagnosis, stage, and treatment recommendations. MDT discussions improve outcomes and Cancer Alliance Queensland is supporting more facilities in their MDT work and in the provision of their MDT data.

Statewide data on the use of key diagnostics including PET-CT to inform diagnosis and treatment are not currently available. As these data become available, Cancer Alliance Queensland would look to include this information in future reporting. Access to clinical trials and psychosocial support as well as to palliative care services are also important safety and quality dimensions that would be of interest as statewide data become available.

This report provided rates of radiation and IV systemic therapy for lung cancer patients. The future inclusion of treatment intent, would also be of use, in particular when reporting mortality following these treatments. Oral chemotherapy treatments are not included in this report and it is hoped these data are available for future reporting.

Patient cohort definition



Surgical Hospital Peer Grouping

The Queensland Lung Cancer Quality Index uses the Australian hospital peer groups defined by the Australian Institute of Health and Welfare (AIHW)[7].

Hospital peer groupings define groups of similar hospitals based on shared characteristics and allow a better understanding of the organisation and provision of hospital services. For hospitals, peer grouping supports comparisons that reflect the purpose, resources and role of each hospital. The AIHW peer grouping is assigned on a broad range of factors and is not specific to oncological practice.

Based on clinical feedback, the AIHW hospital peer groups have been further aggregated into a report peer group detailed in the table below. More information on AIHW peer group hospitals in Queensland is available at Appendix D.

AIHW peer group	Report peer group
Principal referral hospitals	Principal referral hospitals
Private acute group A hospitals	Group A & B hospitals
Public acute group A hospitals	
Public acute group B hospitals	
Private acute group B hospitals	

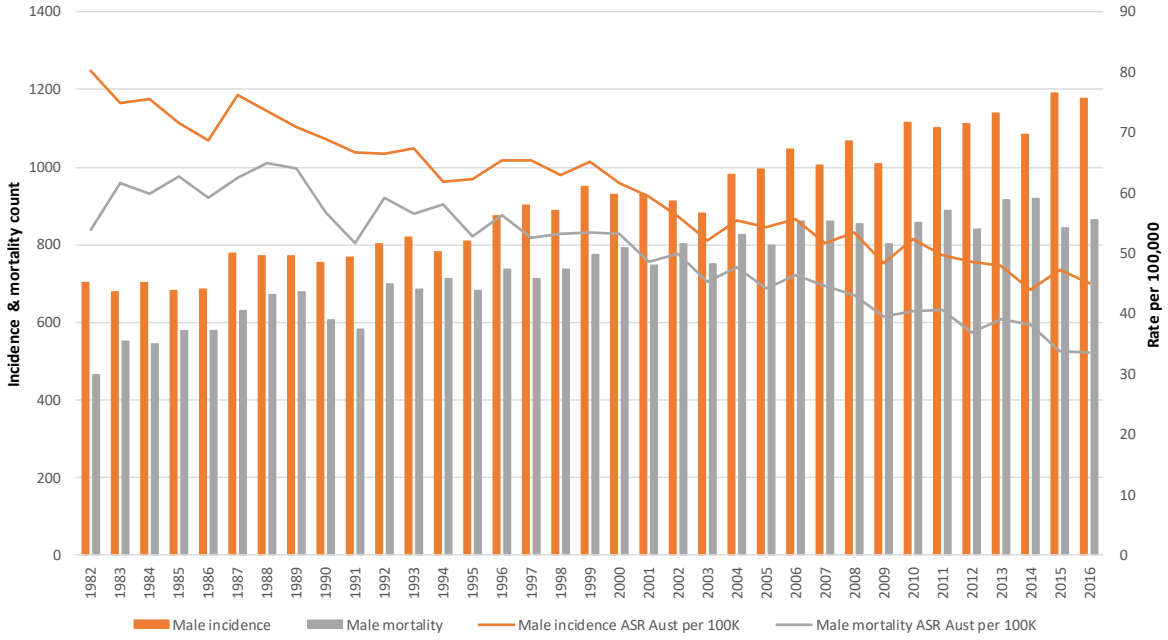
The Queensland hospitals that perform lung surgery are:

AIHW Peer Group	Report peer group	Hospital
Principal referral hospitals	Principal referral hospitals	Gold Coast University Hospital
		Princess Alexandra Hospital
		Royal Brisbane & Women's Hospital
		The Prince Charles Hospital
		Townsville University Hospital
Public acute group A hospitals	Group A and B hospitals	Mater Hospital Brisbane
Private acute group A hospitals		Gold Coast Private Hospital
		Greenslopes Private Hospital
		John Flynn Private Hospital
		Mater Private Hospital Brisbane
		Pindara Private Hospital
		St Andrew's War Memorial Hospital
		St Vincent's Private Hospital Northside
		The Wesley Hospital
Private acute group B hospitals		Mater Hospital Pimlico

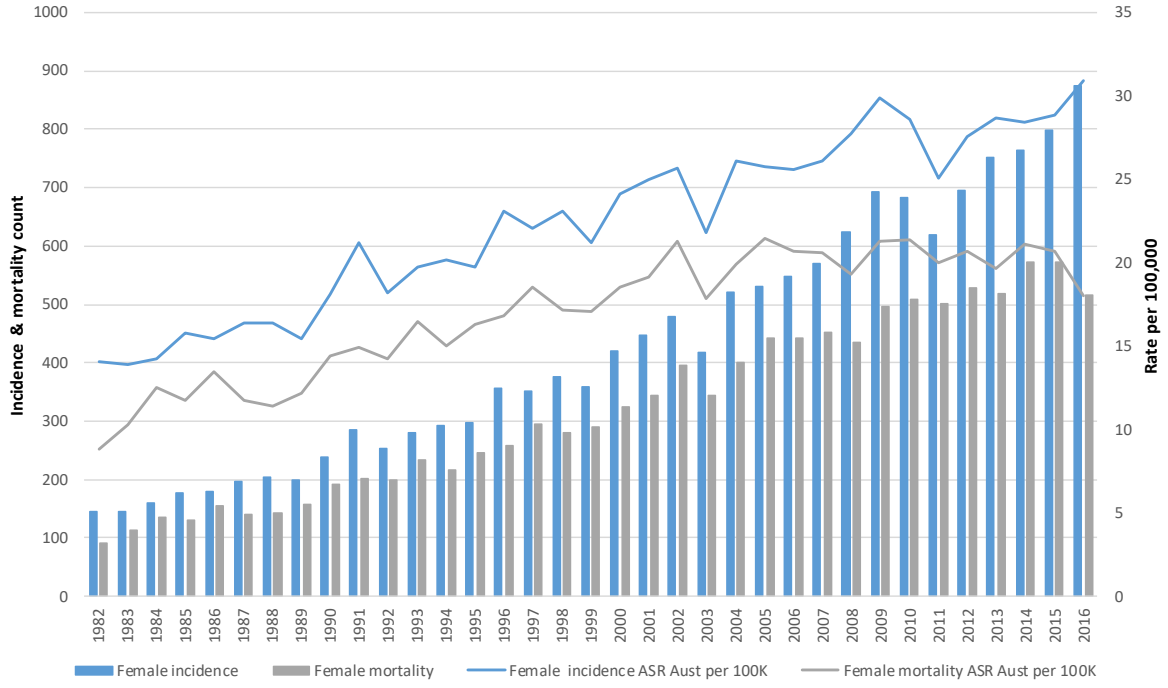
Epidemiological overview

0.1 | Incidence and mortality rates for lung cancer

01.1 | Trends in numbers and age-standardised rates for all male lung cancer incidence and mortality, by sex, Queensland, 1982-2016.



0.1.2 | Trends in numbers and age-standardised rates for all female lung cancer incidence and mortality, by sex, Queensland, 1982-2016.

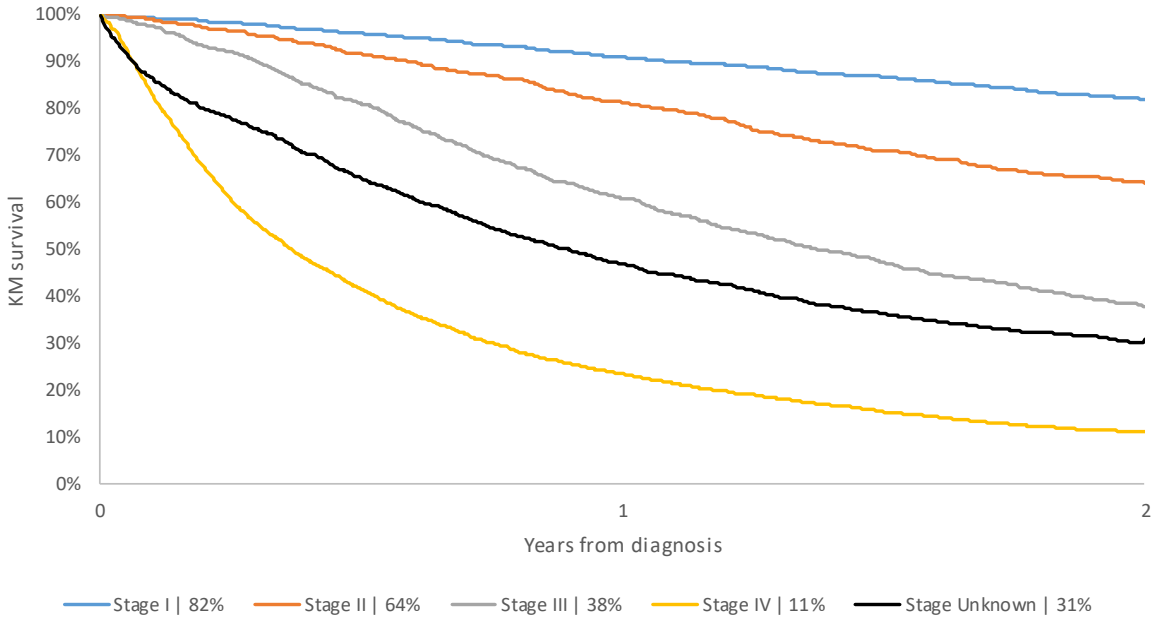


Note:
Data includes death certificate only and autopsy with histology basis of diagnosis, these are excluded in chapters 1-6 examining treatment for lung cancer.
Data tables available at Appendix A.

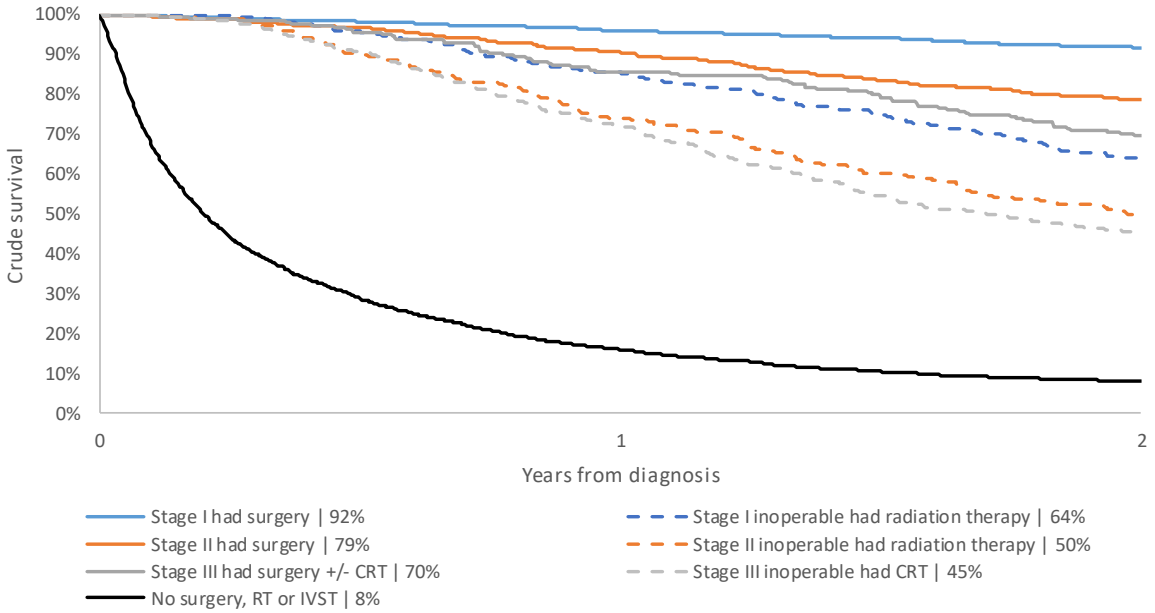
0.2 | Crude survival by TNM stage at diagnosis

Diagnosis years 2011-2016

0.2.1 | What percentage of patients are living 2 years after their diagnosis by stage at diagnosis?



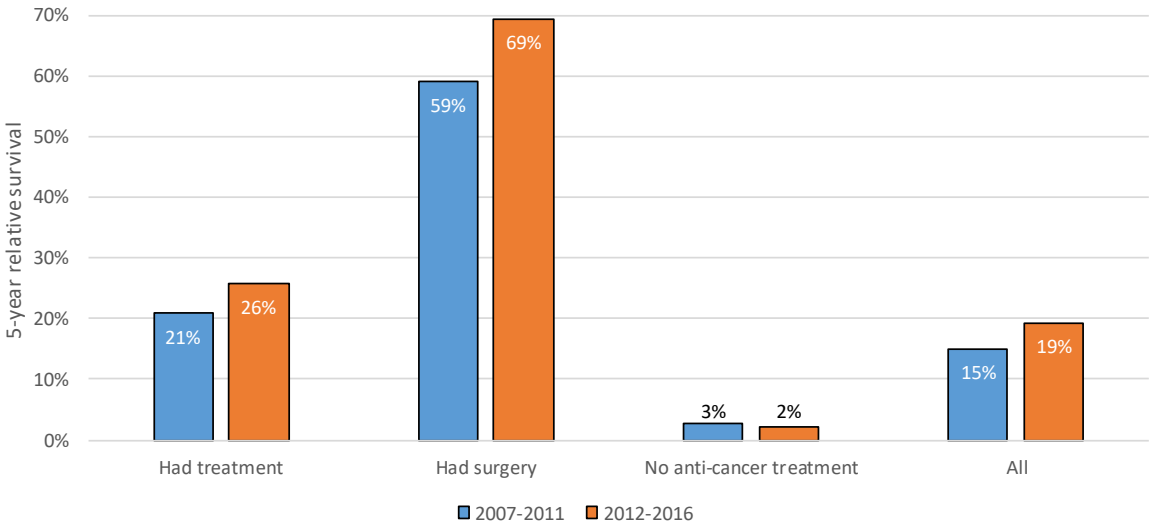
0.2.2 | What percentage of patients are living 2 years after their diagnosis by stage and treatment group?



0.3 | Relative survival

0.3.1 | What is the five-year relative survival for lung cancer?

Relative survival % of lung cancer patients alive at 5 years compared to the general population	Diagnosis year 2007-2011	Diagnosis year 2012-2016
Had treatment	21%	26%
Had Surgery	59%	69%
No anti-cancer treatment	3%	2%
All	**15%**	**19%**



Note:
Had treatment is defined as having surgery, radiation therapy or IV systemic therapy within 365 days of diagnosis.

0.3.2 | How does Queensland's five-year relative survival for lung cancer compare to domestic and international peers?

Relative survival % of lung cancer patients alive at 5 years compared to the general population	Relative survival risk period	Percent
Denmark[8]	2005-2009	15%
Ontario[9]	2008-2012	19.6%
The Surveillance, Epidemiology, and End Results (SEER) Program, USA[10]	2010-2016	24.9%
Australia[11]	2012-2016	18.6%
Queensland	**2007-2011**	**15%**
	2012-2016	**19%**

Note:
This table is presented as a summary and caution should be exercised when interpreting the data as methodological differences may lead to differences in the data reported.

1| Effective

Achieving the best outcomes for Queenslanders with cancer.

1.1 | Treatment rates

Diagnosis years 2011-2016

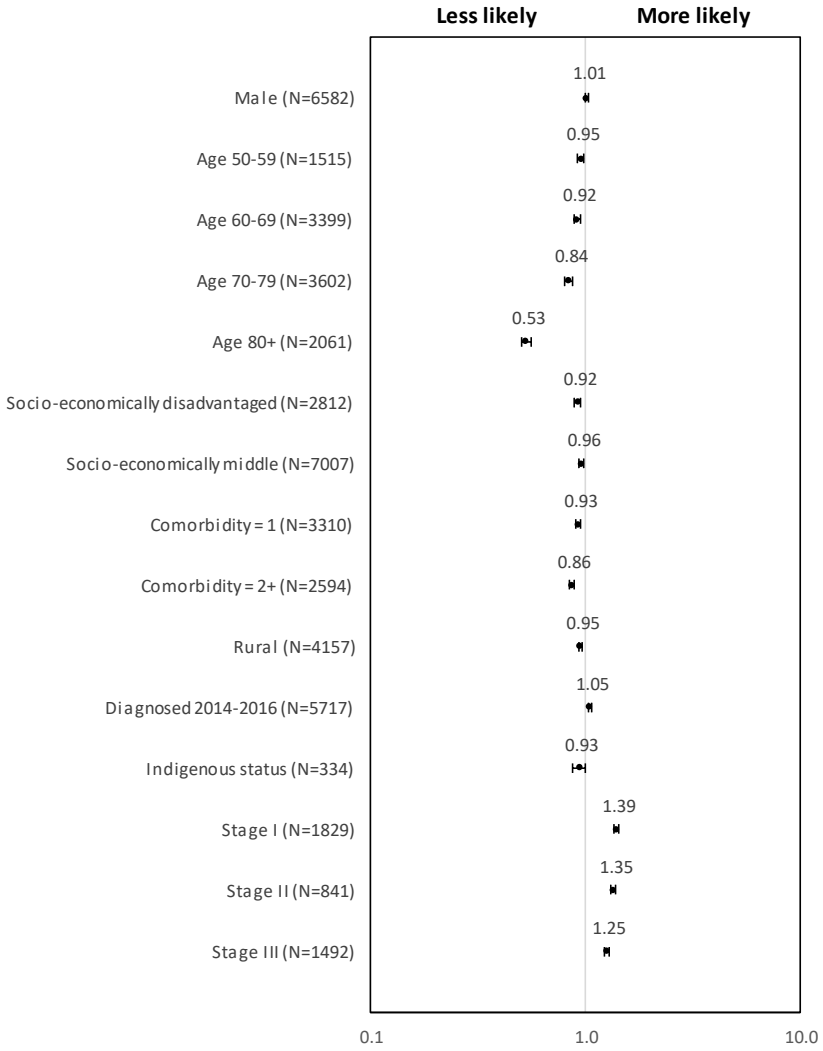
1.1.1 | What percentage of Queenslanders diagnosed with lung cancer receive treatment?

	2011-2013						2014-2016					
	All patients		Had treatment		No anti-cancer treatment		All patients		Had treatment		No anti-cancer treatment	
	Count (N)	%	Count	Row%	Count	Row%	Count (N)	%	Count	Row%	Count	Row%
Queensland	**5241**	**100%**	**3739**	**71%**	**1502**	**29%**	**5717**	**100%**	**4362**	**76%**	**1355**	**24%**
Stage group at diagnosis												
I	743	14%	701	94%	42	5.7%	1086	19%	1038	96%	48	4.4%
II	408	8%	377	92%	31	7.6%	433	8%	398	92%	35	8.1%
III	730	14%	615	84%	115	16%	762	13%	682	90%	80	10%
IV	2421	46%	1595	66%	826	34%	2575	45%	1769	69%	806	31%
Unknown	939	18%	451	48%	488	52%	861	15%	475	55%	386	45%
Sex												
Male	3235	62%	2280	70%	955	30%	3347	59%	2532	76%	815	24%
Female	2006	38%	1459	73%	547	27%	2370	41%	1830	77%	540	23%
Age												
<50	184	4%	163	89%	21	11.4%	197	3%	183	93%	14	7.1%
50-59	751	14%	645	86%	106	14%	764	13%	663	87%	101	13%
60-69	1650	31%	1336	81%	314	19%	1749	31%	1494	85%	255	15%
70-79	1634	31%	1157	71%	477	29%	1968	34%	1549	79%	419	21%
80+	1022	20%	438	43%	584	57%	1039	18%	473	46%	566	54%
Residence at diagnosis												
Major City	3279	63%	2419	74%	860	26%	3522	62%	2735	78%	787	22%
Inner Regional	1230	23%	860	70%	370	30%	1405	25%	1054	75%	351	25%
Rural	732	14%	460	63%	272	37%	790	14%	573	73%	217	27%
Socioeconomic status												
Affluent	562	11%	428	76%	134	24%	577	10%	456	79%	121	21%
Middle	3302	63%	2393	72%	909	28%	3705	65%	2844	77%	861	23%
Disadvantaged	1377	26%	918	67%	459	33%	1435	25%	1062	74%	373	26%
Indigenous status												
Indigenous	147	3%	96	65%	51	35%	187	3%	142	76%	45	24%
Non-Indigenous	5094	97%	3643	72%	1451	28%	5530	97%	4220	76%	1310	24%
Comorbidity												
0	2434	46%	1907	78%	527	22%	2620	46%	2129	81%	491	19%
1	1596	30%	1111	70%	485	30%	1714	30%	1267	74%	447	26%
2+	1211	23%	721	60%	490	40%	1383	24%	966	70%	417	30%
Had MDT review												
Yes	2792	53%	2205	79%	587	21%	3285	57%	2699	82%	586	18%
No	2449	47%	1534	63%	915	37%	2432	43%	1663	68%	769	32%

Note:
Had treatment refers to receiving surgery, RT, or IV systemic therapy within 365 days of diagnosis.
This report contains data on intravenous systemic therapy treatments for lung cancer. Oral systemic therapy data was not available for inclusion; therefore, caution should be exercised when interpreting the data as the number of patients in the no anti-cancer treatment cohort may be an over-representation of the true number.
This analyses only includes the 8 MDTs that provide data to Cancer Alliance Queensland, meaning that the data here are likely an underestimate of the true rate of patients reviewed by MDT.

Diagnosis years 2011-2016

1.1.2 | Factors associated with receiving treatment.



Notes:

The above graph (forest plot) is a graphical display of the rate ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant.

Rate ratios for those aged 50-59, 60-69, 70-79 and 80+ are obtained by comparing to those aged <50.

Rate ratios for those who reside in socio-economically disadvantaged and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who have stage I, stage II and stage III disease are obtained by comparing to those who have stage IV disease.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

1.2 | TNM stage at diagnosis treatment rates and survival

Diagnosis years 2011-2016

1.2.1 | What are the characteristics of patients with lung cancer by stage at diagnosis?

	All patients		Stage I		Stage II		Stage III		Stage IV		Unknown	
	Count (N)	%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**10958**	**100%**	**1829**	**17%**	**841**	**7.7%**	**1492**	**14%**	**4996**	**46%**	**1800**	**16%**
Sex												
Male	6582	60%	979	15%	527	8%	913	14%	3072	47%	1091	17%
Female	4376	40%	850	19%	314	7.2%	579	13%	1924	44%	709	16%
Age												
<50	381	3.5%	35	9.2%	29	7.6%	61	16%	230	60%	26	6.8%
50-59	1515	14%	224	15%	115	7.6%	261	17%	777	51%	138	9.1%
60-69	3399	31%	620	18%	266	7.8%	562	17%	1562	46%	389	11%
70-79	3602	33%	722	20%	319	8.9%	458	13%	1541	43%	562	16%
80+	2061	19%	228	11%	112	5.4%	150	7.3%	886	43%	685	33%
Residence at diagnosis												
Major City	6801	62%	1187	17%	535	7.9%	943	14%	3076	45%	1060	16%
Inner Regional	2635	24%	440	17%	207	7.9%	364	14%	1172	44%	452	17%
Outer Regional	1251	11%	174	14%	80	6.4%	148	12%	617	49%	232	19%
Remote & Very Remote	271	2.5%	28	10%	19	7%	37	14%	131	48%	56	21%
Socioeconomic status												
Affluent	1139	10%	207	18%	84	7.4%	112	9.8%	508	45%	228	20%
Middle	7007	64%	1176	17%	544	7.8%	987	14%	3177	45%	1123	16%
Disadvantaged	2812	26%	446	16%	213	7.6%	393	14%	1311	47%	449	16%
Indigenous status												
Indigenous	334	3%	41	12%	22	6.6%	55	16%	167	50%	49	15%
Non-Indigenous	10620	97%	1788	17%	819	7.7%	1436	14%	4829	45%	1748	16%
Not Stated/Unknown	4	0%	0	0%	0	0%	1	25%	0	0%	3	75%
Comorbidity												
0	5054	46%	811	16%	406	8%	695	14%	2431	48%	711	14%
1	3310	30%	564	17%	237	7.2%	442	13%	1488	45%	579	17%
2+	2594	24%	454	18%	198	7.6%	355	14%	1077	42%	510	20%
Had MDT review												
Yes	6077	55%	1256	21%	606	10%	1231	20%	2715	45%	269	4.4%
No	4881	45%	573	12%	235	4.8%	261	5.3%	2281	47%	1531	31%
ASA												
ASA 1-2	581	5.3%	339	58%	133	23%	60	10%	17	2.9%	32	5.5%
ASA ≥3	1323	12%	786	59%	298	23%	123	9.3%	32	2.4%	84	6.3%
ASA Unknown	9054	83%	704	7.8%	410	4.5%	1309	14%	4947	55%	1684	19%

This analyses only includes the 8 MDTs that provide data to Cancer Alliance Queensland, meaning that the data here are likely an underestimate of the true rate of patients reviewed by MDT.

Diagnosis years 2011-2016

1.2.2 | What treatments do Queenslanders receive by stage at diagnosis?

	All patients		Stage I		Stage II		Stage III		Stage IV		Unknown	
	Count (N)	%	Count	%	Count	%	Count	%	Count	%	Count	%
Queensland	**10958**	**100%**	**1829**	**17%**	**841**	**7.7%**	**1492**	**14%**	**4996**	**46%**	**1800**	**16%**
Treatment												
Had treatment	8101	74%	1739	95%	775	92%	1297	87%	3364	67%	926	51%
No anti-cancer treatment	2857	26%	90	4.9%	66	7.8%	195	13%	1632	33%	874	49%
Surgery												
Had surgery	2206	20%	1311	72%	493	59%	215	14%	62	1.2%	125	6.9%
No surgery	8752	80%	518	28%	348	41%	1277	86%	4934	99%	1675	93%
Radiation therapy (RT)												
Had RT	4978	45%	502	27%	369	44%	999	67%	2490	50%	618	34%
No RT	5980	55%	1327	73%	472	56%	493	33%	2506	50%	1182	66%
IV systemic therapy												
Had IVST	4310	39%	260	14%	447	53%	978	66%	2107	42%	518	29%
No IVST	6648	61%	1569	86%	394	47%	514	34%	2889	58%	1282	71%
Therapy												
Concurrent chemoradiotherapy	1615	15%	69	3.8%	156	19%	547	37%	589	12%	254	14%
Sequential chemoradiotherapy	942	8.6%	29	1.6%	35	4.2%	139	9.3%	668	13%	71	3.9%
Non-concurrent RT IVST	842	7.7%	194	11%	130	15%	161	11%	260	5.2%	97	5.4%
RT alone	2111	19%	342	19%	130	15%	242	16%	1140	23%	257	14%
IVST alone	1221	11%	110	6%	157	19%	158	11%	650	13%	146	8.1%
No IVST or RT	4227	39%	1085	59%	233	28%	245	16%	1689	34%	975	54%
Survival from diagnosis												
1-Yr	48%		91%		82%		61%		24%		48%	
2-Yr	34%		82%		64%		38%		11%		31%	
3-Yr	26%		72%		49%		27%		6%		20%	

Notes:

IVST refers to IV systemic therapy.

More information on treatment rates by TNM stage at diagnosis is available at Appendix A.

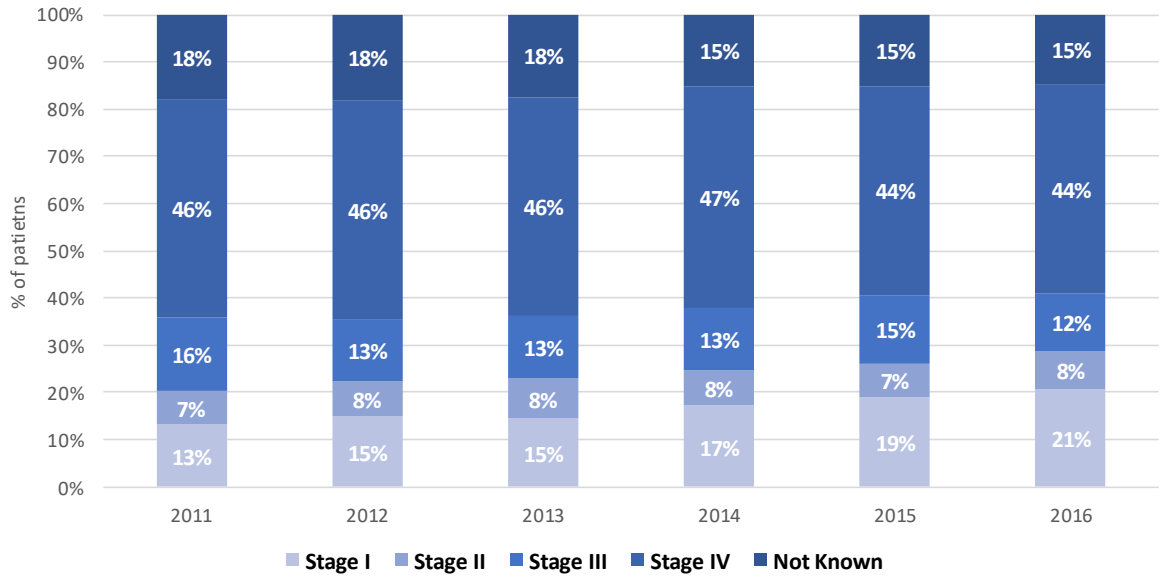
The stage IV surgical patients include patients upstaged at the time of curative intent surgery with unexpected pleural involvement.

This report contains data on intravenous systemic therapy treatments for lung cancer. Oral systemic therapy data was not available for inclusion; therefore, caution should be exercised when interpreting the data as the number of patients in the no anti-cancer treatment cohort may be an over-representation of the true number.

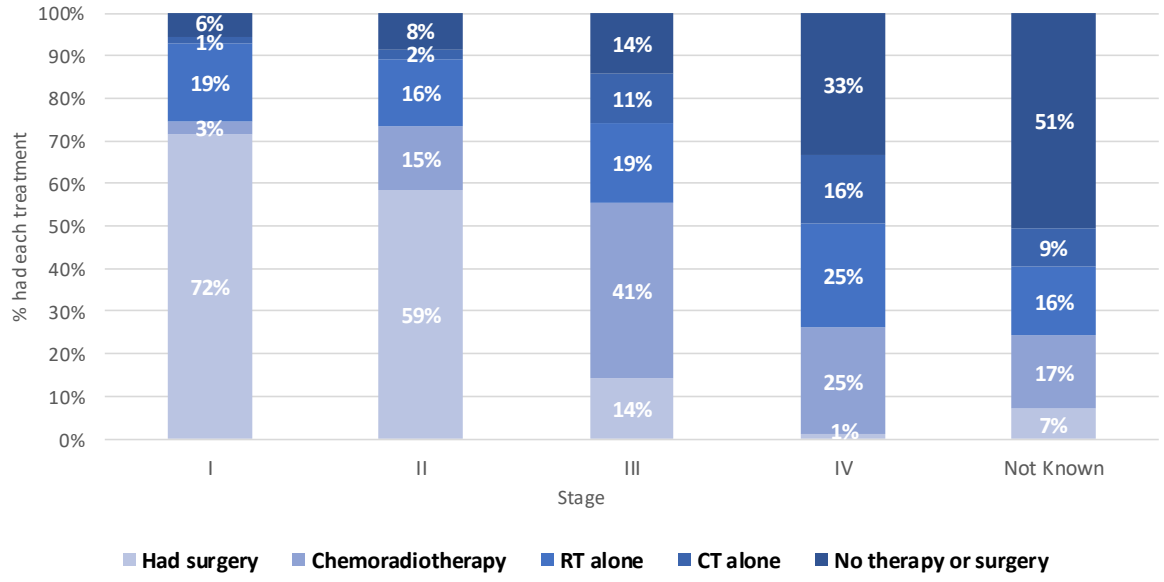
A patient is counted as having concurrent chemoradiotherapy where they receive radiation therapy while receiving IV systemic therapy or vice versa, where the second treatment starts before the end of the first. A patient is counted as having sequential chemoradiotherapy where they receive IV systemic therapy within 45 days of completing radiation therapy, or vice versa. A patient is counted as having non-concurrent RT IVST where they receive both radiation therapy and IV systemic therapy but not concurrently or sequentially as defined in this report.

Diagnosis years 2011-2016

1.2.3 | Annual TNM stage proportions.



1.2.4 | Treatment rates by TNM stage.



Note:
This report contains data on intravenous systemic therapy treatments for lung cancer. Oral systemic therapy data was not available for inclusion in this report; therefore, caution should be exercised when interpreting the data as the number of patients in the no anti-cancer treatment cohort may be an over representation of the true number.

1.3 | Surgery rate in patients with stage I or stage II disease

Diagnosis years 2011-2016

1.3.1 | What is the surgery rate for patients with stage I disease?

	Patients with stage I disease		Received surgery		Did not receive surgery	
	Count (N)	%	Count	Row%	Count	Row%
Queensland	**1829**	**100%**	**1311**	**72%**	**518**	**28%**
Sex						
Male	979	54%	672	69%	307	31%
Female	850	46%	639	75%	211	25%
Age						
<50	35	1.9%	29	83%	6	17%
50-59	224	12%	192	86%	32	14%
60-69	620	34%	483	78%	137	22%
70-79	722	39%	494	68%	228	32%
80+	228	12%	113	50%	115	50%
Residence						
Major City	1187	65%	835	70%	352	30%
Inner Regional	440	24%	310	70%	130	30%
Outer Regional	174	9.5%	140	80%	34	20%
Remote & Very Remote	28	1.5%	26	93%	2	7.1%
Socioeconomic status						
Affluent	207	11%	152	73%	55	27%
Middle	1176	64%	869	74%	307	26%
Disadvantaged	446	24%	290	65%	156	35%
Indigenous status						
Indigenous	41	2.2%	27	66%	14	34%
Non-Indigenous	1788	98%	1284	72%	504	28%
Comorbidity						
0	811	44%	656	81%	155	19%
1	564	31%	410	73%	154	27%
2+	454	25%	245	54%	209	46%
Survival						
1-Yr	91%		96%		79%	
2-Yr	82%		92%		58%	
3-Yr	72%		86%		37%	

Note:
Patients who did not receive surgery may have received other treatments.

Diagnosis years 2011-2016

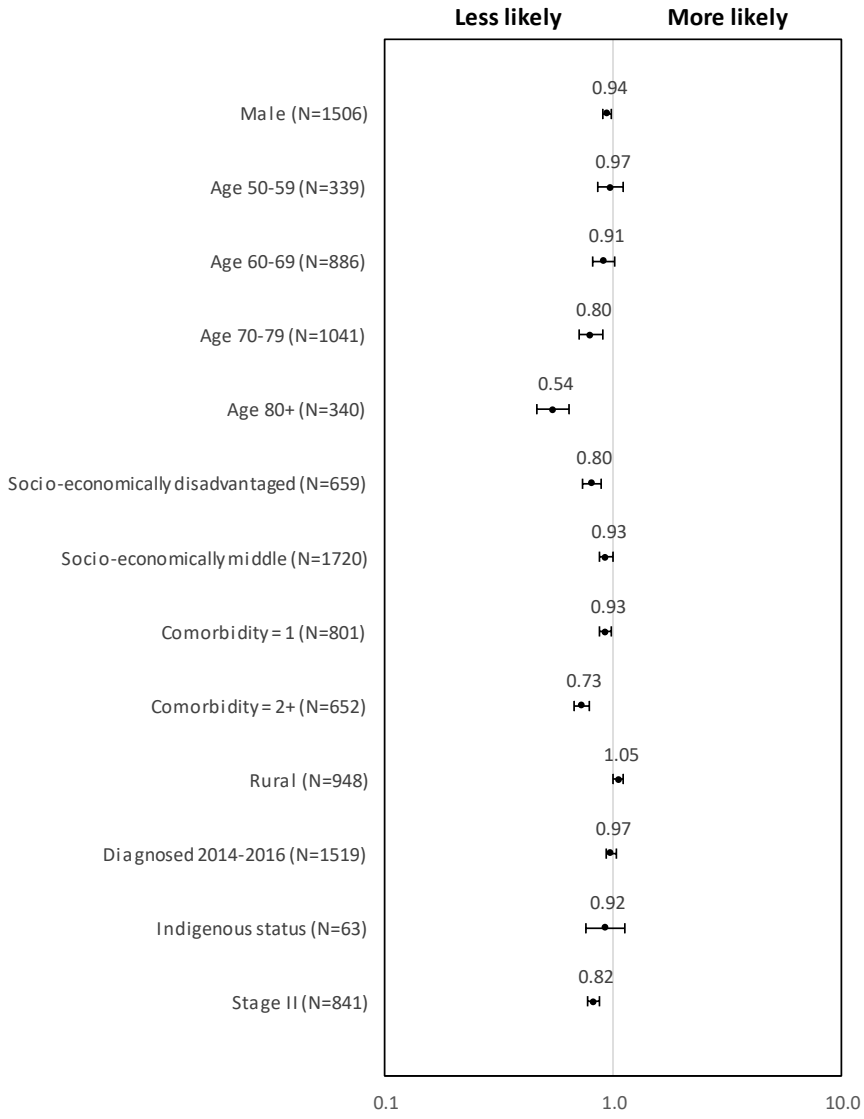
1.3.2 | What is the surgery rate for patients with stage II disease?

	Patients with stage II disease		Received surgery		Did not receive surgery	
	Count (N)	%	Count	Row%	Count	Row%
Queensland	**841**	**100%**	**493**	**59%**	**348**	**41%**
Sex						
Male	527	63%	288	55%	239	45%
Female	314	37%	205	65%	109	35%
Age						
<50	29	3.4%	25	86%	4	14%
50-59	115	14%	82	71%	33	29%
60-69	266	32%	179	67%	87	33%
70-79	319	38%	171	54%	148	46%
80+	112	13%	36	32%	76	68%
Residence						
Major City	535	64%	329	61%	206	39%
Inner Regional	207	25%	100	48%	107	52%
Outer Regional	80	9.5%	53	66%	27	34%
Remote & Very Remote	19	2.3%	11	58%	8	42%
Socioeconomic status						
Affluent	84	10%	64	76%	20	24%
Middle	544	65%	325	60%	219	40%
Disadvantaged	213	25%	104	49%	109	51%
Indigenous status						
Indigenous	22	2.6%	11	50%	11	50%
Non-Indigenous	819	97%	482	59%	337	41%
Not Stated/Unknown	0	0%	0		0	
Comorbidity						
0	406	48%	264	65%	142	35%
1	237	28%	139	59%	98	41%
2+	198	24%	90	45%	108	55%
Survival						
1-Yr	82%		91%		69%	
2-Yr	64%		79%		44%	
3-Yr	49%		65%		27%	

Note:
Patients who did not receive surgery may have received other treatments.

Diagnosis years 2011-2016

1.3.3 | Factors associated with receiving surgery for patients with stage I or II disease.



Notes:

The above graph (forest plot) is a graphical display of the rate ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant.

Rate ratios for those aged 50-59, 60-69, 70-79 and 80+ are obtained by comparing to those aged <50.

Rate ratios for those who reside in socio-economically disadvantaged, and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

1.4 | Adjuvant IV systemic therapy rate in patients with stage II disease

Diagnosis years 2011-2016

1.4.1 | What is the adjuvant IVST rate for patients with stage II disease?

	Patients with stage II disease who had surgery		Received post-operative IVST		Did not receive post-operative IVST	
	Count (N)	%	Count	Row%	Count	Row%
Queensland	**493**	**100%**	**245**	**50%**	**248**	**50%**
Sex						
Male	288	58%	132	46%	156	54%
Female	205	42%	113	55%	92	45%
Age						
<50	25	5.1%	16	64%	9	36%
50-59	82	17%	53	65%	29	35%
60-69	179	36%	96	54%	83	46%
70-79	171	35%	76	44%	95	56%
80+	36	7.3%	4	11%	32	89%
Residence						
Major City	329	67%	170	52%	159	48%
Inner Regional	100	20%	49	49%	51	51%
Outer Regional	53	11%	24	45%	29	55%
Remote & Very Remote	11	2.2%	2	18%	9	82%
Socioeconomic status						
Affluent	64	13%	30	47%	34	53%
Middle	325	66%	161	50%	164	50%
Disadvantaged	104	21%	54	52%	50	48%
Indigenous status						
Indigenous	11	2.2%	7	64%	4	36%
Non-Indigenous	482	98%	238	49%	244	51%
Comorbidity						
0	264	54%	134	51%	130	49%
1	139	28%	69	50%	70	50%
2+	90	18%	42	47%	48	53%
Survival						
1-Yr	91%		93%		89%	
2-Yr	79%		80%		77%	
3-Yr	65%		66%		64%	

Note:
IVST refers to IV systemic therapy.
Adjuvant IV system therapy is defined as occurring within 90 days of surgery.

1.5 | Radiation therapy treatment rate in patients with inoperable stage I or II disease

Diagnosis years 2011-2016

1.5.1 | What is the radiation therapy rate in patients with stage I inoperable disease?

	Patients with inoperable stage I disease		Concurrent-CRT		Sequential-CRT		Non-concurrent RT IVST		RT alone		IVST alone		No anti-cancer treatment	
	Count (N)	%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**518**	**100%**	**40**	**8%**	**11**	**2%**	**58**	**11%**	**292**	**56%**	**13**	**3%**	**104**	**20%**
Sex														
Male	307	59%	24	7.8%	7	2.3%	34	11%	170	55%	6	2%	66	21%
Female	211	41%	16	7.6%	4	1.9%	24	11%	122	58%	7	3.3%	38	18%
Age														
<50	6	1.2%	1	17%	1	17%	0	0%	2	33%	0	0%	2	33%
50-59	32	6.2%	5	16%	1	3.1%	6	19%	14	44%	2	6.3%	4	13%
60-69	137	26%	22	16%	5	3.6%	15	11%	68	50%	4	2.9%	23	17%
70-79	228	44%	12	5.3%	4	1.8%	33	14%	135	59%	5	2.2%	39	17%
80+	115	22%	0	0%	0	0%	4	3.5%	73	63%	2	1.7%	36	31%
Residence														
Major City	352	68%	27	7.7%	4	1.1%	46	13%	212	60%	8	2.3%	55	16%
Inner Regional	130	25%	7	5.4%	7	5.4%	11	8.5%	65	50%	3	2.3%	37	28%
Outer Regional	34	6.6%	6	18%	0	0%	1	2.9%	14	41%	2	5.9%	11	32%
Remote & Very Remote	2	0.4%	0	0%	0	0%	0	0%	1	50%	0	0%	1	50%
Socioeconomic status														
Affluent	55	11%	4	7.3%	1	1.8%	7	13%	34	62%	2	3.6%	7	13%
Middle	307	59%	22	7.2%	5	1.6%	32	10%	178	58%	7	2.3%	63	21%
Disadvantaged	156	30%	14	9%	5	3.2%	19	12%	80	51%	4	2.6%	34	22%
Indigenous status														
Indigenous	14	2.7%	3	21%	0	0%	2	14%	6	43%	0	0%	3	21%
non-Indigenous	504	97%	37	7.3%	11	2.2%	56	11%	286	57%	13	2.6%	101	20%
Comorbidity														
0	155	30%	19	12%	4	2.6%	24	15%	76	49%	6	3.9%	26	17%
1	154	30%	12	7.8%	3	1.9%	18	12%	95	62%	0	0%	26	17%
2+	209	40%	9	4.3%	4	1.9%	16	7.7%	121	58%	7	3.3%	52	25%
Survival														
1-Yr	79%		90%		73%		100%		83%		31%		57%	
2-Yr	58%		75%		36%		84%		61%		23%		37%	
3-Yr	37%		53%		24%		42%		39%		8%		26%	

Notes:

Operable/inoperable status is not available at a statewide level. As a proxy, patients are deemed to be inoperable where they did not receive surgery.

IVST refers to IV systemic therapy. A patient is counted as having concurrent CRT where they receive RT while receiving IVST or vice versa. A patient is counted as having sequential CRT where they receive IVST within 45 days of completing RT, or vice versa. A patient is counted as having non-concurrent RT IVST where they receive both RT and IVST but not concurrently or sequentially as defined in this report.

Diagnosis years 2011-2016

1.5.2 | What is the radiation therapy rate in patients with inoperable stage II disease?

	Patients with inoperable stage II disease		Concurrent-CRT		Sequential-CRT		Non-concurrent RT IVST		RT alone		IVST alone		No anti-cancer treatment	
	Count (N)	%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**348**	**100%**	**109**	**31%**	**15**	**4%**	**35**	**10%**	**109**	**31%**	**9**	**3%**	**71**	**20%**
Sex														
Male	239	46%	78	33%	11	4.6%	26	11%	70	29%	5	2.1%	49	21%
Female	109	21%	31	28%	4	3.7%	9	8.3%	39	36%	4	3.7%	22	20%
Age														
<50	4	0.8%	2	50%	0	0%	0	0%	2	50%	0	0%	0	0%
50-59	33	6.4%	20	61%	2	6.1%	5	15%	3	9.1%	0	0%	3	9.1%
60-69	87	17%	44	51%	7	8%	9	10%	13	15%	4	4.6%	10	11%
70-79	148	29%	39	26%	4	2.7%	19	13%	46	31%	5	3.4%	35	24%
80+	76	15%	4	5.3%	2	2.6%	2	2.6%	45	59%	0	0%	23	30%
Residence														
Major City	206	40%	63	31%	7	3.4%	19	9.2%	69	33%	5	2.4%	43	21%
Inner Regional	107	21%	31	29%	6	5.6%	15	14%	34	32%	1	0.9%	20	19%
Outer Regional	27	5.2%	11	41%	2	7.4%	1	3.7%	4	15%	3	11%	6	22%
Remote & Very Remote	8	1.5%	4	50%	0	0%	0	0%	2	25%	0	0%	2	25%
Socioeconomic status														
Affluent	20	3.9%	5	25%	0	0%	2	10%	6	30%	1	5%	6	30%
Middle	219	42%	73	33%	11	5%	22	10%	63	29%	4	1.8%	46	21%
Disadvantaged	109	21%	31	28%	4	3.7%	11	10%	40	37%	4	3.7%	19	17%
Indigenous status														
Indigenous	11	2.1%	5	45%	0	0%	1	9.1%	1	9.1%	0	0%	4	36%
non-Indigenous	337	65%	104	31%	15	4.5%	34	10%	108	32%	9	2.7%	67	20%
Comorbidity														
0	142	27%	56	39%	7	4.9%	19	13%	40	28%	3	2.1%	17	12%
1	98	19%	25	26%	4	4.1%	8	8.2%	35	36%	2	2%	24	24%
2+	108	21%	28	26%	4	3.7%	8	7.4%	34	31%	4	3.7%	30	28%
Survival														
1-Yr	69%		85%		80%		86%		60%		78%		46%	
2-Yr	44%		64%		33%		54%		38%		44%		19%	
3-Yr	27%		48%		18%		18%		22%		0%		10%	

Note: IVST refers to IV systemic therapy. A patient is counted as having concurrent CRT where they receive RT while receiving IVST or vice versa. A patient is counted as having sequential CRT where they receive IVST within 45 days of completing RT, or vice versa. A patient is counted as having non-concurrent RT IVST where they receive both RT and IVST but not concurrently or sequentially as defined in this report. Operable/inoperable status is not available at a statewide level. As a proxy, patients are deemed to be inoperable where they did not receive surgery.

1.6 | Chemoradiotherapy rate in patients with stage III inoperable disease

Diagnosis years 2011-2016

1.6.1 | What is the chemoradiotherapy rate for patients with inoperable stage III disease?

	Patients with inoperable stage III disease		Concurrent-CRT		Sequential-CRT		Non-concurrent RT IVST		RT alone		IVST alone		No anti-cancer treatment	
	Count (N)	%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**1277**	**100%**	**501**	**39%**	**113**	**8.8%**	**102**	**8%**	**233**	**18%**	**115**	**9%**	**213**	**17%**
Sex														
Male	795	62%	309	39%	60	7.5%	61	7.7%	154	19%	75	9.4%	136	17%
Female	482	38%	192	40%	53	11%	41	8.5%	79	16%	40	8.3%	77	16%
Age														
<50	47	4%	32	68%	1	2.1%	1	2.1%	8	17%	4	8.5%	1	2.1%
50-59	211	17%	107	51%	30	14%	16	7.6%	28	13%	15	7.1%	15	7.1%
60-69	471	37%	215	46%	48	10%	43	9.1%	64	14%	43	9.1%	58	12%
70-79	404	32%	138	34%	28	6.9%	33	8.2%	73	18%	49	12%	83	21%
80+	144	11%	9	6.3%	6	4.2%	9	6.3%	60	42%	4	2.8%	56	39%
Residence														
Major City	811	64%	351	43%	59	7.3%	64	7.9%	142	18%	63	7.8%	132	16%
Inner Regional	313	25%	105	34%	35	11%	25	8%	60	19%	37	12%	51	16%
Outer Regional	123	10%	37	30%	16	13%	12	9.8%	23	19%	13	11%	22	18%
Remote & Very Remote	30	2%	8	27%	3	10%	1	3.3%	8	27%	2	6.7%	8	27%
Socioeconomic status														
Affluent	92	7%	41	45%	8	8.7%	3	3.3%	19	21%	6	6.5%	15	16%
Middle	840	66%	324	39%	79	9.4%	77	9.2%	150	18%	84	10%	126	15%
Disadvantaged	345	27%	136	39%	26	7.5%	22	6.4%	64	19%	25	7.2%	72	21%
Indigenous status														
Indigenous	51	4%	21	41%	2	3.9%	5	9.8%	11	22%	3	5.9%	9	18%
Non-Indigenous	1225	96%	480	39%	111	9.1%	97	7.9%	222	18%	112	9.1%	203	17%
Not Stated/Unknown	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	100%
Comorbidity														
0	599	47%	274	46%	64	11%	51	8.5%	91	15%	46	7.7%	73	12%
1	370	29%	137	37%	31	8.4%	29	7.8%	69	19%	37	10%	67	18%
2+	308	24%	90	29%	18	5.8%	22	7.1%	73	24%	32	10%	73	24%
Survival														
1-Yr	57%		76%		56%		78%		35%		49%		32%	
2-Yr	33%		50%		27%		49%		15%		23%		15%	
3-Yr	22%		37%		18%		25%		9%		14%		8%	

Note:

IVST refers to IV systemic therapy. A patient is counted as having concurrent CRT where they receive RT while receiving IVST or vice versa. A patient is counted as having sequential CRT where they receive IVST within 45 days of completing RT, or vice versa. A patient is counted as having non-concurrent RT IVST where they receive both RT and IVST but not concurrently or sequentially as defined in this report.

Operable/inoperable status is not available at a statewide level. As a proxy, patients are deemed to be inoperable where they did not receive surgery.

1.7 | Treatment rates for patients with stage III and IV disease

Diagnosis years 2011-2016

1.7.1 | What are the treatment rates for patients with stage III disease?

	Stage III		1-Yr survival	2-Yr survival	3-Yr survival
	Count	%			
Queensland	**1492**	**100%**	**61%**	**38%**	**27%**
Had surgery +/- RT, IVST	215	14%	86%	70%	57%
Inoperable	1277	86%	57%	33%	22%
Concurrent-CRT	*501*	*34%*	*76%*	*50%*	*37%*
Sequential-CRT	*113*	*8%*	*56%*	*27%*	*18%*
Non-concurrent RT IVST	*102*	*7%*	*78%*	*49%*	*25%*
RT alone	*233*	*16%*	*35%*	*15%*	*9%*
IVST alone	*115*	*8%*	*49%*	*23%*	*14%*
No surgery, RT or IVST	*213*	*14%*	*32%*	*15%*	*8%*
Concurrent-CRT	547	37%	77%	51%	37%
Sequential-CRT	139	9%	60%	33%	23%
Non-concurrent RT IVST	161	11%	85%	61%	43%
RT alone	242	16%	36%	16%	9%
IVST alone	158	11%	58%	37%	28%
No therapy	245	16%	39%	22%	14%

1.7.2 | What are the treatment rates for patients with stage IV disease?

	Stage IV		1-Yr survival	2-Yr survival	3-Yr survival
	Count	%			
Queensland	**4996**	**100%**	**24%**	**11%**	**6%**
Had surgery +/- RT, IVST	62	1%	76%	56%	41%
Inoperable	4934	99%	23%	11%	6%
Concurrent-CRT	*574*	*11%*	*47%*	*20%*	*9.0%*
Sequential-CRT	*666*	*13%*	*31%*	*12%*	*6.3%*
Non-concurrent RT IVST	*248*	*5%*	*75%*	*48%*	*25%*
RT alone	*1137*	*23%*	*11%*	*4.7%*	*3.1%*
IVST alone	*637*	*13%*	*33%*	*14%*	*8%*
No surgery, RT or IVST	*1672*	*33%*	*8%*	*4%*	*3%*

Notes:
IVST refers to IV systemic therapy. This report contains data on intravenous systemic therapy treatments for lung cancer. Oral systemic therapy data was not available for inclusion; therefore, caution should be exercised when interpreting these results as the number of patients in the no therapy treatment cohorts may be an over-representation of the true number.
A patient is counted as having concurrent CRT where they receive RT while receiving IVST or vice versa. A patient is counted as having sequential CRT where they receive IVST within 45 days of completing RT, or vice versa. A patient is counted as having non-concurrent RT IVST where they receive both RT and IVST but not concurrently or sequentially as defined in this report.

1.8 | Treatment by facility type

Diagnosis years 2011-2016

1.8.1 | What percentage of Queenslanders with lung cancer receive treatment, and where are those treatments delivered?

	All patients	Had Surgery						Had radiation therapy						Had IV systemic therapy					
		Total		Public		Private		Total		Public		Private		Total		Public		Private	
	N	n	% of all patients	n	Row%	n	Row%	n	% of all patients	n	Row%	n	Row%	n	% of all patients	n	Row%	n	Row%
Queensland	**10958**	**2206**	**20%**	**1235**	**56%**	**971**	**44%**	**4978**	**45%**	**2757**	**55%**	**2213**	**44%**	**4310**	**39%**	**2789**	**65%**	**1521**	**35%**
Diagnosis Year																			
2011	1655	291	18%	164	56%	127	44%	746	45%	465	62%	281	38%	611	37%	376	62%	235	38%
2012	1752	308	18%	161	52%	147	48%	797	45%	455	57%	341	43%	662	38%	413	62%	249	38%
2013	1834	379	21%	201	53%	178	47%	784	43%	448	57%	336	43%	711	39%	443	62%	268	38%
2014	1800	370	21%	209	56%	161	44%	801	45%	430	54%	369	46%	715	40%	474	66%	241	34%
2015	1930	436	23%	249	57%	187	43%	899	47%	491	55%	406	45%	784	41%	513	65%	271	35%
2016	1987	422	21%	251	59%	171	41%	951	48%	468	49%	480	50%	827	42%	570	69%	257	31%
Stage group																			
I	1829	1311	72%	777	59%	534	41%	502	27%	315	63%	187	37%	260	14%	141	54%	119	46%
II	841	493	59%	288	58%	205	42%	369	44%	219	59%	150	41%	447	53%	306	68%	141	32%
III	1492	215	14%	126	59%	89	41%	999	67%	664	66%	335	34%	978	66%	832	85%	146	15%
IV	4996	62	1.2%	25	40%	37	60%	2490	50%	1468	59%	1014	41%	2107	42%	1418	67%	689	33%
Unknown	1800	125	6.9%	19	15%	106	85%	618	34%	91	15%	527	85%	518	29%	92	18%	426	82%

Note:
The stage IV surgical patients include patients upstaged at the time of curative intent surgery with unexpected pleural involvement.

1.9 | Hospitals performing lung cancer surgery

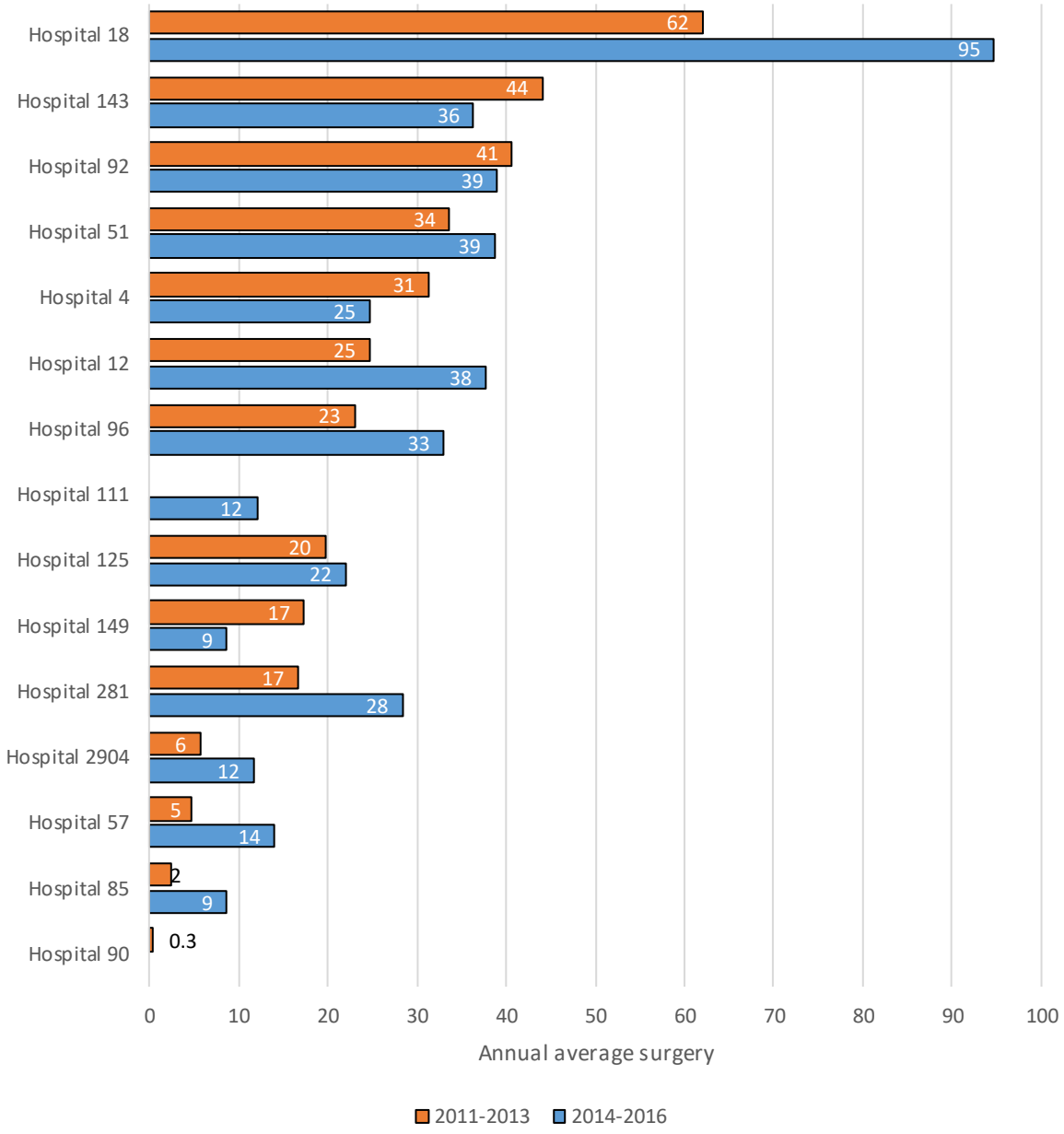
Diagnosis years 2011-2016

1.9.1 | Which hospitals perform lung cancer surgery?

		2011-2013 Diagnosis year Rate Surgery count	2014-2016 Diagnosis year Rate Surgery count	2011-2016 Diagnosis year Rate Surgery count
Principal referral hospitals	Hospital 18	19% 186	23% 284	21% 470
	Hospital 92	12% 122	9.5% 117	11% 239
	Hospital 12	7.6% 74	9.2% 113	8.5% 187
	Hospital 4	9.6% 94	6% 74	7.6% 168
	Hospital 281	5.1% 50	6.9% 85	6.1% 135
Group A & B hospitals	Hospital 143	13% 132	8.9% 109	11% 241
	Hospital 51	10% 101	9.4% 116	9.8% 217
	Hospital 96	7.1% 69	8.1% 99	7.6% 168
	Hospital 125	6% 59	5.4% 66	5.7% 125
	Hospital 149	5.3% 52	2.1% 26	3.5% 78
	Hospital 57	1.4% 14	3.4% 42	2.5% 56
	Hospital 2904	1.7% 17	2.9% 35	2.4% 52
	Hospital 111		2.9% 36	1.6% 36
	Hospital 85	0.7% 7	2.1% 26	1.5% 33
	Hospital 90	0.1% 1		0.05% 1
Queensland		**978**	**1228**	**2206**

Diagnosis years 2011-2016

1.9.2 | Annual average lung cancer surgery per hospital by period.



2| Efficient

Optimally using resources to achieve desired outcomes.

2.1 | Length of stay

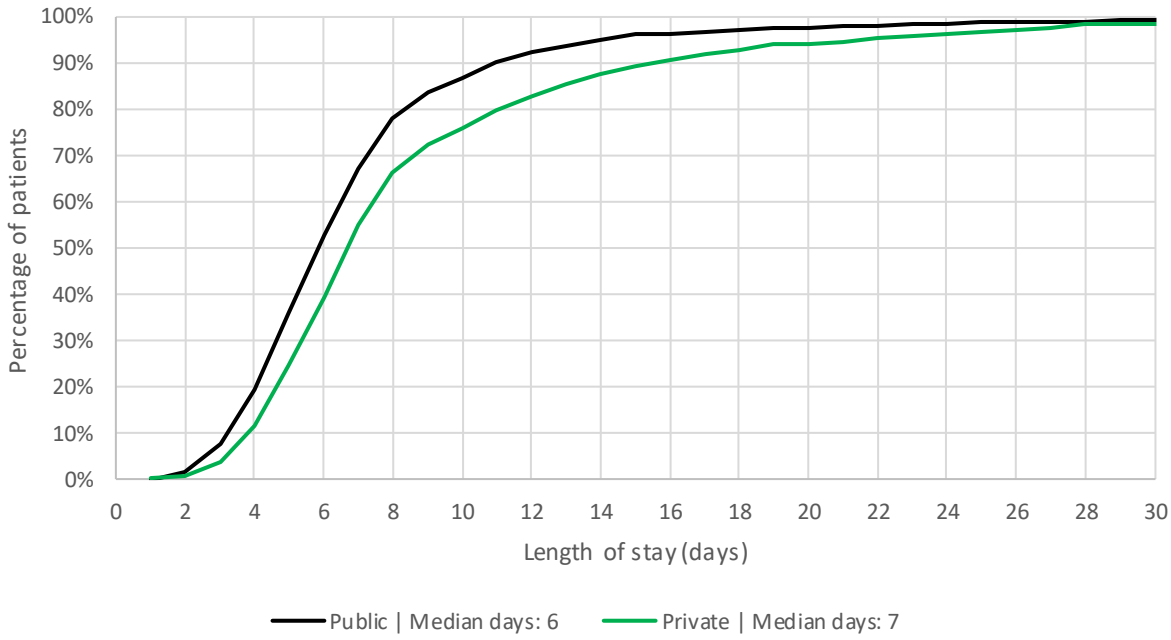
Diagnosis years 2011-2016

2.1.1 | How long do patients who receive surgery stay in hospital (from admission to discharge date)?

		2011-2013 **Diagnosis year** Median days (IQR)	2014-2016 **Diagnosis year** Median days (IQR)	2011-2016 **Diagnosis year** Median days (IQR)
Principal referral hospitals	Hospital 18	8 (7-9)	6 (5-7)	7 (5-8)
	Hospital 92	5 (4-7)	5 (4-7)	5 (4-7)
	Hospital 12	7 (6-9)	6 (5-9)	7 (5-9)
	Hospital 4	7 (6-8)	5 (4-7)	6 (5-8)
	Hospital 281	7 (6-11)	6 (4-7)	6 (5-8)
Group A & B hospitals	Hospital 143	7 (6-8)	6 (4-8)	7 (5-8)
	Hospital 51	9 (7-14)	8 (5-12)	8 (6-13)
	Hospital 96	7 (6-10)	6 (5-8)	7 (5-9)
	Hospital 125	8 (6-12)	8 (6-11)	8 (6-11)
	Hospital 149	8 (6-12)	7 (5-12)	8 (6-11)
	Hospital 57	12 (8-19)	8 (7-14)	9 (7-15)
	Hospital 2904	5 (4-7)	6 (5-8)	6 (4-8)
	Hospital 111		4 (3-8)	4 (3-8)
	Hospital 85	7 (5-28)	8 (5-11)	8 (5-11)
	Hospital 90	28 (28-28)		28 (28-28)
Hospital type				
Public hospitals		7 (5-9)	6 (5-8)	6 (5-8)
Private hospitals		7 (6-11)	7 (5-10)	7 (6-10)
Queensland		**7 (6-9)**	**6 (5-8)**	**7 (5-9)**

Diagnosis years 2011-2016

2.1.2 | What is the distribution of length of stay?



Note:
Due to the skewed nature of the distribution the x-axis has been capped at 30 days in order to better illustrate most patients in the graph.

3| Safe

Avoiding and preventing adverse outcomes or injuries caused by healthcare management.

3.1 | In-hospital surgical mortality

Diagnosis years 2011-2016

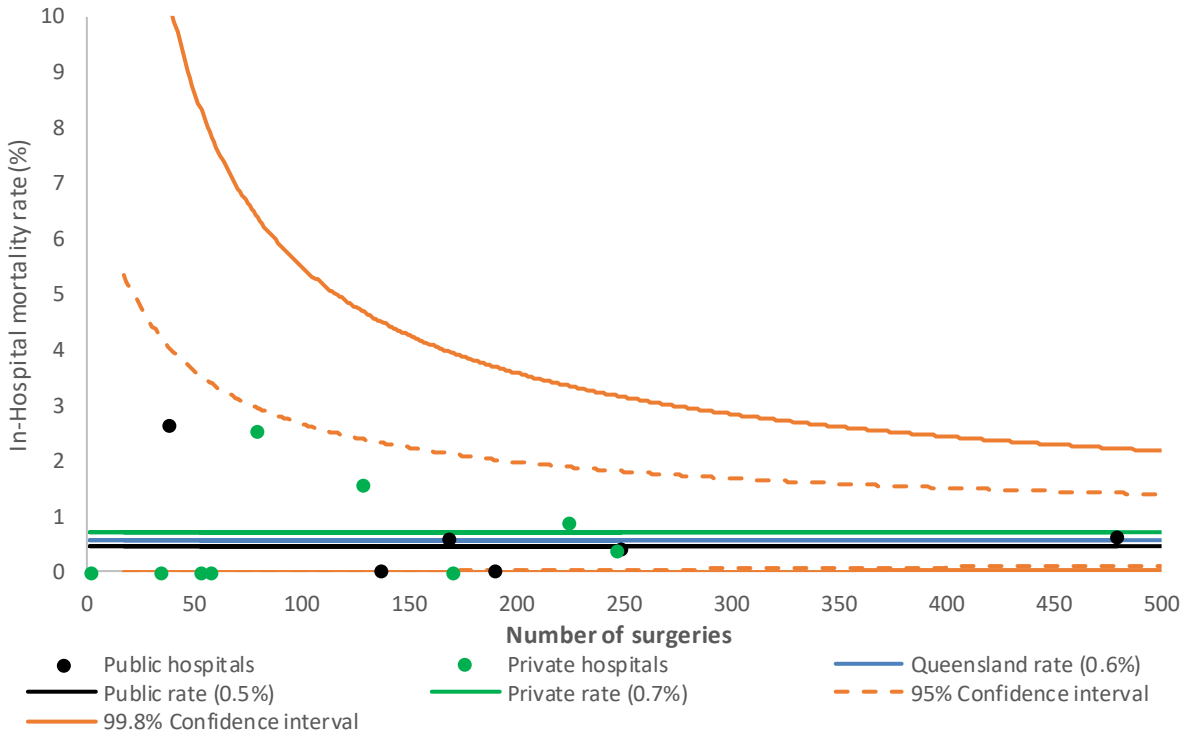
3.1.1 | What percentage of patients die in hospital following surgery?

		2011-2013 Diagnosis year Crude rate (n/N)	2014-2016 Diagnosis year Crude rate (n/N)	2011-2016 Diagnosis year Crude rate (n/N)
Principal referral hospitals	Hospital 18	0.5% (1/186)	0.7% (2/284)	0.6% (3/470)
	Hospital 92	0% (0/122)	0.9% (1/117)	0.4% (1/239)
	Hospital 12	0% (0/74)	0% (0/113)	0% (0/187)
	Hospital 4	1.1% (1/94)	0% (0/74)	0.6% (1/168)
	Hospital 281	0% (0/50)	0% (0/85)	0% (0/135)
Group A & B hospitals	Hospital 143	0% (0/132)	0.9% (1/109)	0.4% (1/241)
	Hospital 51	1% (1/101)	0.9% (1/116)	0.9% (2/217)
	Hospital 96	0% (0/69)	0% (0/99)	0% (0/168)
	Hospital 125	1.7% (1/59)	1.5% (1/66)	1.6% (2/125)
	Hospital 149	3.8% (2/52)	0% (0/26)	2.6% (2/78)
	Hospital 57	0% (0/14)	0% (0/42)	0% (0/56)
	Hospital 2904	0% (0/17)	0% (0/35)	0% (0/52)
	Hospital 111		2.8% (1/36)	2.8% (1/36)
	Hospital 85	0% (0/7)	0% (0/26)	0% (0/33)
	Hospital 90	0% (0/1)		0% (0/1)
Hospital type				
Public hospitals		0.4% (2/526)	0.6% (4/709)	0.5% (6/1235)
Private hospitals		0.9% (4/452)	0.6% (3/519)	0.7% (7/971)
Queensland		**0.6% (6/978)**	**0.6% (7/1228)**	**0.6% (13/2206)**

Notes:
Caution should be exercised when interpreting these rates at a facility level due to the small numbers involved.
Annual mortality crude rates by facility of treatment are available at Appendix A.

Diagnosis years 2011-2016

3.1.2 | In-hospital mortality following surgery by hospital volume.



3.2 | 30-day surgical mortality

Diagnosis years 2011-2016

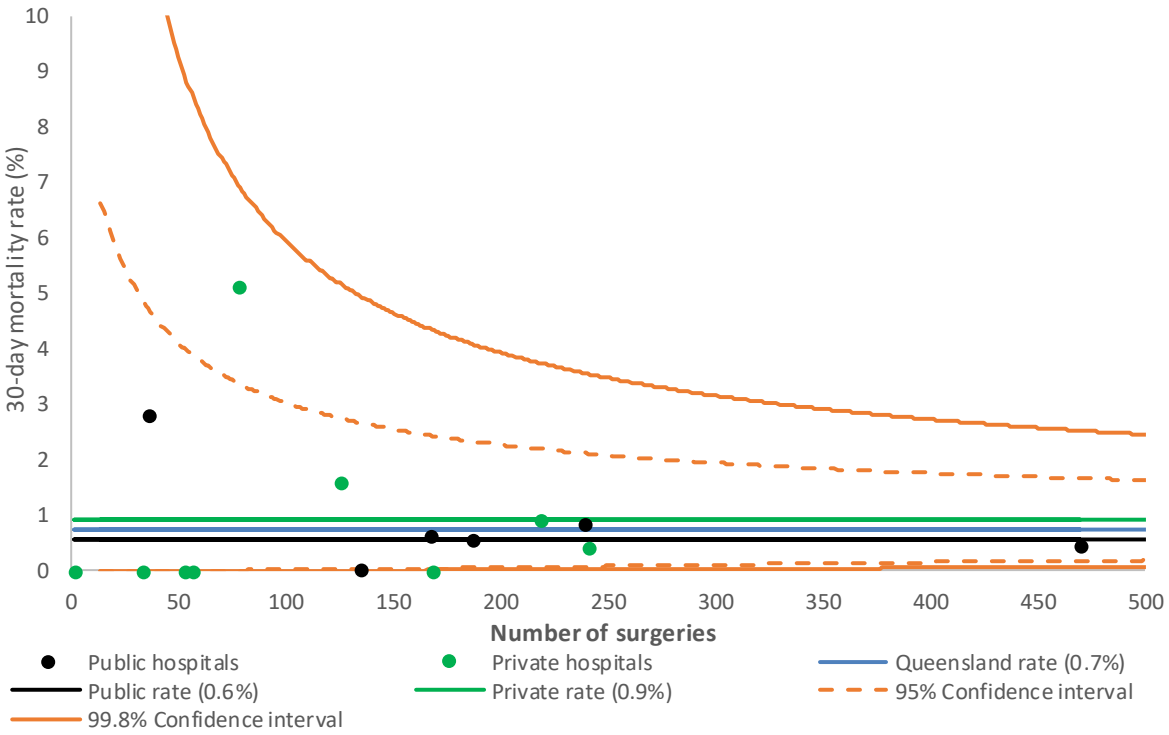
3.2.1 | What percentage of patients died within 30 days of surgery?

		2011-2013 Diagnosis year Crude rate (n/N)	2014-2016 Diagnosis year Crude rate (n/N)	2011-2016 Diagnosis year Crude rate (n/N)
Principal referral hospitals	Hospital 18	0% (0/186)	0.7% (2/284)	0.4% (2/470)
	Hospital 92	0.8% (1/122)	0.9% (1/117)	0.8% (2/239)
	Hospital 12	1.4% (1/74)	0% (0/113)	0.5% (1/187)
	Hospital 4	1.1% (1/94)	0% (0/74)	0.6% (1/168)
	Hospital 281	0% (0/50)	0% (0/85)	0% (0/135)
Group A & B hospitals	Hospital 143	0% (0/132)	0.9% (1/109)	0.4% (1/241)
	Hospital 51	1% (1/101)	0.9% (1/116)	0.9% (2/217)
	Hospital 96	0% (0/69)	0% (0/99)	0% (0/168)
	Hospital 125	1.7% (1/59)	1.5% (1/66)	1.6% (2/125)
	Hospital 149	5.8% (3/52)	3.8% (1/26)	5.1% (4/78)
	Hospital 57	0% (0/14)	0% (0/42)	0% (0/56)
	Hospital 2904	0% (0/17)	0% (0/35)	0% (0/52)
	Hospital 111		2.8% (1/36)	2.8% (1/36)
	Hospital 85	0% (0/7)	0% (0/26)	0% (0/33)
	Hospital 90	0% (0/1)		0% (0/1)
Hospital type				
Public hospitals		0.6% (3/526)	0.6% (4/709)	0.6% (7/1235)
Private hospitals		1.1% (5/452)	0.8% (4/519)	0.9% (9/971)
Queensland		**0.8% (8/978)**	**0.7% (8/1228)**	**0.7% (16/2206)**

Notes:
Caution should be exercised when interpreting these rates at a facility level due to the small numbers involved.
Annual mortality crude rates by facility of treatment are available at Appendix A.

Diagnosis years 2011-2016

3.2.2 | 30-day mortality following surgery by hospital volume.



3.3 | 90-day surgical mortality

Diagnosis years 2011-2016

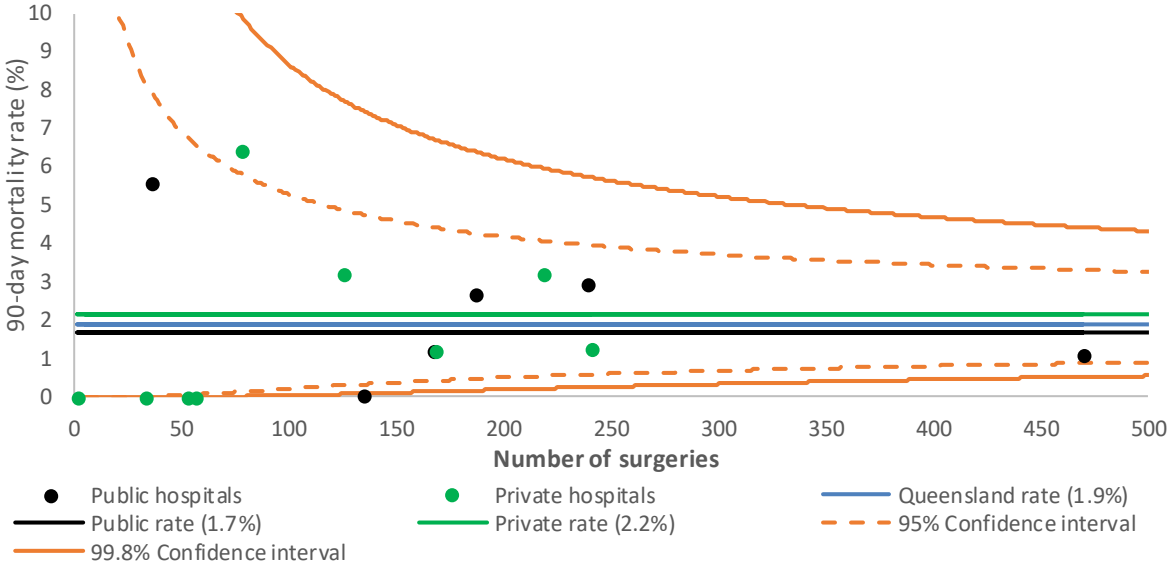
3.3.1 | What percentage of patients died within 90 days of surgery?

		2011-2013 Diagnosis year Crude rate (n/N)	2014-2016 Diagnosis year Crude rate (n/N)	2011-2016 Diagnosis year Crude rate (n/N)
Principal referral hospitals	Hospital 18	0.5% (1/186)	1.4% (4/284)	1.1% (5/470)
	Hospital 92	3.3% (4/122)	2.6% (3/117)	2.9% (7/239)
	Hospital 12	4.1% (3/74)	1.8% (2/113)	2.7% (5/187)
	Hospital 4	2.1% (2/94)	0% (0/74)	1.2% (2/168)
	Hospital 281	0% (0/50)	0% (0/85)	0% (0/135)
Group A & B hospitals	Hospital 143	0.8% (1/132)	1.8% (2/109)	1.2% (3/241)
	Hospital 51	4% (4/101)	2.6% (3/116)	3.2% (7/217)
	Hospital 96	1.4% (1/69)	1% (1/99)	1.2% (2/168)
	Hospital 125	3.4% (2/59)	3% (2/66)	3.2% (4/125)
	Hospital 149	5.8% (3/52)	7.7% (2/26)	6.4% (5/78)
	Hospital 57	0% (0/14)	0% (0/42)	0% (0/56)
	Hospital 2904	0% (0/17)	0% (0/35)	0% (0/52)
	Hospital 111		5.6% (2/36)	5.6% (2/36)
	Hospital 85	0% (0/7)	0% (0/26)	0% (0/33)
	Hospital 90	0% (0/1)		0% (0/1)
Hospital type				
Public hospitals		1.9% (10/526)	1.6% (11/709)	1.7% (21/1235)
Private hospitals		2.4% (11/452)	1.9% (10/519)	2.2% (21/971)
Queensland		**2.1% (21/978)**	**1.7% (21/1228)**	**1.9% (42/2206)**

Notes:
Caution should be exercised when interpreting these rates at a facility level due to the small numbers involved.
Annual mortality crude rates by facility of treatment are available at Appendix A.

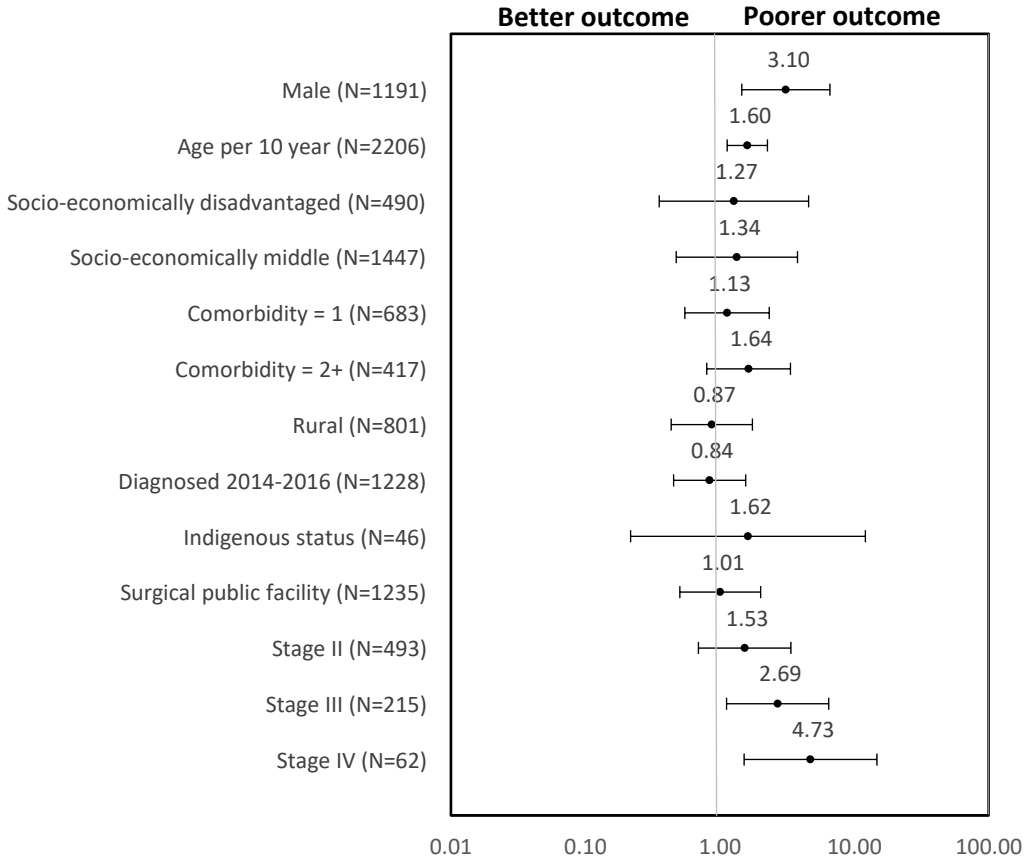
Diagnosis years 2011-2016

3.3.2 | 90-day mortality following surgery by hospital volume.



Diagnosis years 2011-2016

3.3.3 | Relative risk of 90-day mortality following surgery.



Notes:

Rate ratios for age highlight the change in mortality with each 10-year increase in age.

Rate ratios for those who reside in socio-economically disadvantaged, and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who have stage II, stage III and stage IV disease are obtained by comparing to those who have stage I disease.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

3.4 | Prolonged length of stay (≥12 days)

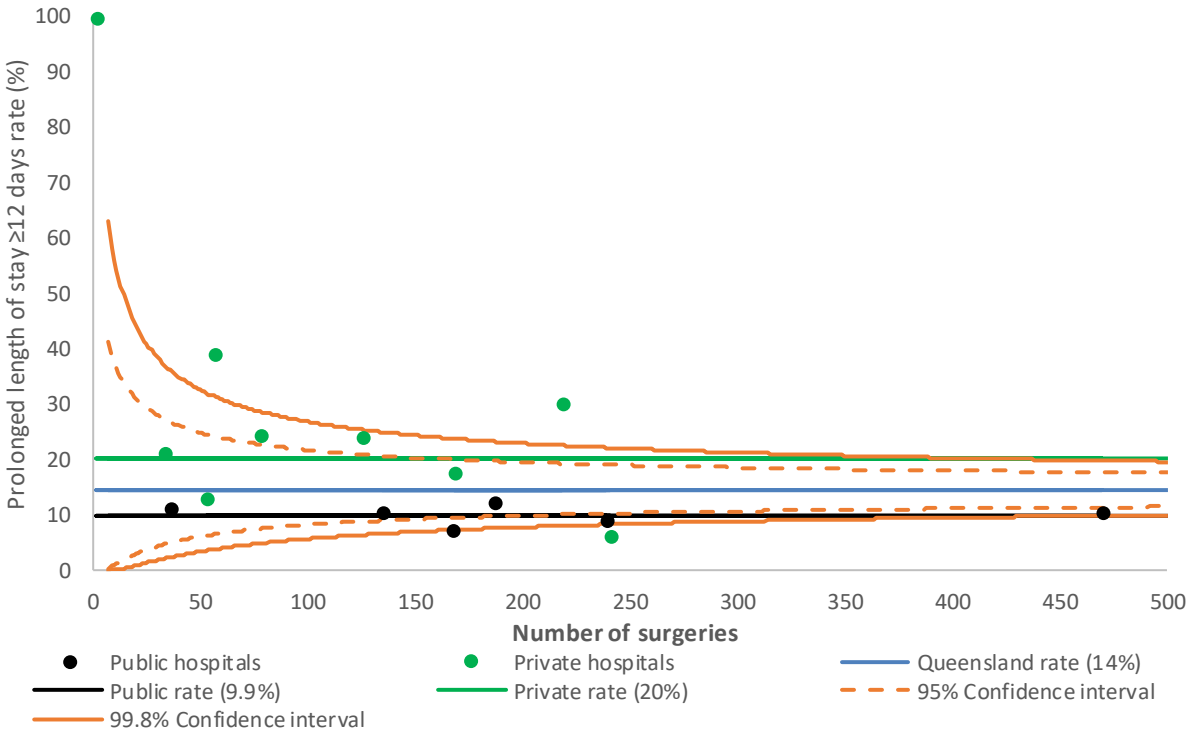
Diagnosis years 2011-2016

3.4.1 | What percentage of patients had a length of stay of ≥12 days after surgery?

		2011-2013 Diagnosis year Crude rate (n/N)	2014-2016 Diagnosis year Crude rate (n/N)	2011-2016 Diagnosis year Crude rate (n/N)
Principal referral hospitals	Hospital 18	14% (26/186)	7.7% (22/284)	10% (48/470)
	Hospital 92	11% (14/122)	6% (7/117)	8.8% (21/239)
	Hospital 12	9.5% (7/74)	14% (16/113)	12% (23/187)
	Hospital 4	8.5% (8/94)	5.4% (4/74)	7.1% (12/168)
	Hospital 281	16% (8/50)	7.1% (6/85)	10% (14/135)
Group A & B hospitals	Hospital 143	6.8% (9/132)	5.5% (6/109)	6.2% (15/241)
	Hospital 51	37% (37/101)	25% (29/116)	30% (66/217)
	Hospital 96	22% (15/69)	15% (15/99)	18% (30/168)
	Hospital 125	25% (15/59)	23% (15/66)	24% (30/125)
	Hospital 149	25% (13/52)	23% (6/26)	24% (19/78)
	Hospital 57	57% (8/14)	33% (14/42)	39% (22/56)
	Hospital 2904	18% (3/17)	11% (4/35)	13% (7/52)
	Hospital 111		11% (4/36)	11% (4/36)
	Hospital 85	29% (2/7)	19% (5/26)	21% (7/33)
	Hospital 90	100% (1/1)		100% (1/1)
Hospital type				
Public hospitals		12% (63/526)	8.3% (59/709)	9.9% (122/1235)
Private hospitals		23% (103/452)	18% (94/519)	20% (197/971)
Queensland		**17% (166/978)**	**12% (153/1228)**	**14% (319/2206)**

Diagnosis years 2011-2016

3.4.2 | Length of stay of ≥12 days after surgery rate by hospital volume.



4| Accessible

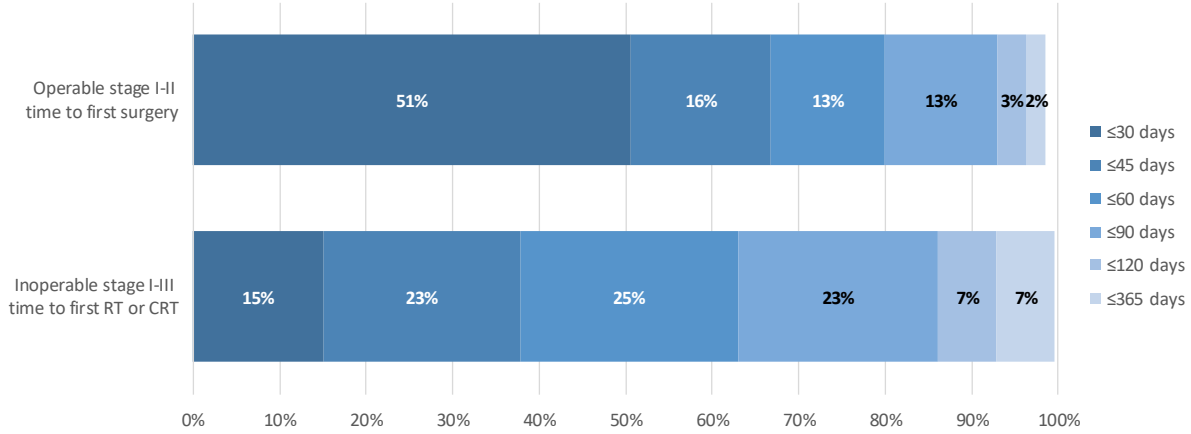
Making health services available in the most suitable setting in a reasonable time.

4.1 | Time to treatment by TNM stage at diagnosis

Diagnosis years 2011-2016

4.1.1 | How soon do lung cancer patients receive their first treatment given their stage at diagnosis?

By first treatment received.



4.2 | Time to first treatment within 30 days

Diagnosis years 2011-2016

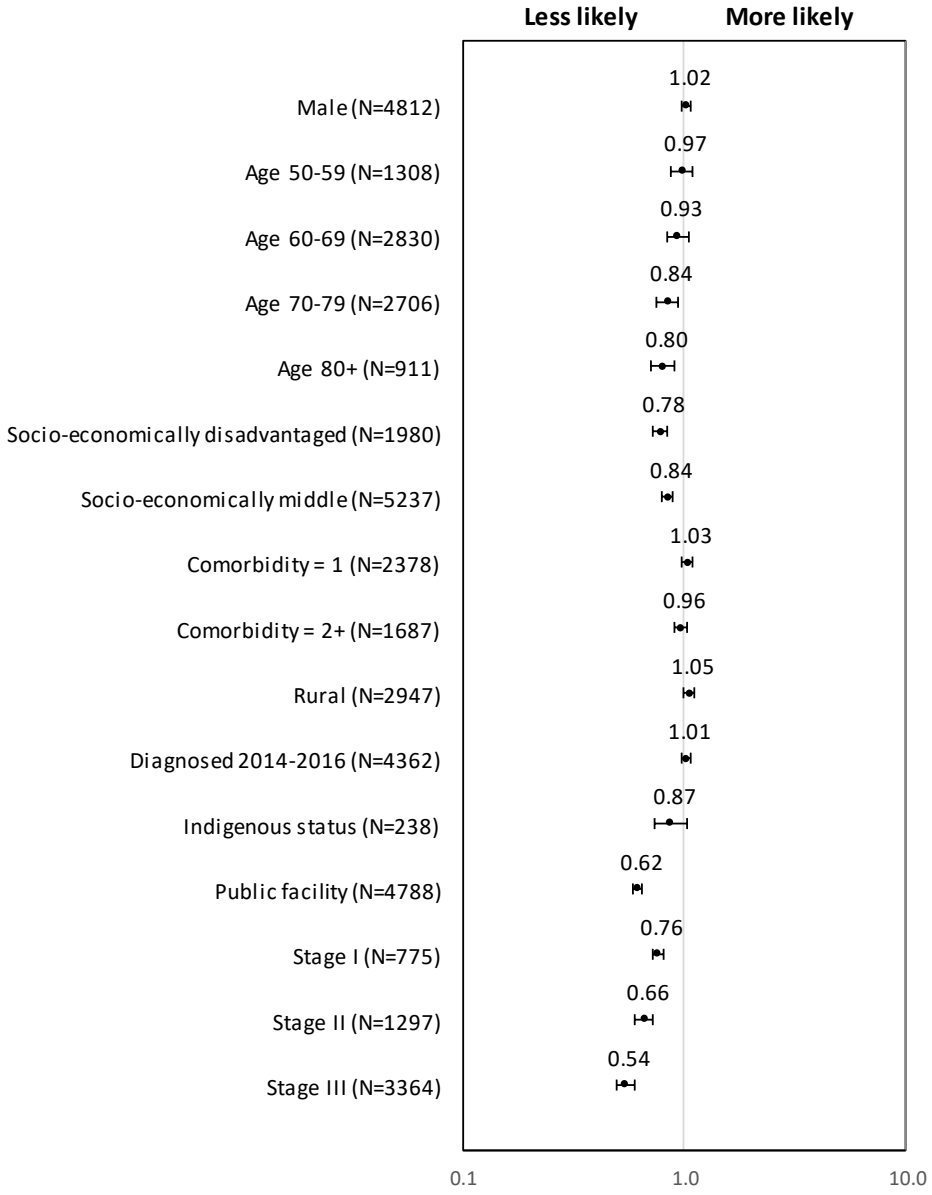
4.2.1 | What percentage of patients receive their first treatment within 30 days of diagnosis?

	2011-2013 **Diagnosis year** Crude rate (n/N)	**2014-2016** **Diagnosis year** Crude rate (n/N)	**2011-2016** **Diagnosis year** Crude rate (n/N)
Stage group			
Stage I	43% (298/701)	42% (434/1038)	42% (732/1739)
Stage II	36% (135/377)	37% (148/398)	37% (283/775)
Stage III	26% (160/615)	30% (208/682)	28% (368/1297)
Stage IV	56% (886/1595)	57% (1001/1769)	56% (1887/3364)
Stage Unknown	53% (241/451)	51% (244/475)	52% (485/926)
Facility type			
Public facility	36% (805/2253)	38% (953/2535)	37% (1758/4788)
Private facility	62% (915/1485)	59% (1079/1822)	60% (1994/3307)
Queensland	**46%** **(1720/3739)**	**47%** **(2035/4362)**	**46%** **(3755/8101)**

Notes:
Cancer Alliance Queensland has statewide coverage of radiation oncology in the treatment of lung cancer, while we receive notification that a patient received radiation therapy, the treatment facility is not always reportable. Due to this, there are a total of 6 patients that received radiation therapy with an unknown facility type causing a difference in the Queensland denominator and the facility type total.
This chapter reports on time to first treatment. 2092 patients had surgery as their first treatment while 3793 had radiation therapy as their first treatment and 2386 had intravenous systemic therapy as their first treatment.
This report contains data on intravenous systemic therapy treatments for lung cancer. Oral systemic therapy data was not available for inclusion; therefore, caution should be exercised when interpreting these results as they may be an under representation of the true number of patients treated.

Diagnosis years 2011-2016

4.2.2 | Factors associated with receiving treatment within 30 days of diagnosis.



Notes:

The above graph (forest plot) is a graphical display of the rate ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant.

Rate ratios for those aged 50-59, 60-69, 70-79 and 80+ are obtained by comparing to those aged <50.

Rate ratios for those who reside in socio-economically disadvantaged, and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who have, stage I, stage II and stage III disease are obtained by comparing to those who have stage IV disease.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

4.3 | Time to first surgery within 30 days

Diagnosis years 2011-2016

4.3.1 | What percentage of patients receive their first surgery within 30 days of diagnosis?

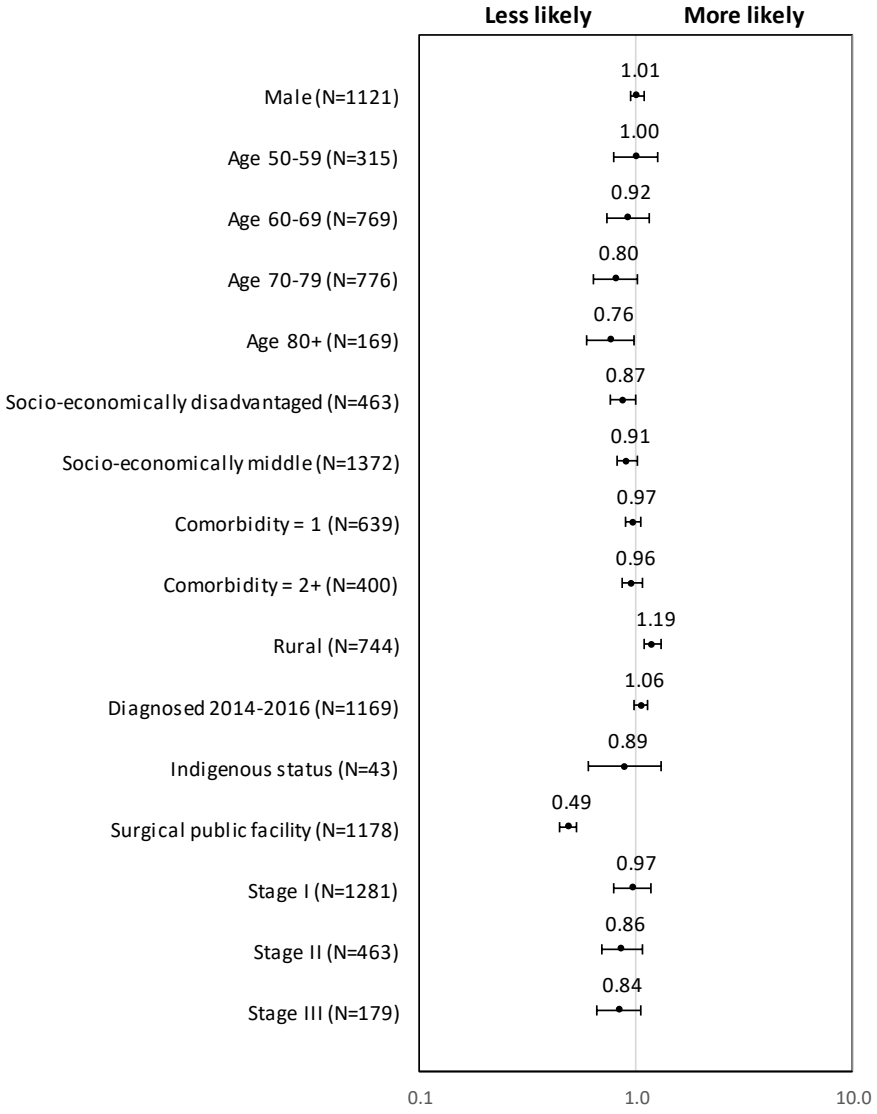
Where lung surgery is first treatment received.

		2011-2013 Diagnosis year Crude rate (n/N)	2014-2016 Diagnosis year Crude rate (n/N)	2011-2016 Diagnosis year Crude rate (n/N)
Stage group				
Stage I		53% (283/529)	54% (403/752)	54% (686/1281)
Stage II		48% (109/226)	48% (113/237)	48% (222/463)
Stage III		43% (38/88)	52% (47/91)	47% (85/179)
Stage IV		52% (14/27)	78% (21/27)	65% (35/54)
Stage Unknown		75% (40/53)	77% (48/62)	77% (88/115)
Hospital				
Principal referral hospitals	Hospital 18	37% (64/172)	33% (88/264)	35% (152/436)
	Hospital 92	14% (17/119)	25% (28/114)	19% (45/233)
	Hospital 12	61% (43/70)	65% (72/110)	64% (115/180)
	Hospital 4	36% (33/91)	30% (21/69)	34% (54/160)
	Hospital 281	29% (14/49)	44% (37/85)	38% (51/134)
Group A & B hospitals	Hospital 143	67% (78/116)	62% (61/99)	65% (139/215)
	Hospital 51	89% (82/92)	95% (106/112)	92% (188/204)
	Hospital 96	53% (36/68)	62% (59/95)	58% (95/163)
	Hospital 125	77% (43/56)	79% (49/62)	78% (92/118)
	Hospital 149	81% (42/52)	77% (20/26)	79% (62/78)
	Hospital 57	93% (13/14)	82% (31/38)	85% (44/52)
	Hospital 2904	88% (14/16)	83% (29/35)	84% (43/51)
	Hospital 111		46% (16/35)	46% (16/35)
	Hospital 85	57% (4/7)	60% (15/25)	59% (19/32)
	Hospital 90	100% (1/1)		100% (1/1)
Hospital type				
Public hospitals		34% (171/501)	39% (262/677)	37% (433/1178)
Private hospitals		74% (313/422)	75% (370/492)	75% (683/914)
Queensland		**52% (484/923)**	**54% (632/1169)**	**53% (1116/2092)**

Diagnosis years 2011-2016

4.3.2 | Factors associated with receiving surgery as first treatment within 30 days of diagnosis.

Where lung surgery is first treatment received.



Notes:

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Rate ratios for those aged 50-59, 60-69, 70-79 and 80+ are obtained by comparing to those aged <50.

Rate ratios for those who reside in socio-economically disadvantaged, and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who have, stage I, stage II and stage III disease are obtained by comparing to those who have stage IV disease.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

4.4 | Time to first radiation therapy within 30 days

Diagnosis years 2011-2016

4.4.1 | What percentage of patients receive their first radiation therapy within 30 days of diagnosis?

Where radiation therapy is first treatment received.

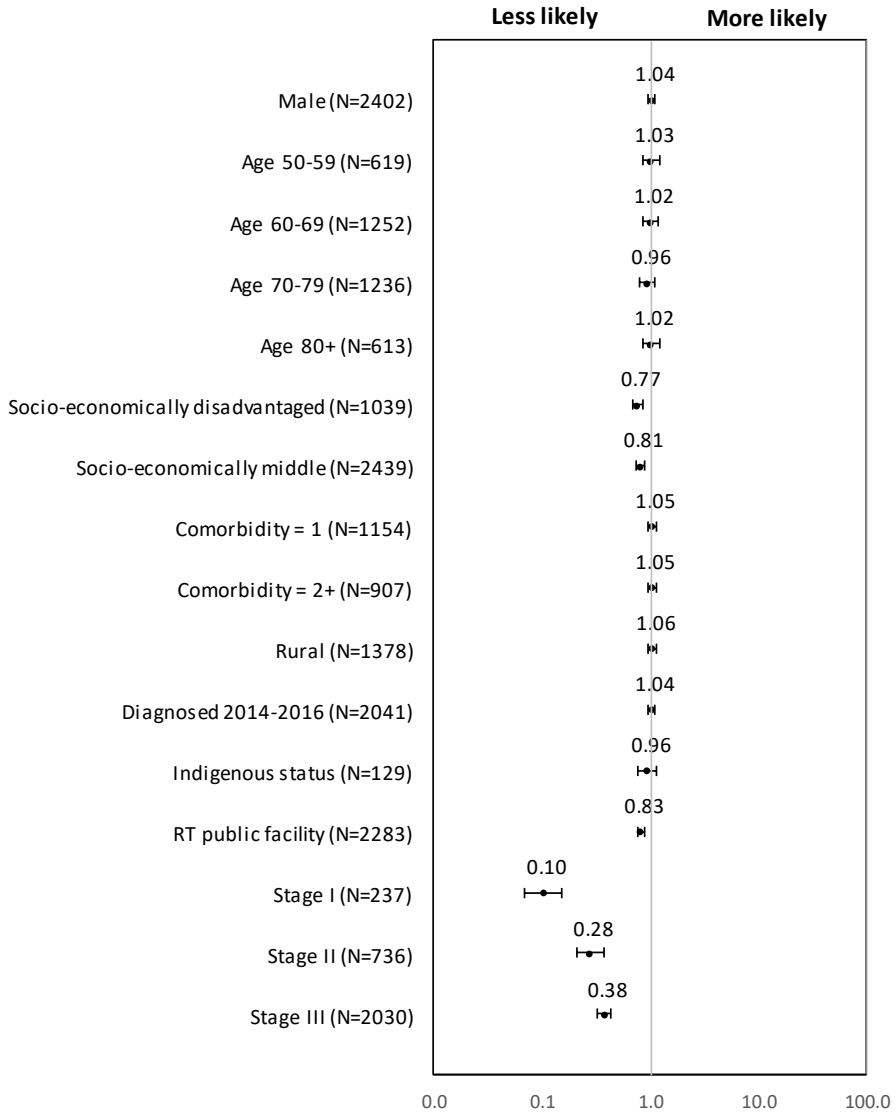
	2011-2013 Diagnosis year Crude rate (n/N)	2014-2016 Diagnosis year Crude rate (n/N)	2011-2016 Diagnosis year Crude rate (n/N)
Stage group			
Stage I	5% (8/152)	7% (16/235)	6% (24/387)
Stage II	17% (20/121)	16% (18/111)	16% (38/232)
Stage III	19% (65/346)	25% (93/370)	22% (158/716)
Stage IV	58% (561/963)	61% (629/1027)	60% (1190/1990)
Stage Unknown	48% (110/231)	43% (101/237)	45% (211/468)
Facility type			
Public facility	37% (418/1144)	39% (429/1089)	38% (847/2233)
Private facility	52% (346/668)	48% (425/886)	50% (771/1554)
Queensland	**42%** **(764/1813)**	**43%** **(857/1980)**	**43%** **(1621/3793)**

Notes:
Cancer Alliance Queensland has statewide coverage of radiation oncology in the treatment of lung cancer, while we receive notification that a patient received radiation therapy, the treatment facility is not always reportable. Due to this, there are a total of 6 patients that received radiation therapy with an unknown facility type causing a difference in the Queensland denominator and the facility type total.
Facility type is defined as facility of first radiation therapy.

Diagnosis years 2011-2016

4.4.2 | Factors associated with receiving radiation therapy within 30 days of diagnosis.

Where radiation therapy is first treatment received.



Notes:

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Rate ratios for those aged 50-59, 60-69, 70-79 and 80+ are obtained by comparing to those aged <50.

Rate ratios for those who reside in socio-economically disadvantaged, and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who have, stage I, stage II and stage III disease are obtained by comparing to those who have stage IV disease.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

4.5 | Time to first IV systemic therapy within 30 days

Diagnosis years 2011-2016

4.5.1 | What percentage of patients receive their first IV systemic therapy within 30 days of diagnosis?

Where IV systemic therapy is first treatment received.

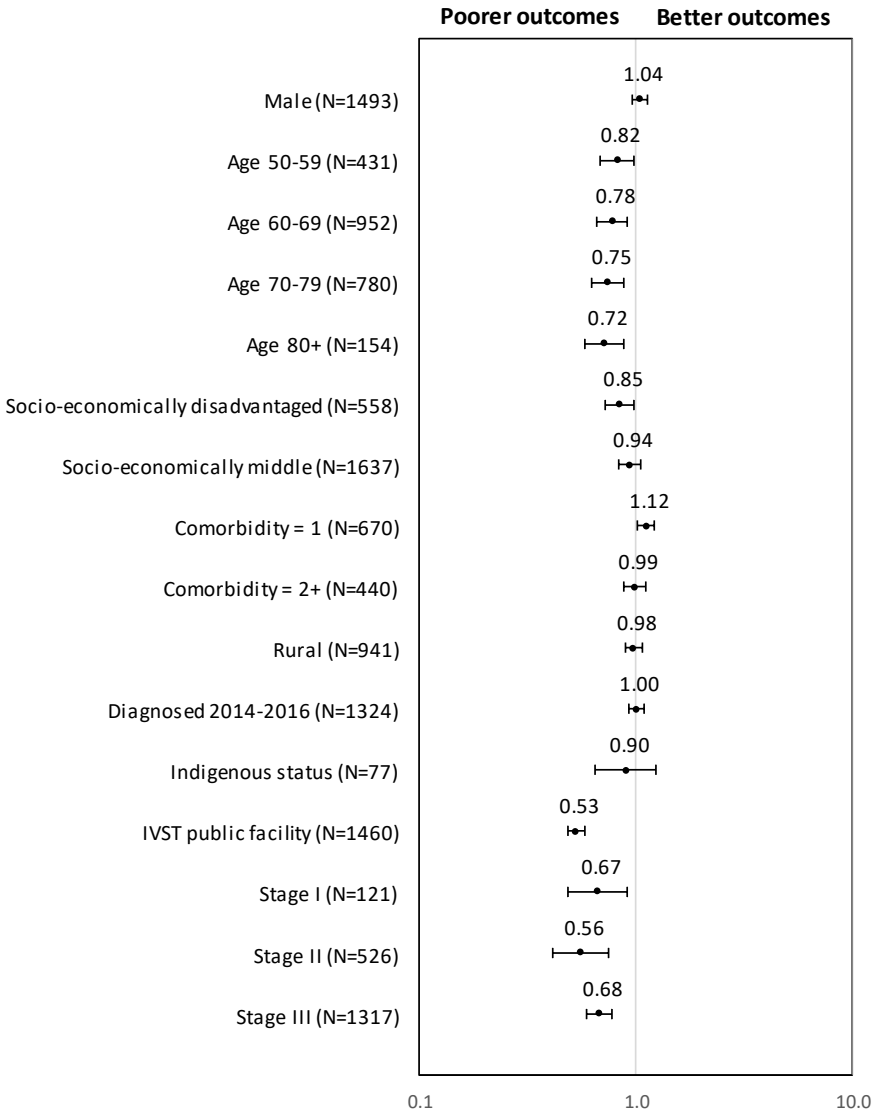
	2011-2013 **Diagnosis year** Crude rate (n/N)	2014-2016 **Diagnosis year** Crude rate (n/N)	2011-2016 **Diagnosis year** Crude rate (n/N)
Stage group			
Stage I	33% (9/27)	37% (16/43)	36% (25/70)
Stage II	24% (12/49)	28% (20/71)	27% (32/120)
Stage III	32% (73/230)	30% (87/291)	31% (160/521)
Stage IV	54% (323/596)	52% (364/703)	53% (687/1299)
Stage Unknown	60% (112/186)	61% (115/190)	60% (227/376)
Facility type			
Public facility	36% (233/646)	34% (281/837)	35% (514/1483)
Private facility	67% (296/442)	70% (321/461)	68% (617/903)
Queensland	**49%** **(529/1088)**	**46%** **(602/1298)**	**47%** **(1131/2386)**

Note:
Facility type is defined as facility of first IV systemic therapy.

Diagnosis years 2011-2016

4.5.2 | Factors associated with receiving IV systemic therapy within 30 days of diagnosis.

Where IV systemic therapy is first treatment received.



Notes:

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Rate ratios for those aged 50-59, 60-69, 70-79 and 80+ are obtained by comparing to those aged <50.

Rate ratios for those who reside in socio-economically disadvantaged, and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who have, stage I, stage II and stage III disease are obtained by comparing to those who have stage IV disease.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

5| Equitable

Providing care and ensuring health status does not vary in quality because of personal characteristics.

5.1 | Over 75 years

Diagnosis years 2011-2016

5.1.1 | What percentage of patients aged ≥75 receive surgery within 30 days of diagnosis?

Where surgery is first treatment received.

		2011-2013 Diagnosis year		2014-2016 Diagnosis year	
		Age <75 Crude rate (n/N)	**Age 75+** Crude rate (n/N)	**Age <75** Crude rate (n/N)	**Age 75+** Crude rate (n/N)
Principal referral hospitals	Hospital 18	42% (52/125)	26% (12/47)	36% (77/211)	21% (11/53)
	Hospital 92	15% (15/103)	13% (2/16)	23% (21/93)	33% (7/21)
	Hospital 12	65% (40/62)	38% (3/8)	66% (61/93)	65% (11/17)
	Hospital 4	44% (31/71)	10% (2/20)	33% (19/57)	17% (2/12)
	Hospital 281	28% (11/39)	30% (3/10)	45% (29/65)	40% (8/20)
Group A & B hospitals	Hospital 143	69% (59/85)	61% (19/31)	61% (42/69)	63% (19/30)
	Hospital 51	92% (59/64)	82% (23/28)	96% (74/77)	91% (32/35)
	Hospital 96	62% (28/45)	35% (8/23)	65% (44/68)	56% (15/27)
	Hospital 125	82% (37/45)	55% (6/11)	76% (37/49)	92% (12/13)
	Hospital 149	80% (28/35)	82% (14/17)	89% (17/19)	43% (3/7)
	Hospital 57	92% (11/12)	100% (2/2)	80% (24/30)	88% (7/8)
	Hospital 2904	89% (8/9)	86% (6/7)	74% (17/23)	100% (12/12)
	Hospital 111			57% (16/28)	0% (0/7)
	Hospital 85	57% (4/7)		59% (10/17)	63% (5/8)
	Hospital 90	100% (1/1)			
Hospital type					
Public hospitals		37% (149/400)	22% (22/101)	41% (223/547)	30% (39/130)
Private hospitals		78% (235/303)	66% (78/119)	75% (265/352)	75% (105/140)
Queensland		**55%** **(384/703)**	**45%** **(100/220)**	**54%** **(488/899)**	**53%** **(144/270)**

Diagnosis years 2011-2016

5.1.2 | What percentage of patients aged ≥75 receive radiation therapy within 30 days of diagnosis?

Where radiation therapy is first treatment received.

	2011-2013 Diagnosis year		2014-2016 Diagnosis year	
	Age <75 Crude rate (n/N)	**Age 75+** Crude rate (n/N)	**Age <75** Crude rate (n/N)	**Age 75+** Crude rate (n/N)
Public facility	37% (321/863)	26% (73/281)	41% (333/813)	28% (77/276)
Private facility	52% (220/422)	47% (116/246)	48% (275/574)	44% (138/312)
Queensland	**42% (541/1286)**	**35% (189/527)**	**42% (609/1391)**	**35% (215/589)**

Notes:
Facility type is defined as facility of first radiation therapy.
Cancer Alliance Queensland has statewide coverage of radiation oncology in the treatment of lung cancer, while we receive notification that a patient received radiation therapy, the treatment facility is not always reportable. Due to this, there are a total of 6 patients that received radiation therapy with an unknown facility type causing a difference in the Queensland denominator and the facility type total.

Diagnosis years 2011-2016

5.1.3 | What percentage of patients aged ≥75 receive IV systemic therapy within 30 days of diagnosis?

Where IV systemic therapy is first treatment received.

	2011-2013 Diagnosis year		2014-2016 Diagnosis year	
	Age <75 Crude rate (n/N)	**Age 75+** Crude rate (n/N)	**Age <75** Crude rate (n/N)	**Age 75+** Crude rate (n/N)
Public facility	35% (194/547)	36% (36/99)	34% (241/715)	29% (35/122)
Private facility	66% (227/345)	69% (67/97)	70% (224/320)	67% (94/141)
Queensland	**47% (421/892)**	**53% (103/196)**	**45% (465/1035)**	**49% (129/263)**

Note:
Facility type is defined as facility of first IV systemic therapy.

5.2 | Socio-economic status

Diagnosis years 2011-2016

5.2.1 | What percentage of socio-economically disadvantaged patients receive surgery within 30 days of diagnosis?

Where surgery is first treatment received.

		2011-2013 Diagnosis year			2014-2016 Diagnosis year		
		Disadvantaged Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)	**Disadvantaged** Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)
Principal referral hospitals	Hospital 18	33% (17/51)	38% (42/112)	56% (5/9)	29% (22/77)	34% (59/173)	50% (7/14)
	Hospital 92	18% (4/22)	16% (13/82)	0% (0/15)	26% (9/34)	22% (14/65)	33% (5/15)
	Hospital 12	71% (12/17)	58% (30/52)	100% (1/1)	79% (22/28)	59% (46/78)	100% (4/4)
	Hospital 4	43% (9/21)	30% (15/50)	45% (9/20)	19% (5/26)	36% (14/39)	50% (2/4)
	Hospital 281	0% (0/2)	28% (13/46)	100% (1/1)	44% (4/9)	45% (33/74)	0% (0/2)
Group A & B hospitals	Hospital 143	56% (10/18)	69% (54/78)	70% (14/20)	100% (14/14)	55% (37/67)	56% (10/18)
	Hospital 51	78% (21/27)	89% (33/37)	100% (28/28)	96% (24/25)	96% (45/47)	93% (37/40)
	Hospital 96	57% (8/14)	49% (19/39)	60% (9/15)	58% (11/19)	63% (37/59)	65% (11/17)
	Hospital 125	67% (8/12)	81% (34/42)	50% (1/2)	80% (12/15)	81% (34/42)	60% (3/5)
	Hospital 149	100% (2/2)	79% (37/47)	100% (3/3)		75% (18/24)	100% (2/2)
	Hospital 57	100% (7/7)	86% (6/7)		70% (7/10)	86% (18/21)	86% (6/7)
	Hospital 2904		88% (14/16)		100% (1/1)	82% (28/34)	
	Hospital 111				22% (2/9)	55% (11/20)	50% (3/6)
	Hospital 85	50% (1/2)	75% (3/4)	0% (0/1)		71% (12/17)	38% (3/8)
	Hospital 90	100% (1/1)					
Hospital type							
Public hospitals		37% (42/113)	33% (113/342)	35% (16/46)	35% (64/183)	39% (177/449)	47% (21/45)
Private hospitals		70% (58/83)	74% (200/270)	80% (55/69)	82% (69/84)	74% (229/311)	74% (72/97)
Queensland		**51%** **(100/196)**	**51%** **(313/612)**	**62%** **(71/115)**	**50%** **(133/267)**	**53%** **(406/760)**	**65%** **(93/142)**

Diagnosis years 2011-2016

5.2.2 | What percentage of socio-economically disadvantaged patients receive radiation therapy within 30 days of diagnosis?

Where radiation therapy is first treatment received.

	2011-2013 Diagnosis year			2014-2016 Diagnosis year		
	Disadvantaged Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)	**Disadvantaged** Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)
Public facility	35% (117/337)	34% (234/685)	35% (43/122)	35% (111/314)	38% (247/645)	40% (52/130)
Private facility	50% (75/149)	47% (208/444)	71% (53/75)	38% (79/210)	46% (275/594)	72% (59/82)
Queensland	**39% (192/487)**	**39% (442/1129)**	**49% (96/197)**	**36% (190/525)**	**42% (523/1243)**	**52% (111/212)**

Notes:
Facility type is defined as facility of first radiation therapy.
Cancer Alliance Queensland has statewide coverage of radiation oncology in the treatment of lung cancer, while we receive notification that a patient received radiation therapy, the treatment facility is not always reportable. Due to this, there are a total of 6 patients that received radiation therapy with an unknown facility type causing a difference in the Queensland denominator and the facility type total.

Diagnosis years 2011-2016

5.2.3 | What percentage of socio-economically disadvantaged patients receive IV systemic therapy within 30 days of diagnosis?

Where IV systemic therapy is first treatment received.

	2011-2013 Diagnosis year			2014-2016 Diagnosis year		
	Disadvantaged Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)	**Disadvantaged** Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)
Public facility	34% (62/182)	37% (155/418)	28% (13/46)	26% (55/209)	34% (200/586)	50% (21/42)
Private facility	59% (43/73)	66% (188/285)	75% (63/84)	67% (56/84)	68% (218/320)	77% (44/57)
Queensland	**41% (105/255)**	**49% (343/703)**	**58% (76/130)**	**38% (111/293)**	**46% (418/906)**	**66% (65/99)**

Note:
Facility type is defined as facility of first IV systemic therapy.

5.3 | Remoteness

Diagnosis years 2011-2016

5.3.1 | What percentage of patients living outside a metropolitan area receive surgery within 30 days of diagnosis?

Where surgery is first treatment received.

		2011-2013 Diagnosis year			2014-2016 Diagnosis year		
		Rural & remote Crude rate (n/N)	**Regional** Crude rate (n/N)	**Metro-politan** Crude rate (n/N)	**Rural & remote** Crude rate (n/N)	**Regional** Crude rate (n/N)	**Metro-politan** Crude rate (n/N)
Principal referral hospitals	Hospital 18	36% (4/11)	47% (28/59)	31% (32/102)	41% (7/17)	33% (34/102)	32% (47/145)
	Hospital 92	40% (2/5)	33% (4/12)	11% (11/102)	20% (1/5)	50% (5/10)	22% (22/99)
	Hospital 12	68% (28/41)	33% (1/3)	54% (14/26)	67% (46/69)	60% (6/10)	65% (20/31)
	Hospital 4	25% (1/4)	36% (13/36)	37% (19/51)	0% (0/5)	24% (10/42)	50% (11/22)
	Hospital 281		0% (0/2)	30% (14/47)		100% (1/1)	43% (36/84)
Group A & B hospitals	Hospital 143	75% (3/4)	65% (26/40)	68% (49/72)	100% (4/4)	68% (17/25)	57% (40/70)
	Hospital 51	100% (7/7)	63% (17/27)	100% (58/58)	100% (9/9)	95% (40/42)	93% (57/61)
	Hospital 96	67% (2/3)	83% (5/6)	49% (29/59)	78% (7/9)	57% (8/14)	61% (44/72)
	Hospital 125	80% (24/30)	50% (2/4)	77% (17/22)	74% (26/35)	80% (4/5)	86% (19/22)
	Hospital 149	100% (2/2)		80% (40/50)			77% (20/26)
	Hospital 57	100% (1/1)	90% (9/10)	100% (3/3)	50% (1/2)	86% (18/21)	80% (12/15)
	Hospital 2904			88% (14/16)		100% (1/1)	82% (28/34)
	Hospital 111				50% (1/2)	100% (2/2)	42% (13/31)
	Hospital 85	0% (0/1)	100% (2/2)	50% (2/4)	100% (1/1)	0% (0/1)	61% (14/23)
	Hospital 90			100% (1/1)			
Hospital type							
Public hospitals		57% (35/61)	41% (46/112)	27% (90/328)	56% (55/98)	35% (58/167)	36% (149/412)
Private hospitals		81% (39/48)	69% (61/89)	75% (213/285)	80% (48/60)	81% (88/109)	72% (234/323)
Queensland		**68%** (74/109)	**53%** (107/201)	**49%** (303/613)	**65%** (103/158)	**53%** (146/276)	**52%** (383/735)

Diagnosis years 2011-2013

5.3.2 | What percentage of patients living outside a metropolitan area receive radiation therapy within 30 days of diagnosis?

Where radiation therapy is first treatment received.

	2011-2013 Diagnosis year			2014-2016 Diagnosis year		
	Disadvantaged Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)	**Disadvantaged** Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)
Public facility	44% (51/115)	37% (85/230)	32% (258/799)	47% (54/115)	39% (86/218)	36% (270/756)
Private facility	35% (39/113)	58% (100/173)	52% (197/382)	41% (58/141)	41% (95/233)	51% (260/512)
Queensland	**39% (90/228)**	**46% (185/404)**	**39% (455/1181)**	**44% (112/256)**	**40% (181/453)**	**42% (531/1271)**

Notes:
Facility type is defined as facility of first radiation therapy.
Cancer Alliance Queensland has statewide coverage of radiation oncology in the treatment of lung cancer, while we receive notification that a patient received radiation therapy, the treatment facility is not always reportable. Due to this, there are a total of 6 patients that received radiation therapy with an unknown facility type causing a difference in the Queensland denominator and the facility type total.

Diagnosis years 2011-2016

5.3.3 | What percentage of patients living outside a metropolitan area receive IV systemic therapy within 30 days of diagnosis?

Where IV systemic therapy is first treatment received.

	2011-2013 Diagnosis year			2014-2016 Diagnosis year		
	Disadvantaged Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)	**Disadvantaged** Crude rate (n/N)	**Middle** Crude rate (n/N)	**Affluent** Crude rate (n/N)
Public facility	39% (37/96)	34% (62/181)	36% (131/369)	31% (39/126)	28% (69/247)	36% (168/464)
Private facility	56% (18/32)	68% (67/98)	67% (209/312)	67% (29/43)	70% (73/105)	69% (216/313)
Queensland	**43% (55/128)**	**46% (129/279)**	**50% (340/681)**	**40% (68/169)**	**40% (142/352)**	**49% (384/777)**

Note:
Facility type is defined as facility of first IV systemic therapy.

5.4 | In-flows

Diagnosis years 2011-2016

5.4.1 | What percent of patients who receive surgery reside outside my HHS?

	2011-2013 Diagnosis year		2014-2016 Diagnosis year		2011-2016 Diagnosis year	
	# of hospitals performing surgery	% cases (n/N)	# of hospitals performing surgery	% cases (n/N)	# of hospitals performing surgery	% cases (n/N)
Gold Coast	4	3% (3/120)	3	1% (2/146)	4	2% (5/266)
Metro North	5	61% (322/527)	5	61% (382/625)	5	61% (704/1152)
Metro South	3	23% (45/198)	4	28% (77/278)	4	26% (122/476)
Townsville	2	57% (76/133)	2	61% (109/179)	2	59% (185/312)
Queensland	**14**	**46% (446/978)**	**14**	**46% (570/1228)**	**15**	**46% (1016/2206)**

Note:
Hospital counts displayed are for unique facilities.

Diagnosis years 2011-2016

5.4.2 | What percent of patients who receive radiation therapy reside outside my HHS?

	2011-2013 Diagnosis year		2014-2016 Diagnosis year		2011-2016 Diagnosis year	
	# of facilities performing RT	% cases (n/N)	# of facilities performing RT	% cases (n/N)	# of facilities performing RT	% cases (n/N)
Cairns and Hinterland	1	8% (8/95)	1	7% (9/131)	1	8% (17/226)
Central Queensland			1	7% (1/14)	1	7% (1/14)
Darling Downs	1	20% (25/123)	1	20% (22/108)	1	20% (47/231)
Gold Coast	3	5% (9/170)	3	4% (15/342)	3	5% (24/512)
Metro North	4	52% (463/895)	3	45% (377/834)	4	49% (840/1729)
Metro South	2	41% (262/646)	4	29% (183/640)	4	35% (445/1286)
Sunshine Coast	2	6% (13/213)	3	5% (11/232)	3	5% (24/445)
Townsville	1	50% (87/175)	1	38% (84/219)	1	43% (171/394)
West Moreton			1	25% (3/12)	1	25% (3/12)
Wide Bay	1	0% (0/9)	2	3% (3/112)	2	2% (3/121)
Queensland	**15**	**37% (867/2326)**	**20**	**27% (708/2644)**	**21**	**32% (1575/4970)**

Note:
Hospital counts displayed are for unique facilities.

Diagnosis years 2011-2016

5.4.3 | What percent of patients who receive IV systemic therapy reside outside my HHS?

	2011-2013 Diagnosis year		2014-2016 Diagnosis year		2011-2016 Diagnosis year	
	# of facilities performing IVST	% cases (n/N)	# of facilities performing IVST	% cases (n/N)	# of facilities performing IVST	% cases (n/N)
Cairns and Hinterland	2	5% (4/74)	3	9% (8/92)	3	7% (12/166)
Central Queensland	4	0% (0/49)	4	4% (3/84)	4	2% (3/133)
Darling Downs	2	13% (12/94)	2	23% (27/115)	2	19% (39/209)
Gold Coast	7	2% (6/243)	8	4% (13/331)	8	3% (19/574)
Mackay	2	0% (0/36)	3	0% (0/56)	3	0% (0/92)
Metro North	12	41% (228/555)	12	33% (198/597)	14	37% (426/1152)
Metro South	9	27% (141/518)	9	22% (111/514)	10	24% (252/1032)
North West	2	17% (1/6)	1	22% (2/9)	2	20% (3/15)
Sunshine Coast	7	3% (6/184)	7	5% (9/198)	8	4% (15/382)
Townsville	4	27% (32/119)	3	19% (28/148)	4	22% (60/267)
West Moreton	2	0% (0/17)	3	6% (3/52)	3	4% (3/69)
Wide Bay	4	2% (2/89)	5	2% (3/130)	6	2% (5/219)
Queensland	**57**	**22% (432/1984)**	**60**	**17% (405/2326)**	**67**	**19% (837/4310)**

Note:
IVST refers to IV systemic therapy.
Hospital counts displayed are for unique facilities.

5.5 | Out-flows

Diagnosis years 2011-2016

5.5.1 | What percentage of patients underwent surgery outside of the HHS in which they live?

	2011-2013 Diagnosis year % (n/N)	2014-2016 Diagnosis year % (n/N)	2011-2016 Diagnosis year % (n/N)
Cairns and Hinterland	100% (49/49)	100% (79/79)	100% (128/128)
Central Queensland	100% (32/32)	100% (44/44)	100% (76/76)
Central West	100% (5/5)	100% (8/8)	100% (13/13)
Darling Downs	100% (40/40)	100% (56/56)	100% (96/96)
Gold Coast	9% (12/129)	5% (7/151)	7% (19/280)
Mackay	100% (30/30)	100% (38/38)	100% (68/68)
Metro North	2% (5/210)	5% (14/257)	4% (19/467)
Metro South	19% (35/188)	11% (24/225)	14% (59/413)
North West	100% (3/3)	100% (7/7)	100% (10/10)
South West	100% (8/8)	100% (4/4)	100% (12/12)
Sunshine Coast	100% (97/97)	100% (134/134)	100% (231/231)
Torres and Cape	100% (1/1)	100% (3/3)	100% (4/4)
Townsville	0% (0/57)	3% (2/72)	2% (2/129)
West Moreton	100% (37/37)	100% (53/53)	100% (90/90)
Wide Bay	100% (92/92)	100% (97/97)	100% (189/189)
Queensland	**46% (446/978)**	**46% (570/1228)**	**46% (1016/2206)**

Diagnosis years 2011-2016

5.5.2 | What percentage of patients underwent radiation therapy outside of the HHS in which they live?

	2011-2013 Diagnosis year % (n/N)	2014-2016 Diagnosis year % (n/N)	2011-2016 Diagnosis year % (n/N)
Cairns and Hinterland	25% (29/116)	10% (14/136)	17% (43/252)
Central Queensland	100% (90/90)	90% (117/130)	94% (207/220)
Central West	100% (5/5)	100% (9/9)	100% (14/14)
Darling Downs	25% (33/131)	34% (44/130)	30% (77/261)
Gold Coast	48% (148/309)	7% (23/350)	26% (171/659)
Mackay	100% (60/60)	100% (62/62)	100% (122/122)
Metro North	5% (24/456)	7% (35/492)	6% (59/948)
Metro South	25% (125/509)	17% (94/551)	21% (219/1060)
North West	100% (9/9)	100% (17/17)	100% (26/26)
South West	100% (13/13)	100% (15/15)	100% (28/28)
Sunshine Coast	12% (28/228)	11% (28/249)	12% (56/477)
Torres and Cape	100% (10/10)	100% (9/9)	100% (19/19)
Townsville	3% (3/91)	4% (6/141)	4% (9/232)
West Moreton	100% (118/118)	94% (134/143)	97% (252/261)
Wide Bay	95% (173/182)	50% (108/217)	70% (281/399)
Queensland	**37% (868/2326)**	**27% (715/2644)**	**32% (1583/4970)**

Notes:
Cancer Alliance Queensland has statewide coverage of radiation oncology in the treatment of lung cancer, while we receive notification that a patient received radiation therapy, the treatment facility is not always reportable. Due to this, there are a total of 8 patients that received radiation therapy with an unknown facility type causing a difference between the Queensland in-flow and out-flow rates.

Diagnosis years 2011-2016

5.5.3 | What percentage of patients underwent IV systemic therapy outside of the HHS in which they live?

	2011-2013 Diagnosis year % (n/N)	2014-2016 Diagnosis year % (n/N)	2011-2016 Diagnosis year % (n/N)
Cairns and Hinterland	18% (15/85)	12% (11/95)	14% (26/180)
Central Queensland	33% (24/73)	39% (51/132)	37% (75/205)
Central West	100% (3/3)	100% (5/5)	100% (8/8)
Darling Downs	22% (23/105)	23% (27/115)	23% (50/220)
Gold Coast	18% (52/289)	4% (12/330)	10% (64/619)
Mackay	38% (22/58)	23% (17/73)	30% (39/131)
Metro North	6% (21/348)	6% (26/425)	6% (47/773)
Metro South	12% (53/430)	10% (47/450)	11% (100/880)
North West	50% (5/10)	56% (9/16)	54% (14/26)
South West	100% (5/5)	100% (12/12)	100% (17/17)
Sunshine Coast	9% (18/196)	10% (22/211)	10% (40/407)
Torres and Cape	100% (6/6)	100% (6/6)	100% (12/12)
Townsville	2% (2/89)	4% (5/125)	3% (7/214)
West Moreton	83% (84/101)	65% (91/140)	73% (175/241)
Wide Bay	53% (99/186)	34% (64/191)	43% (163/377)
Queensland	**22% (432/1984)**	**17% (405/2326)**	**19% (837/4310)**

6| Surgical survival

Understanding the outcomes of oncological surgery.

6.1 | 1-year surgical survival

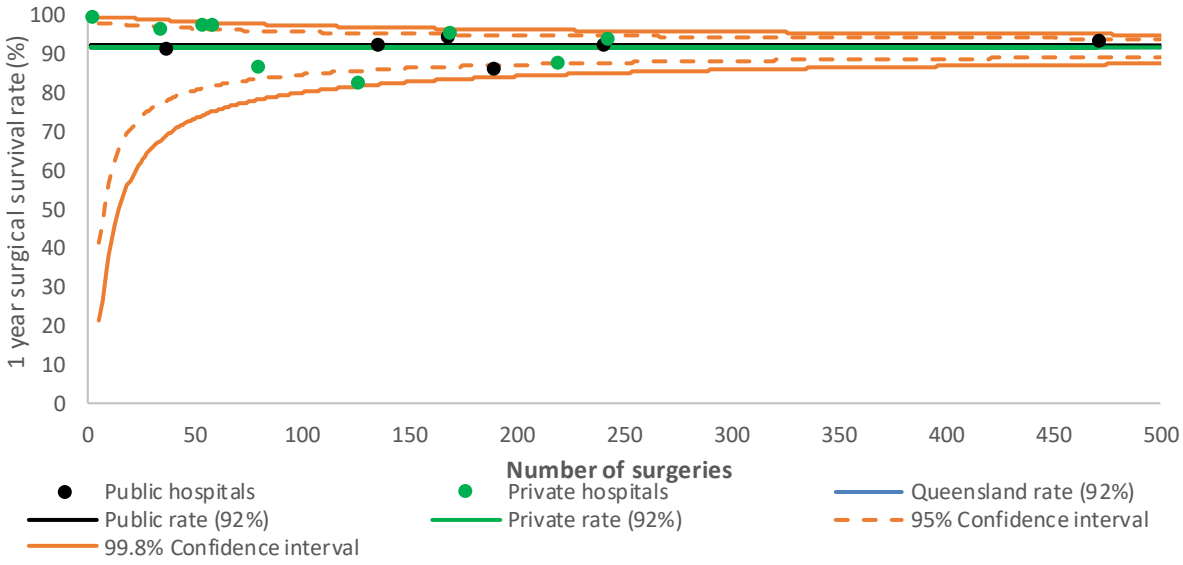
Diagnosis years 2011-2016

6.1.1 | What percentage of patients are alive one year after surgery?

		2011-2013 Diagnosis year Crude rate (n/N)	2014-2016 Diagnosis year Crude rate (n/N)	2011-2016 Diagnosis year Crude rate (n/N)
Principal referral hospitals	Hospital 18	94% (174/186)	94% (266/284)	94% (440/470)
	Hospital 92	91% (111/122)	94% (110/117)	92% (221/239)
	Hospital 12	89% (66/74)	85% (96/113)	87% (162/187)
	Hospital 4	96% (90/94)	93% (69/74)	95% (159/168)
	Hospital 281	94% (47/50)	92% (78/85)	93% (125/135)
Group A & B hospitals	Hospital 143	95% (125/132)	94% (103/109)	95% (228/241)
	Hospital 51	84% (85/101)	92% (107/116)	88% (192/217)
	Hospital 96	90% (62/69)	100% (99/99)	96% (161/168)
	Hospital 125	80% (47/59)	86% (57/66)	83% (104/125)
	Hospital 149	87% (45/52)	88% (23/26)	87% (68/78)
	Hospital 57	93% (13/14)	100% (42/42)	98% (55/56)
	Hospital 2904	100% (17/17)	97% (34/35)	98% (51/52)
	Hospital 111		92% (33/36)	92% (33/36)
	Hospital 85	100% (7/7)	96% (25/26)	97% (32/33)
	Hospital 90	100% (1/1)		100% (1/1)
Hospital Type				
Public hospitals		93% (488/526)	92% (652/709)	92% (1140/1235)
Private hospitals		89% (402/452)	94% (490/519)	92% (892/971)
Queensland		**91% (890/978)**	**93% (1142/1228)**	**92% (2032/2206)**

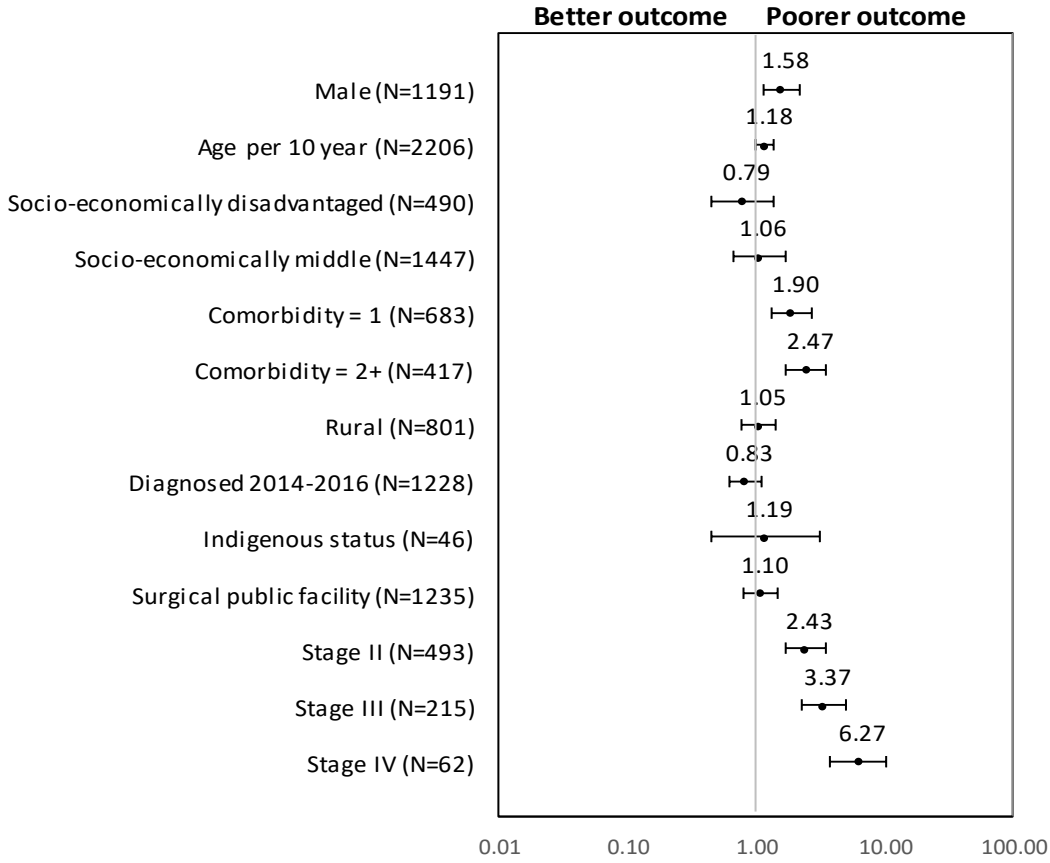
Diagnosis years 2011-2016

6.1.2 | 1-year surgical survival following surgery by hospital volume.



Diagnosis years 2011-2016

6.1.3 | Factors associated with 1-year surgical survival.



Notes:

The above graph (forest plot) is a graphical display of the rate ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant.

Rate ratios for age highlight the change in survival with each 10-year increase in age.

Rate ratios for those who reside in socio-economically disadvantaged, and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who have stage II, stage III and stage IV disease are obtained by comparing to those who have stage I disease.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

6.2 | 2-year surgical survival

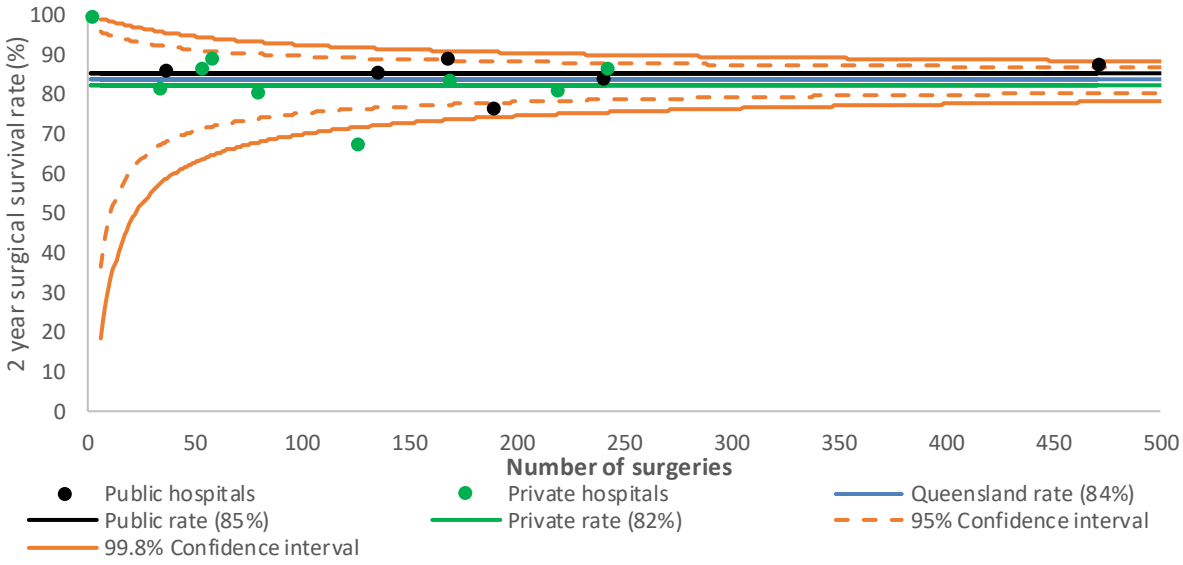
Diagnosis years 2011-2016

6.2.1 | What percentage of patients are alive two years after surgery?

		2011-2013 Diagnosis year Crude rate (n/N)	2014-2016 Diagnosis year Crude rate (n/N)	2011-2016 Diagnosis year Crude rate (n/N)
Principal referral hospitals	Hospital 18	85% (158/186)	90% (256/284)	88% (414/470)
	Hospital 92	82% (100/122)	86% (101/117)	84% (201/239)
	Hospital 12	81% (60/74)	74% (84/113)	77% (144/187)
	Hospital 4	93% (87/94)	84% (62/74)	89% (149/168)
	Hospital 281	88% (44/50)	85% (72/85)	86% (116/135)
Group A & B hospitals	Hospital 143	86% (113/132)	89% (97/109)	87% (210/241)
	Hospital 51	75% (76/101)	86% (100/116)	81% (176/217)
	Hospital 96	78% (54/69)	88% (87/99)	84% (141/168)
	Hospital 125	59% (35/59)	76% (50/66)	68% (85/125)
	Hospital 149	79% (41/52)	85% (22/26)	81% (63/78)
	Hospital 57	79% (11/14)	93% (39/42)	89% (50/56)
	Hospital 2904	76% (13/17)	91% (32/35)	87% (45/52)
	Hospital 111		86% (31/36)	86% (31/36)
	Hospital 85	86% (6/7)	81% (21/26)	82% (27/33)
	Hospital 90	100% (1/1)		100% (1/1)
Hospital Type				
Public hospitals		85% (449/526)	85% (606/709)	85% (1055/1235)
Private hospitals		77% (350/452)	86% (448/519)	82% (798/971)
Queensland		**82%** **(799/978)**	**86%** **(1054/1228)**	**84%** **(1853/2206)**

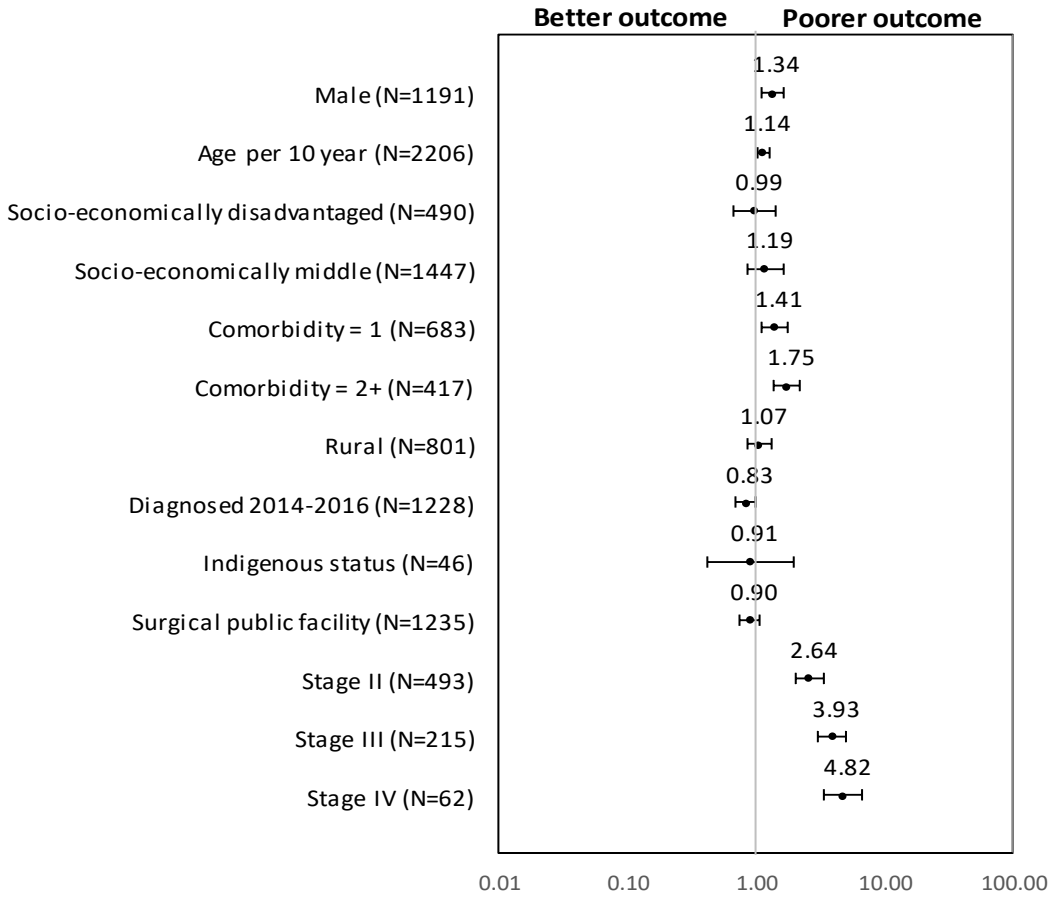
Diagnosis years 2011-2016

6.2.2 | 2-year surgical survival following surgery by hospital volume.



Diagnosis years 2011-2016

6.2.3 | Factors associated with 2-year surgical survival.



Notes:

The above graph (forest plot) is a graphical display of the rate ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant.

Rate ratios for age highlight the change in survival with each 10-year increase in age.

Rate ratios for those who reside in socio-economically disadvantaged, and socio-economically middle locations are obtained by comparing to those who reside in socio-economically affluent locations.

Rate ratios for those who are have comorbidity = 1, and comorbidity = 2+ are obtained by comparing to those who have no comorbidities.

Rate ratios for those who have stage II, stage III and stage IV disease are obtained by comparing to those who have stage I disease.

Rate ratios for those who reside in rural locations are obtained by comparing to those who reside in urban locations, see the glossary for more information.

Appendix

Appendix A | Additional data tables

A.1 | Incidence and mortality counts and age-standardised rates 1982-2021[12]

	Incidence						Mortality					
Year of diagnosis	Male N	Male ASR	Female N	Female ASR	Person N	Person ASR	Male N	Male ASR	Female N	Female ASR	Person N	Person ASR
1982	704	80	146	14	850	44	465	54	88	9	553	29
1983	678	75	146	14	824	41	552	62	113	10	665	33
1984	702	76	160	14	862	42	543	60	135	13	678	33
1985	681	72	176	16	857	41	579	63	131	12	710	34
1986	684	69	179	15	863	39	577	59	156	13	733	34
1987	778	76	197	16	975	43	629	62	140	12	769	34
1988	770	74	204	16	974	42	670	65	143	11	813	35
1989	770	71	200	15	970	40	677	64	157	12	834	35
1990	756	69	238	18	994	40	604	57	191	14	795	33
1991	768	67	284	21	1052	42	584	52	202	15	786	31
1992	804	67	253	18	1057	40	698	59	200	14	898	34
1993	818	67	279	20	1097	41	686	57	234	16	920	34
1994	783	62	293	20	1076	39	712	58	217	15	929	34
1995	807	62	298	20	1105	39	683	53	246	16	929	33
1996	876	65	356	23	1232	42	736	56	259	17	995	34
1997	901	65	351	22	1252	42	712	53	296	18	1008	34
1998	888	63	377	23	1265	41	737	53	281	17	1018	33
1999	949	65	359	21	1308	41	775	53	290	17	1065	34
2000	929	62	420	24	1349	41	792	53	325	19	1117	34
2001	931	59	446	25	1377	41	749	49	344	19	1093	32
2002	912	56	478	26	1390	40	803	50	397	21	1200	34
2003	883	52	418	22	1301	36	752	45	345	18	1097	30
2004	982	55	521	26	1503	40	829	48	401	20	1230	33
2005	994	54	529	26	1523	39	798	44	442	21	1240	32
2006	1045	56	547	26	1592	40	861	46	442	21	1303	32
2007	1007	52	569	26	1576	38	860	45	451	21	1311	32
2008	1067	54	624	28	1691	40	853	43	435	19	1288	30
2009	1008	48	692	30	1700	38	803	40	497	21	1300	30
2010	1111	52	680	28	1791	39	857	40	508	21	1365	30
2011	1108	50	621	25	1729	37	888	41	502	20	1390	30
2012	1117	49	693	27	1810	37	844	37	528	21	1372	28
2013	1140	48	751	29	1891	38	917	39	519	20	1436	29
2014	1080	44	762	28	1842	35	924	38	573	21	1497	29
2015	1197	47	797	29	1994	38	844	34	575	21	1419	27
2016	1167	45	868	31	2035	37	868	34	515	18	1383	25

A.2 | Treatment rates by TNM stage at diagnosis | **Diagnosis years 2011-2016**

	All patients		Had treatment		No anti-cancer treatment		Had Surgery		No Surgery		Had RT		No RT		Had IVST		No IVST	
	Count (N)	%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**10958**	**100%**	**8101**	**74%**	**2857**	**26%**	**2206**	**20%**	**8752**	**80%**	**4978**	**45%**	**5980**	**55%**	**4310**	**39%**	**6648**	**61%**
Stage group at diagnosis																		
I	1829	17%	1739	95%	90	4.9%	1311	72%	518	28%	502	27%	1327	73%	260	14%	1569	86%
II	841	8%	775	92%	66	7.8%	493	59%	348	41%	369	44%	472	56%	447	53%	394	47%
III	1492	14%	1297	87%	195	13%	215	14%	1277	86%	999	67%	493	33%	978	66%	514	34%
IV	4996	46%	3364	67%	1632	33%	62	1.2%	4934	99%	2490	50%	2506	50%	2107	42%	2889	58%
Unknown	1800	16%	926	51%	874	49%	125	6.9%	1675	93%	618	34%	1182	66%	518	29%	1282	71%
Diagnosis years																		
2011-2013	5241	48%	3739	71%	1502	29%	978	19%	4263	81%	2327	44%	2914	56%	1984	38%	3257	62%
2014-2016	5717	52%	4362	76%	1355	24%	1228	21%	4489	79%	2651	46%	3066	54%	2326	41%	3391	59%
Sex																		
Male	6582	60%	4812	73%	1770	27%	1191	18%	5391	82%	3088	47%	3494	53%	2617	40%	3965	60%
Female	4376	40%	3289	75%	1087	25%	1015	23%	3361	77%	1890	43%	2486	57%	1693	39%	2683	61%
Age																		
<50	381	3%	346	91%	35	9.2%	73	19%	308	81%	236	62%	145	38%	240	63%	141	37%
50-59	1515	14%	1308	86%	207	14%	342	23%	1173	77%	846	56%	669	44%	858	57%	657	43%
60-69	3399	31%	2830	83%	569	17%	816	24%	2583	76%	1693	50%	1706	50%	1677	49%	1722	51%
70-79	3602	33%	2706	75%	896	25%	804	22%	2798	78%	1551	43%	2051	57%	1314	36%	2288	64%
80+	2061	19%	911	44%	1150	56%	171	8.3%	1890	92%	652	32%	1409	68%	221	11%	1840	89%
Residence at diagnosis																		
Major City	6801	62%	5154	76%	1647	24%	1405	21%	5396	79%	3192	47%	3609	53%	2724	40%	4077	60%
Inner Regional	2635	24%	1914	73%	721	27%	517	20%	2118	80%	1145	43%	1490	57%	1064	40%	1571	60%
Outer Regional	1251	11%	851	68%	400	32%	235	19%	1016	81%	528	42%	723	58%	435	35%	816	65%
Remote & Very Remote	271	2%	182	67%	89	33%	49	18%	222	82%	113	42%	158	58%	87	32%	184	68%
Socioeconomic status																		
Affluent	1139	10%	884	78%	255	22%	269	24%	870	76%	533	47%	606	53%	453	40%	686	60%
Middle	7007	64%	5237	75%	1770	25%	1447	21%	5560	79%	3172	45%	3835	55%	2827	40%	4180	60%
Disadvantaged	2812	26%	1980	70%	832	30%	490	17%	2322	83%	1273	45%	1539	55%	1030	37%	1782	63%
Indigenous status																		
Indigenous	334	3%	238	71%	96	29%	46	14%	288	86%	156	47%	178	53%	129	39%	205	61%
Non-Indigenous	10620	97%	7862	74%	2758	26%	2160	20%	8460	80%	4821	45%	5799	55%	4181	39%	6439	61%
Not Stated/Unknown	4	0%	1	25%	3	75%	0	0%	4	100%	1	25%	3	75%	0	0%	4	100%
Comorbidity																		
0	5054	46%	4036	80%	1018	20%	1106	22%	3948	78%	2390	47%	2664	53%	2305	46%	2749	54%
1	3310	30%	2378	72%	932	28%	683	21%	2627	79%	1481	45%	1829	55%	1207	36%	2103	64%
2+	2594	24%	1687	65%	907	35%	417	16%	2177	84%	1107	43%	1487	57%	798	31%	1796	69%
Had MDT review																		
Yes	6077	55%	4904	81%	1173	19%	1278	21%	4799	79%	3152	52%	2925	48%	2533	42%	3544	58%
No	4881	45%	3197	65%	1684	35%	928	19%	3953	81%	1826	37%	3055	63%	1777	36%	3104	64%

Note:
IVST refers to IV systemic therapy. The stage IV surgical patients include patients upstaged at the time of curative intent surgery with unexpected pleural involvement.
This analyses only includes the 8 MDTs that provide data to Cancer Alliance Queensland, meaning that the data here are likely an underestimate of the true rate of patients reviewed by MDT.

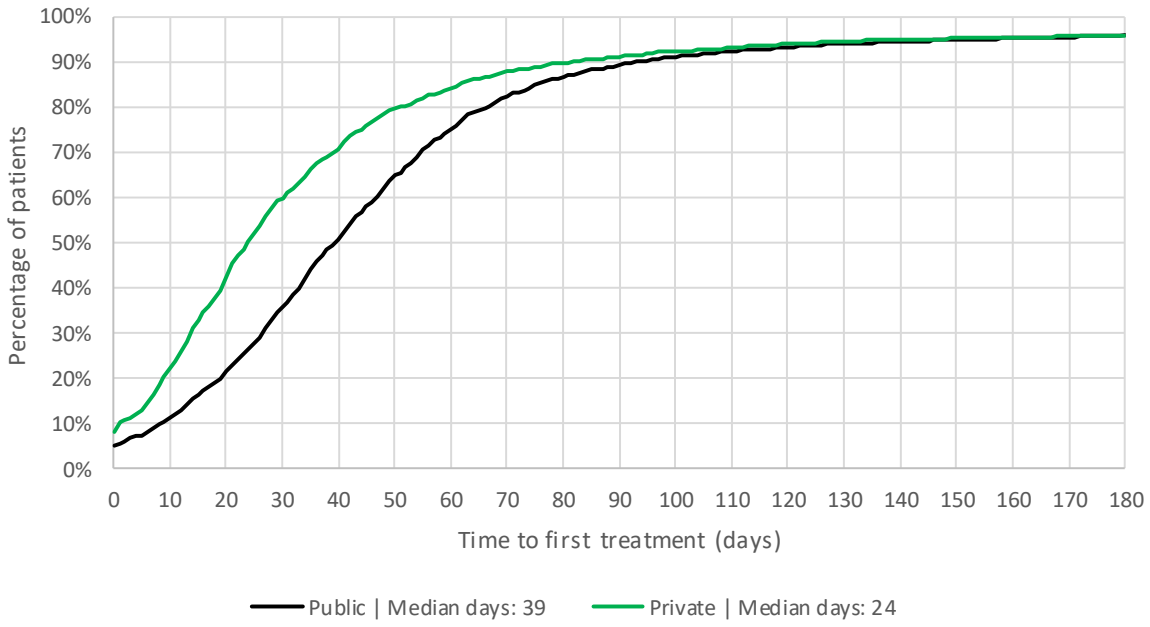
Diagnosis years 2011-2016

A.3 | What are the median days from diagnosis to first treatment?

	2011-2013 Diagnosis year Median days (IQR)	**2014-2016 Diagnosis year** Median days (IQR)	**2011-2016 Diagnosis year** Median days (IQR)
Stage group			
Stage I	38 (6-64)	38 (12-61)	38 (9-62)
Stage II	42 (20-67)	38 (23-59)	40 (22-61)
Stage III	47 (29-64)	41 (28-55)	43 (28-60)
Stage IV	27 (14-46)	27 (14-43)	27 (14-44)
Stage Unknown	27 (14-59)	29 (16-69)	28 (15-63)
Facility type			
Public facility	41 (23-63)	38 (22-57)	39 (22-60)
Private facility	22 (10-43)	25 (12-46)	24 (12-44)
Queensland	**34 (16-57)**	**33 (17-54)**	**33 (16-55)**

Diagnosis years 2011-2016

A.4 | Distribution of days from diagnosis to treatment by facility type.



Note:
Due to the skewed nature of the distribution the x-axis has been capped at 180 in order to better illustrate most patients in the graph.

Diagnosis years 2011-2016

A.5 | What are the median days from diagnosis to first surgery?

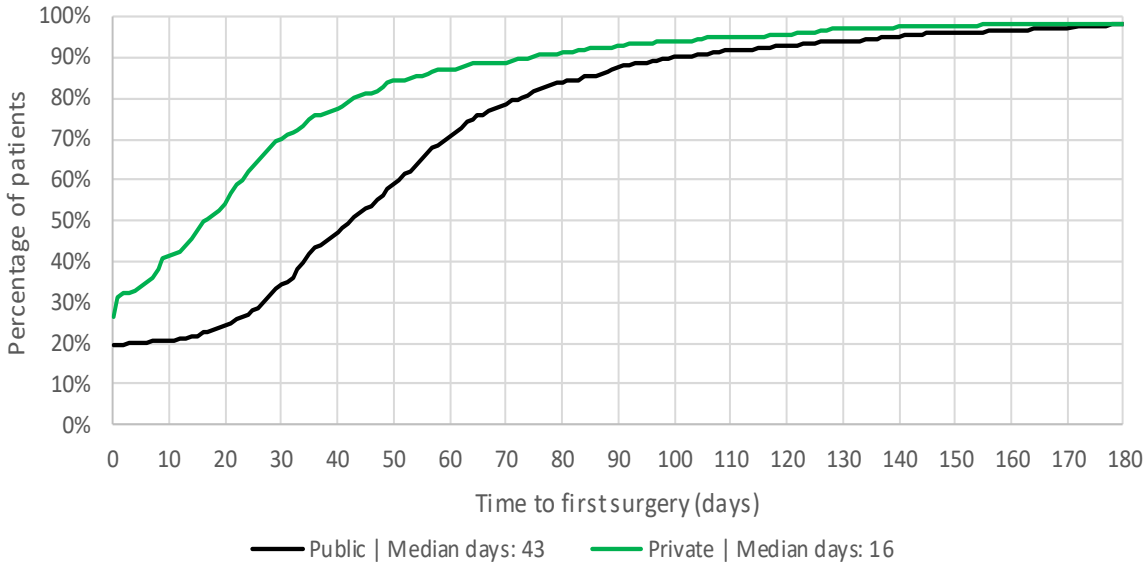
Where lung surgery is first treatment received.

		2011-2013 **Diagnosis year** Median days (IQR)	2014-2016 **Diagnosis year** Median days (IQR)	2011-2016 **Diagnosis year** Median days (IQR)
Stage group				
Stage I		28 (0-58)	28 (0-53)	28 (0-55)
Stage II		34 (14-58)	34 (17-56)	34 (16-58)
Stage III		45 (17-69)	35 (14-83)	39 (14-79)
Stage IV		32 (8-67)	16 (0-49)	24 (8-53)
Stage Unknown		7 (0-48)	8 (0-48)	7 (0-48)
Hospital				
Principal referral hospitals	Hospital 18	45 (22-68)	45 (27-69)	45 (26-68)
	Hospital 92	61 (45-90)	50 (32-61)	54 (35-75)
	Hospital 12	1 (0-65)	0 (0-47)	0 (0-53)
	Hospital 4	34 (25-61)	47 (27-63)	39 (26-62)
	Hospital 281	42 (27-57)	35 (21-50)	35 (22-53)
Group A & B hospitals	Hospital 143	26 (1-56)	26 (1-49)	26 (1-54)
	Hospital 51	8 (0-26)	10 (2-21)	9 (0-22)
	Hospital 96	29 (14-46)	22 (1-51)	25 (9-48)
	Hospital 125	0 (0-32)	1 (0-35)	1 (0-34)
	Hospital 149	11 (0-29)	11 (0-30)	11 (0-29)
	Hospital 57	8 (0-15)	16 (0-34)	14 (0-28)
	Hospital 2904	2 (1-26)	17 (1-22)	16 (1-24)
	Hospital 111		41 (13-82)	41 (13-82)
	Hospital 85	26 (15-43)	27 (15-45)	26 (15-44)
	Hospital 90	0 (0-0)		0 (0-0)
Hospital type				
Public hospitals		45 (22-69)	41 (18-61)	43 (20-64)
Private hospitals		17 (0-36)	16 (0-35)	16 (0-36)
Queensland		**31 (1-59)**	**29 (1-54)**	**30 (1-56)**

Diagnosis years 2011-2016

A.6 | Distribution of days from diagnosis to surgery by facility type.

Where lung surgery is first treatment received.



Note: Due to the skewed nature of the distribution the x-axis has been capped at 180 in order to better illustrate most patients in the graph.

Diagnosis years 2011-2016

A.7 |What are the median days from diagnosis to first radiation therapy?

Where radiation therapy is first treatment received.

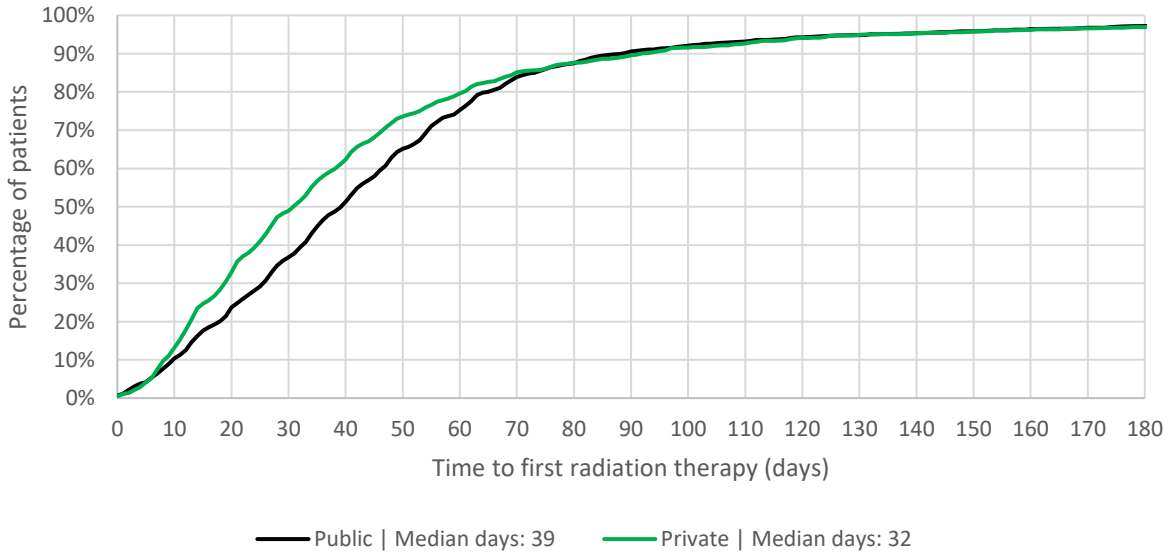
	2011-2013 **Diagnosis year** Median days (IQR)	2014-2016 **Diagnosis year** Median days (IQR)	2011-2016 **Diagnosis year** Median days (IQR)
Stage group			
Stage I	63 (49-95)	62 (47-92)	63 (48-92)
Stage II	67 (42-94)	52 (35-67)	57 (39-78)
Stage III	53 (39-70)	45 (31-58)	48 (34-64)
Stage IV	27 (13-44)	24 (13-42)	26 (13-43)
Stage Unknown	36 (20-89)	41 (20-108)	37 (20-97)
Facility type			
Public facility	41 (21-63)	37 (20-59)	39 (20-62)
Private facility	30 (15-57)	33 (14-60)	33 (15-59)
Queensland	**37** **(19-62)**	**35** **(18-59)**	**36** **(18-61)**

Note: Facility type is defined as facility of first radiation therapy.

Diagnosis years 2011-2016

A.8 | Distribution of days from diagnosis to first radiation therapy by facility type.

Where radiation therapy is first treatment received.



Note: Due to the skewed nature of the distribution the x-axis has been capped at 180 in order to better illustrate most patients in the graph.

Diagnosis years 2011-2016

A.9 | What are the median days from diagnosis to first IV systemic therapy.

Where IV systemic therapy is first treatment received.

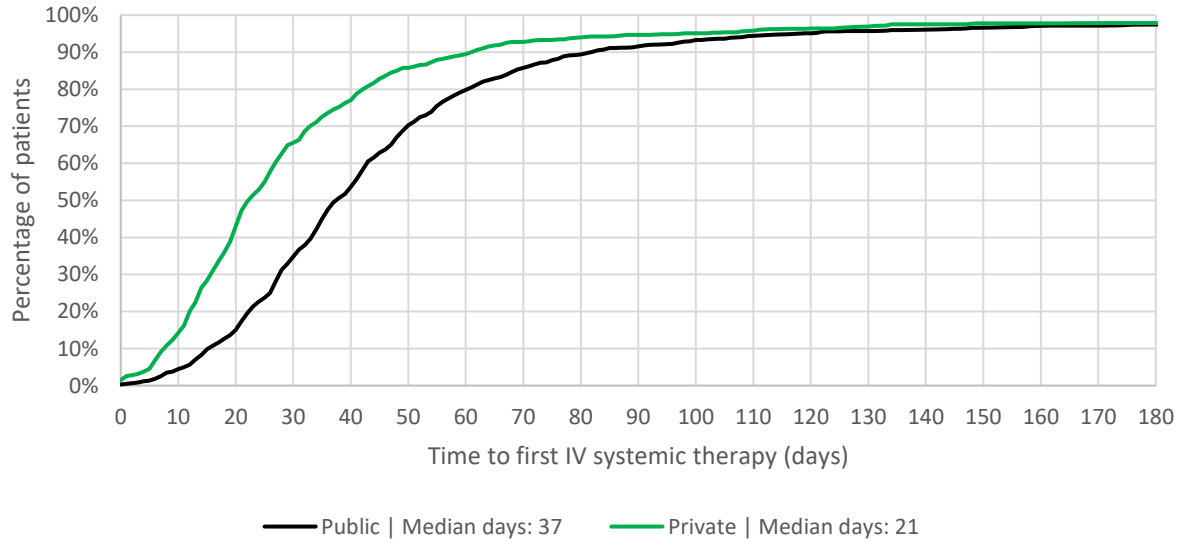
	2011-2013 Diagnosis year Median days (IQR)	2014-2016 Diagnosis year Median days (IQR)	2011-2016 Diagnosis year Median days (IQR)
Stage group			
Stage I	34 (20-50)	40 (20-78)	39 (20-61)
Stage II	42 (33-79)	37 (25-55)	39 (27-62)
Stage III	41 (25-57)	39 (28-53)	40 (28-54)
Stage IV	29 (17-50)	30 (19-45)	29 (18-47)
Stage Unknown	23 (14-49)	27 (19-54)	26 (16-49)
Facility type			
Public facility	38 (25-58)	37 (27-54)	37 (26-56)
Private facility	20 (12-36)	22 (15-35)	21 (13-36)
Queensland	**31 (17-52)**	**32 (21-48)**	**32 (20-50)**

Note: Facility type is defined as facility of first IV systemic therapy

Diagnosis years 2011-2016

A.10 | Distribution of days from diagnosis to first IV systemic therapy by facility type.

Where IV systemic therapy is first treatment received.



Note: Due to the skewed nature of the distribution the x-axis has been capped at 180 in order to better illustrate most patients in the graph.

Diagnosis year 2011-2016

A.11 | In-hospital mortality | What percentage of patients die in hospital following surgery?

		2011	2012	2013	2014	2015	2016	Qld
		Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)
Principal referral hospitals	Hospital 18	- (0/51)	1.7% (1/59)	- (0/76)	1.2% (1/85)	0.9% (1/111)	- (0/88)	**0.6% (3/470)**
	Hospital 92	- (0/33)	- (0/44)	- (0/45)	- (0/37)	2.4% (1/41)	- (0/39)	**0.4% (1/239)**
	Hospital 12	- (0/27)	- (0/20)	- (0/27)	- (0/31)	- (0/30)	- (0/52)	**- (0/187)**
	Hospital 4	2.8% (1/36)	- (0/24)	- (0/34)	- (0/24)	- (0/22)	- (0/28)	**0.6% (1/168)**
	Hospital 281	- (0/17)	- (0/14)	- (0/19)	- (0/25)	- (0/31)	- (0/29)	**- (0/135)**
Group A & B hospitals	Hospital 143	- (0/38)	- (0/47)	- (0/47)	- (0/30)	2.5% (1/40)	- (0/39)	**0.4% (1/241)**
	Hospital 51	- (0/31)	3.2% (1/31)	- (0/39)	- (0/40)	- (0/43)	3% (1/33)	**0.9% (2/217)**
	Hospital 96	- (0/17)	- (0/25)	- (0/27)	- (0/33)	- (0/36)	- (0/30)	**- (0/168)**
	Hospital 125	5.9% (1/17)	- (0/16)	- (0/26)	3.4% (1/29)	- (0/19)	- (0/18)	**1.6% (2/125)**
	Hospital 149	5.3% (1/19)	5.6% (1/18)	- (0/15)	- (0/10)	- (0/9)	- (0/7)	**2.6% (2/78)**
	Hospital 57	- (0/3)	- (0/4)	- (0/7)	- (0/7)	- (0/11)	- (0/24)	**- (0/56)**
	Hospital 2904	- (0/1)	- (0/6)	- (0/10)	- (0/8)	- (0/13)	- (0/14)	**- (0/52)**
	Hospital 111	-	-	-	- (0/7)	7.1% (1/14)	- (0/15)	**2.8% (1/36)**
	Hospital 85	- (0/1)	-	- (0/6)	- (0/4)	- (0/16)	- (0/6)	**- (0/33)**
	Hospital 90	-	-	- (0/1)	-	-	-	**- (0/1)**
Queensland		**1% (3/291)**	**1% (3/308)**	**0% (0/379)**	**0.5% (2/370)**	**0.9% (4/436)**	**0.2% (1/422)**	**0.6% (13/2206)**

Diagnosis year 2011-2016

A.12 | 30-day mortality | What percentage of patients die within 30 days following surgery?

		2011	2012	2013	2014	2015	2016	Qld
		Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)
Principal referral hospitals	Hospital 18	- (0/51)	- (0/59)	- (0/76)	- (0/85)	1.8% (2/111)	- (0/88)	**0.4% (2/470)**
	Hospital 92	- (0/33)	2.3% (1/44)	- (0/45)	- (0/37)	2.4% (1/41)	- (0/39)	**0.8% (2/239)**
	Hospital 12	- (0/27)	- (0/20)	3.7% (1/27)	- (0/31)	- (0/30)	- (0/52)	**0.5% (1/187)**
	Hospital 4	2.8% (1/36)	- (0/24)	- (0/34)	- (0/24)	- (0/22)	- (0/28)	**0.6% (1/168)**
	Hospital 281	- (0/17)	- (0/14)	- (0/19)	- (0/25)	- (0/31)	- (0/29)	**- (0/135)**
Group A & B hospitals	Hospital 143	- (0/38)	- (0/47)	- (0/47)	- (0/30)	2.5% (1/40)	- (0/39)	**0.4% (1/241)**
	Hospital 51	- (0/31)	3.2% (1/31)	- (0/39)	- (0/40)	- (0/43)	3% (1/33)	**0.9% (2/217)**
	Hospital 96	- (0/17)	- (0/25)	- (0/27)	- (0/33)	- (0/36)	- (0/30)	**- (0/168)**
	Hospital 125	5.9% (1/17)	- (0/16)	- (0/26)	3.4% (1/29)	- (0/19)	- (0/18)	**1.6% (2/125)**
	Hospital 149	5.3% (1/19)	5.6% (1/18)	6.7% (1/15)	10% (1/10)	- (0/9)	- (0/7)	**5.1% (4/78)**
	Hospital 57	- (0/3)	- (0/4)	- (0/7)	- (0/7)	- (0/11)	- (0/24)	**- (0/56)**
	Hospital 2904	- (0/1)	- (0/6)	- (0/10)	- (0/8)	- (0/13)	- (0/14)	**- (0/52)**
	Hospital 111	-	-	-	- (0/7)	7.1% (1/14)	- (0/15)	**2.8% (1/36)**
	Hospital 85	- (0/1)	-	- (0/6)	- (0/4)	- (0/16)	- (0/6)	**- (0/33)**
	Hospital 90	-	-	- (0/1)	-	-	-	**- (0/1)**
Queensland		**1% (3/291)**	**1% (3/308)**	**0.5% (2/379)**	**0.5% (2/370)**	**1.1% (5/436)**	**0.2% (1/422)**	**0.7% (16/2206)**

Diagnosis year 2011-2016

A.13 | 90-day morality | What percentage of patients die within 90 days following surgery?

		2011	2012	2013	2014	2015	2016	Qld
		Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)	Crude rate (n/N)
Principal referral hospitals	Hospital 18	- (0/51)	1.7% (1/59)	- (0/76)	2.4% (2/85)	1.8% (2/111)	- (0/88)	**1.1% (5/470)**
	Hospital 92	- (0/33)	4.5% (2/44)	4.4% (2/45)	- (0/37)	7.3% (3/41)	- (0/39)	**2.9% (7/239)**
	Hospital 12	3.7% (1/27)	5% (1/20)	3.7% (1/27)	3.2% (1/31)	3.3% (1/30)	- (0/52)	**2.7% (5/187)**
	Hospital 4	5.6% (2/36)	- (0/24)	- (0/34)	- (0/24)	- (0/22)	- (0/28)	**1.2% (2/168)**
	Hospital 281	- (0/17)	- (0/14)	- (0/19)	- (0/25)	- (0/31)	- (0/29)	**- (0/135)**
Group A & B hospitals	Hospital 143	- (0/38)	- (0/47)	2.1% (1/47)	3.3% (1/30)	2.5% (1/40)	- (0/39)	**1.2% (3/241)**
	Hospital 51	- (0/31)	13% (4/31)	- (0/39)	- (0/40)	4.7% (2/43)	3% (1/33)	**3.2% (7/217)**
	Hospital 96	- (0/17)	4% (1/25)	- (0/27)	3% (1/33)	- (0/36)	- (0/30)	**1.2% (2/168)**
	Hospital 125	5.9% (1/17)	- (0/16)	3.8% (1/26)	3.4% (1/29)	5.3% (1/19)	- (0/18)	**3.2% (4/125)**
	Hospital 149	5.3% (1/19)	5.6% (1/18)	6.7% (1/15)	10% (1/10)	11% (1/9)	- (0/7)	**6.4% (5/78)**
	Hospital 57	- (0/3)	- (0/4)	- (0/7)	- (0/7)	- (0/11)	- (0/24)	**- (0/56)**
	Hospital 2904	- (0/1)	- (0/6)	- (0/10)	- (0/8)	- (0/13)	- (0/14)	**- (0/52)**
	Hospital 111	-	-	-	- (0/7)	14% (2/14)	- (0/15)	**5.6% (2/36)**
	Hospital 85	- (0/1)	-	- (0/6)	- (0/4)	- (0/16)	- (0/6)	**- (0/33)**
	Hospital 90	-	-	- (0/1)	-	-	-	**- (0/1)**
Queensland		**1.7% (5/291)**	**3.2% (10/308)**	**1.6% (6/379)**	**1.9% (7/370)**	**3% (13/436)**	**0.2% (1/422)**	**1.9% (42/2206)**

Appendix B | National and international comparisons of key indicators

Table B1: National and international comparisons of key indicators

			s.1.2.2	s.1.2.2	s.1.2.2	s.1.2.2	s.1.2.2	s.1.3.1	s.1.4.1	s.1.6.1	S.1.2.2	s.3.2.1	s.3.3.1	s.6.1.1	s.6.2.1
Country/Region	Diagnosis year	Total patients	Stage IV IVST	Had RT	Stage I Had RT	Had chemotherapy	Surgery rate	Stage I-II surgery rate	Stage II post-op IVST	Inoperable Stage III CRT	1-year survival from Dx	30-day surgical mortality	90-day surgical mortality	1-year surgical survival	2-year surgical survival
Belgium[13]	2010-2011	7,586	70%					60%	66%+		44%	2%	4.8%		
Belgium [14]	2010-2011	9817					21%							88%	
Chile[15]	2004	1,867							49%						
England[16]	2013	20,409*	57%	29%		68%		51%							
England[17]	2014	17,641*	57%				15%								
England[18]	2016	6,276									32%				
England[19]	2009-2013	144,357					14%	52%							
France[20]	2006	840							24%						
Scotland[16]	2013	20,409*		36%		70%		46%							
Scotland[17]	2014	17,641*	58%				22%	63%							
USA[21]	1998-2010	129,893										2.8%	3.3%	95%	92%
California, USA[22]	2003-2014	14,545			13%			73%							
Connecticut, USA[23]	2004-2009	119146										3.4%			
Netherlands[24]	2001-2006	43,544					23%			60%					
Netherlands[25]	2013-2016	5449					23%					1.9%			
Victoria, Australia[26]	2011-2017	6,029						68%							
Ontario, Canada[27]	2012-2016	8,285		38%											
Ontario, Canada[28]	2011-2014								51%+						
Ontario, Canada[29]	2014-2017	21,157						55%^				1.4%	3.2%		
Denmark[30]	2003-2012	34,373		16%		26%	20%					3%		82%	71%
Denmark[25]	2013-2016	2,489					23%					1.5%			
Queensland	**2011-2016**	**10,959**	**42%**	**45%**	**27%**	**39%***	**20%**	**68%**	**50%**	**48%**	**48%**	**0.7%**	**1.9%**	**92%**	**84%**

Notes:

This table is presented as a summary and caution should be exercised when interpreting the data as methodological differences may lead to differences in the data reported, for instance Queensland systemic therapy includes intra-venous systemic therapy and not oral chemotherapy and treatments are selected where they occurred within 365 days of diagnosis.

IVST refers to IV systemic therapy.

^Stage I who had surgery within 180 days.

+Reports on stage II and stage IIIA.

*Cohorts from the same report.

Appendix C | Data sources

Queensland Cancer Register

The Queensland Cancer Register (QCR) operates under the Public Health Act 2005 to receive information on cancer in Queensland. The QCR is population-based and maintains a register of all cases of cancer diagnosed in Queensland since 1982 (excluding basal and squamous cell carcinomas of the skin). The site and the histology of registered cancers recorded are coded to International Classification of Diseases for Oncology, 3rd edition (ICD-O-3) – Australasian Association of Cancer Registries modification 1.2.1. Prior to July 2004, the primary site of cancer was coded to the International Classification of Diseases for Oncology, 2nd edition (ICD-O-2).

Notification of cancer is a statutory requirement for all public and private hospitals, nursing homes, and pathology services. Notifications are received for all persons with cancer separated from public and private hospitals and nursing homes. Cancer-related pathology reports are received from Queensland pathology laboratories. Mortality data with cancer identified as the underlying cause of death, as well as cancer-related deaths are abstracted from the mortality files of the Registry of Births, Deaths and Marriages.

Queensland Hospital Admitted Patient Data Collection

Queensland Health Admitted Patient Data Collection (QHAPDC) contains data on all patient separations (discharged, died, transferred, or statistically separated) from any hospital permitted to admit patients, including public psychiatric hospitals.

QHAPDC provides population-wide surgical data for Queensland and includes: surgical procedures performed during the patient admission for both public and private facilities, admission-type data such as elective/emergency status, public/private status and length of stay data about where patients receive their surgery.

Queensland Oncology Repository

The Queensland Oncology Repository (QOR) is a cancer patient database developed and maintained by the Queensland Cancer Control Analysis Team (QCCAT; Queensland Health) to support Queensland's cancer control, safety, and quality assurance initiatives. QOR consolidates cancer patient information for the state and contains data on cancer diagnoses and deaths, surgery, chemotherapy, and radiotherapy. QOR also includes data collected by clinicians at multidisciplinary team (MDT) meetings across the state. For more information, visit https://qccat.health.qld.gov.au/QOR.

Appendix D | AIHW Peer Group Definitions

The following definitions are sourced directly from Australian Institute of Health and Welfare (2015)[5].

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.

The selection of Principal referral hospitals was guided by evidence of the following service units:
- 24-hour emergency department
- ICU
- all or most of the following specialised units: cardiac surgery, neurosurgery, infectious diseases, bone marrow transplant, organ (kidney, liver, heart, lung or pancreas) transplant and burns units.

Public acute 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.*

Public acute group A hospitals include those public acute hospitals that do not qualify as Principal referral hospitals, and possess all or most of the following characteristics:
- 24-hour emergency department
- ICU
- coronary care unit
- oncology unit
- more than 10% of acute weighted separations having a DRG with a cost weight greater than 4
- more than 200 DRGs with at least 5 separations.

Private acute 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.

The selection of Private acute group A hospitals was guided by the presence of both of the following characteristics:
- 24-hour emergency department
- ICU.

Selection was also guided by the presence of all or most of the following facilities:
- special care nursery unit
- coronary care unit
- cardiac surgery unit
- neurosurgery unit.

Public acute 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.

Public acute group B hospitals do not have the high-end specialised service units that are in the Principal referral hospitals and the Public acute group A hospitals but have a 24-hour emergency department.

Private acute 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.

The selection of private acute hospitals for Group B hospitals was guided by the presence of an ICU and all or most of the following characteristics:

- special care nursery unit
- coronary care unit
- cardiac surgery unit
- neurosurgery unit.

The selection process was essentially the same as for the Private acute group A hospitals except without the 24-hour emergency department component.

Public acute group C 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).

Public acute group C hospitals consist of public acute hospitals that do not meet the service characteristics of the Principal referral hospitals, Public acute group A hospitals and Public acute group B hospitals, but possess all or most of the following characteristics:

- proportion of separations with surgery greater than 4%
- obstetric unit
- emergency department, or accident and emergency service.

Hospitals with a high proportion of surgical separations with low cost weights are excluded from this group.

Private acute group C 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.

The selection of Private acute group C hospitals was based on those private acute hospitals that:

- do not meet the service characteristics of Private acute group A and Private acute group B hospitals
- had at least 200 separations in 7 or more of the following 19 selected SRGs: Acute psychiatry; Breast surgery; Cardiology; Cardiothoracic surgery; Chemotherapy; Colorectal surgery; Ear, nose, throat, head and neck; Gastroenterology; Gynaecology; Neurology; Neurosurgery; Obstetrics; Oncology; Ophthalmology; Orthopaedics; Plastic and reconstructive surgery; Qualified neonate; Rehabilitation and Respiratory medicine.

Public acute group D 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.

Public acute group D hospitals consist of public acute hospitals that do not meet the service characteristics of the other public acute hospital groups but have 200 or more separations per year. Hospitals with fewer than 200 separations were allocated to the Very small hospitals group.

Private acute group D 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.

Methods

Method for assigning a surgery record to a patient

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 NSCLC in 2010 and 2015, the surgery record linked to the NSCLC cancer diagnosed in 2010 will be counted, where the surgery occurred 30 days prior to the diagnosis date and up to 365 days after the diagnosis date.

Where patients have had more than one surgery at the same or similar times, the following ranking has been adopted, pneumonectomy, lobectomy, and partial resection:

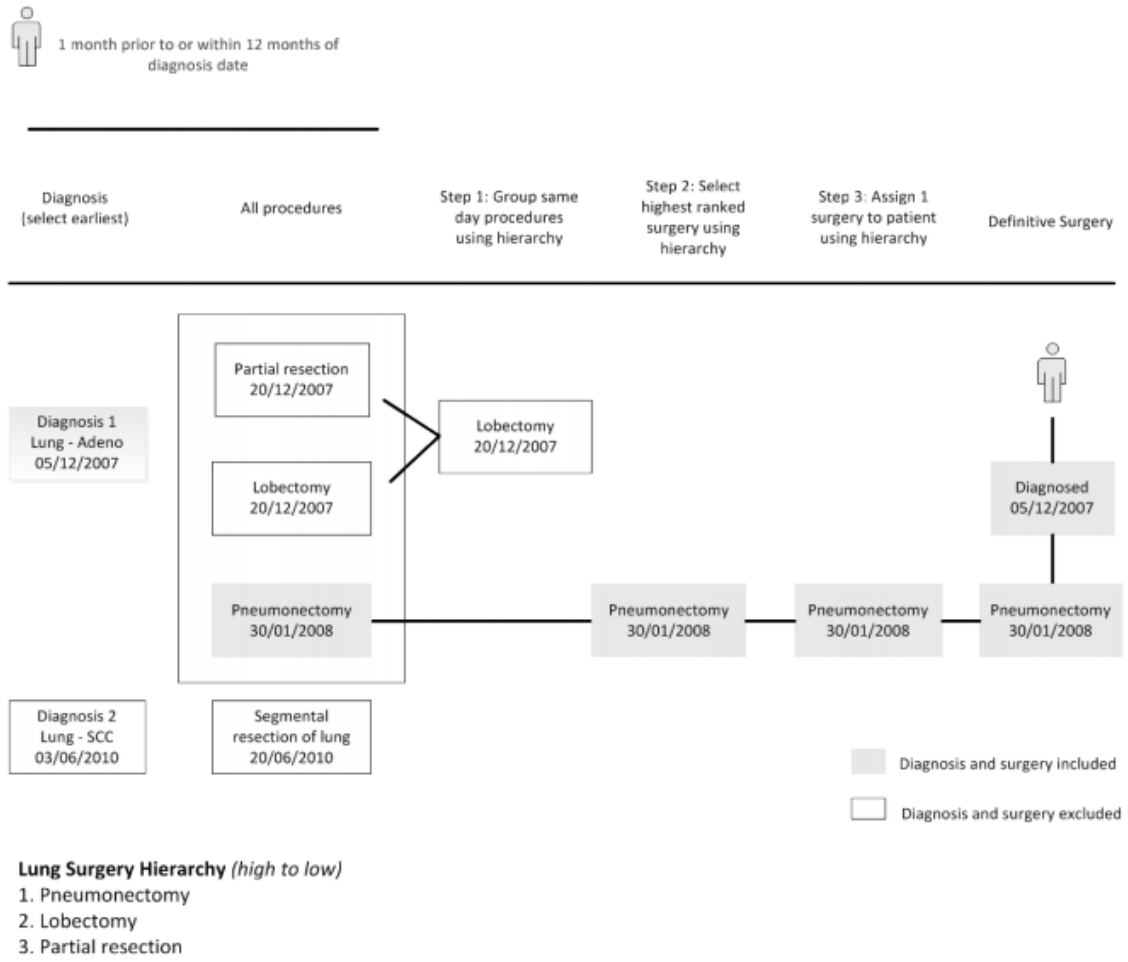
- If the patient has a pneumonectomy and one other procedure then the pneumonectomy is the procedure considered
- If the patient has a lobectomy and partial resection then the lobectomy is the procedure considered
- If the patient only has a partial resection then this is the procedure considered
- If 2 partial resections then the most recent is the procedure considered
- If 2 lobectomies then the most recent is the procedure considered.

The table below lists lung cancer surgery procedures and associated ICD-10-AM codes as well as the ranking that is recommended when assigning a surgery to a patient who has had more than one procedure; the figure below provides a worked example.

Table M1: Lung surgery procedures and ranking where a person has had more than one procedure

ICD-10-AM	Procedure/Grouping	Ranking
	Pneumonectomy	
38438-02	Pneumonectomy	1
38441-01	Radical pneumonectomy	1
	Lobectomy of lung	
38438-01	Lobectomy of lung	2
38441-00	Radical lobectomy	2
	Partial Resection	
90169-00	Endoscopic wedge resection of lung	3
38440-01	Radical wedge resection of lung	3
38438-00	Segmental wedge resection of lung	3
38440-00	Wedge resection of lung	3

Figure M1: Example of lung cancer surgery ranking where a patient has had more than one procedure



Lung Surgery Hierarchy *(high to low)*
1. Pneumonectomy
2. Lobectomy
3. Partial resection

Chemotherapy and radiation therapy data in this report

This report contains data on intravenous systemic therapy treatments for lung cancer. Oral systemic therapy data was not available for inclusion; therefore, caution should be exercised when interpreting the data as the number of patients in the no anti-cancer or no therapy treatment cohorts may be an over-representation of the true number.

A patient is counted as having concurrent chemoradiotherapy where they receive radiation therapy while receiving IV systemic therapy or vice versa. A patient is counted as having sequential chemoradiotherapy where they receive IV systemic therapy within 45 days of completing radiation therapy, or vice versa.

A patient is counted as having non-concurrent RT IVST where they receive both radiation therapy and IV systemic therapy but not concurrently or sequentially as defined in this report.

Method for deriving stage at diagnosis from multiple population-based data sources

Introduction

Cancer Alliance Queensland (CAQ) received stage notifications from MDT and oncology treatment data collection systems in the standard tumour-node-metastasis form (TNM; according to the 7th edition UICC[31] and AJCC coding manuals[32]) or in a condensed stage I-IV form. These notifications were incorporated into the Queensland Oncology Repository (QOR). Multiple stage notifications were received for many patients in the NSCLC 2011-2016 cohort. We derived a single overall stage category per tumour using a hierarchical approach that prioritised information deemed as best quality. Highest quality staging data is where stage is determined at MDT prior to treatment commencement.

We also used other strategies to enable complete staging. Cancer Alliance Queensland (CAQ)-derived staging rules were developed to impute M0 from missing M data. Further, where admitted patient data or the Queensland Cancer Register (QCR) recorded distant metastasis 30 days prior or 90 days post diagnosis, this was used to assign a tumour to stage IV, minimising missing information[1].

Steps to calculate stage at diagnosis

To describe lung cancer treatments and survival in the context of stage, stage at diagnosis – when the initial course of treatment was planned – was used. Where not captured at MDT, treatment, pathology, and admitted patient data was used.

We commenced the project with a review of the literature to research what stage spread and survival rates had been reported elsewhere. Domestic and international comparisons of lung cancer stage at diagnosis are presented at Table M2.

Table M2: Domestic and international comparison of lung cancer stage at diagnosis

Location/source	Year	N	Stage I	Stage II	Stage III	Stage IV	Stage unknown
Belgium[13]	2010-2011	9,817	14.4%	8.1%	21.1%	40.6%	15.4%
England[33]	2012	34,997	13.2%	7.5%	20.0%	49.0%	10.2%
Ontario[29]	2016	8,285	26.4%	8.2%	19.2%	45.9%	1.2%
Canada (not incl. Ontario) [34]	2013	7,732	22.3%	8.8%	18.4%	47.3%	0.3%
Victorian Lung Cancer Registry[26]	2011-2017	6,029	8.8%	6.4%	21.7%	38%	25%
Cancer Australia[35]	2011	10,639	11.7%	6.5%	11.2%	42.2%	28.5%
Denmark[30]	2003-2012	34,373	19%	6%	27%	46%	1%
Cancer Alliance Queensland	**2011-2016**	**10,958**	**16.7%**	**7.7%**	**13.6%**	**45.6%**	**16.4%**

Queensland lung cancer survival compares favourably to other jurisdictions, particularly for early stage disease (Table M3).

[1] For more information on the data sources used in this report see Appendix C.

Table M3: Domestic and international comparisons of lung cancer survival by stage at diagnosis

	Belgium[13] 2010-2011	Netherlands[24] 2011-2006	England[16] 2013	Denmark[8] 2010-2012	Scotland[36] 2013-2015	Victoria[26] 2011-2017	Queensland 2011-2016
Stage I							
1-yr	88%	85%	80%	88%	83%	85%	**91%**
2-yr		70%				75%	**82%**
3-yr		60%			56%	70%	**72%**
Stage II							
1-yr	74%	60%	75%	70%	66%	75%	**82%**
2-yr		40%				60%	**64%**
3-yr		25%			34%	45%	**49%**
Stage III							
1-yr	53%		50%	51%	44%	60%	**61%**
2-yr						40%	**38%**
3-yr					14%	30%	**27%**
Stage IV							
1-yr	28%		20%	22%	24%	30%	**24%**
2-yr						20%	**11%**
3-yr					3%	15%	**6%**
All							
1-yr	45%		46%	43%	38%	54%	**48%**
2-yr						39%	**34%**
3-yr					18%		**26%**

The process to assign stage at diagnosis to a tumour is summarised at Table M4. Employing an iterative approach, a patient-level chart review of pathology, radiology, and hospital discharge data and engagement with lung cancer experts was undertaken to ensure the staging dataset was valid. This information was used to continuously refine the rules at steps 1 to 5.

Table M4: Steps to calculate stage at diagnosis, NSCLC, 2011-2016, Queensland

Steps
1. Assign a stage for each tumour using available MDT and oncology data collection systems Locate stage notifications for NSCLC patients in QOR diagnosed between 2011 and 2016. Assign a single overall stage category per tumour using a hierarchical approach prioritising data deemed as best quality. Exclude Tis, or tumours discovered at autopsy, or known only from the death certificate (DCO/autopsy only). Observe TNM staging manual rules prioritising TN pathological over clinical stage, and where disagreement exists, selecting the lower stage category[31] [32]. **2. Impute missing stage using rules in the 7th edn TNM staging manuals** Where a tumour stage remains unknown, and TNM are incomplete, assign overall stage in the following circumstances: • TX and/or NX M1 – assign stage IV • T4NXM0 – assign stage III • TXN3M0 – assign stage IIIB. **3. Use CAQ-derived staging rules to augment staging data** Where a tumour stage remains unknown, use CAQ-derived staging rules to assign M0: • For surgical patients with known TN stage and unknown M stage, assign M0 and stage the tumour according to the 7th edition staging manual. • For patients with an inpatient admission 90+ days from diagnosis and lung cancer with distant metastasis absent from the conditions coded at discharge and known TN stage and unknown M stage, assign M0 and stage the tumour according to the 7th edition staging manual. **4. Use inpatient and QCR data to augment staging data** Where a tumour stage remains unknown, use inpatient and QCR data to augment QOR staging data: • Assign stage IV to patients with an inpatient admission and with distant metastasis coded at discharge (using ICD-10 AM diagnosis codes C781-C79X) 30 days prior or 90 days post-diagnosis. Exclude ICD-10 AM C780 metastasis to the lung. • Assign stage IV to patients who had distant metastasis (stage IV) notified to the QCR 30 days prior or 90 days post diagnosis. *Note where admitted patient data indicated metastasis and QOR indicated stage I-III, QOR staging I-III was retained unless the patient died within 180 days of diagnosis. This rule was determined through patient-level review and expert advice.*

Steps	
5.	**Define the unknown stage cohort** Where a tumour remains unknown, record as such.
6.	**Continuously undertake chart review to validate the above steps** QCCAT undertook patient-level reviews of histology, radiology, and hospital discharge data to quality check all the above rules and methodology, and continuously refined the methodology.
7.	**Continuously gain expert review and advice** QCCAT liaised with cancer clinicians, domestic and international lung cancer registries, and the Lung cancer sub-committee to review the staging rules and data, and continuously refined the methodology.

It is important to note that stage IV surgical patients include patients upstaged at the time of curative intent surgery with unexpected pleural involvement.

For validity purposes, a "restrictive" stage was developed which required that QOR received the necessary information to assign a valid overall stage. The non-restrictive stage included all other records where the overall stage was I-IV through CAQ-derived staging rules, the use of admitted patient data or QCR data, or QCCAT review of histology, radiology, and hospital discharge data.

Kaplan Meier survival curves and patient characteristics were inspected for restrictive and non-restrictive stage, as well as for each CAQ-derived staging rule and the results considered by the Lung Cancer Sub-committee. After discussion, the Sub-committee agreed the stage at diagnosis data were sensible and valid.

Patients with unknown stage

Tumours assigned to the "unknown stage" cohort were included in this report to enable meaningful inferences about this cohort and to demonstrate an effort to stage all cases. Often partial TNM staging data are available but this is insufficient to assign an overall stage. Cases with unknown stage arise for a multitude of reasons:

- Patients seen at private MDTs who do not report their data to CAQ
- Patients where the basis of diagnosis was clinical only with some missing/unknown TNM information
- Patients with radiology results that were not provided to CAQ
- Patients who die before staging was completed.

The unknown stage cohort was older, had higher co-morbidities, and were less likely to receive anti-cancer treatment compared to patients with a known stage. Our findings are in line with those published elsewhere[37]. At their 2020 meeting, the Lung Cancer Sub-committee agreed that the unknown cohort likely included bulky stage III and stage IV patients. Tables exploring socio-clinical factors of patients with unknown compared to known stage are available at 1.2.1 and 1.2.2.

Moving forward

Where a patient received neoadjuvant therapy before surgery, the size and extent of the tumour may have changed[38]. The coverage of post-therapy stage (yT, yN) was not sufficient for use in this report and pTN or cTN was used. In the future, the reporting of both pre- and post- therapy TN would be useful to enable varied analyses of these cohorts.

The 7th edition TNM eliminated MX instead recommending assuming these cases to be M0[39]. We adjusted this rule to suit the Queensland context as PET scan data, a typical investigation used to determine the presence of distant metastasis, is a known gap in the QOR. We developed CAQ-derived staging rules to impute M0 from missing or MX staging information (as outlined in Table M4). As the stage at diagnosis information flowing to QOR expands, assuming MX to be M0 may be possible.

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Quality Indicator definitions

Quality index indicator definition

Indicator definitions		
Section 1		
1.3 | Surgery rate in patients with stage I or stage II disease		
Stage I	n: N:	Patients who were stage I and had surgery Patients who were stage I
Stage II	n: N:	Patients who were stage II and had surgery Patients who were stage II
1.4 | Adjuvant IV systemic therapy rate in patients with stage II disease		
Stage II	n: N:	Patients who were stage II and had post-surgery IV systemic therapy (within 90 days) Patients who were stage II and had surgery
1.5 | Radiation therapy treatment rate in patients with inoperable stage I or II disease		
Stage I	n: N:	Patients who were inoperable stage I and had radiation therapy Patients who were inoperable stage I
Stage II	n: N:	Patients who were inoperable stage II and had radiation therapy Patients who were inoperable stage II
1.6 | Chemoradiotherapy rate in patients with stage III inoperable disease		
Concurrent-CRT	n: n:	Patients who were stage III and did not receive surgery but had concurrent-CRT Patients who were stage III and did not receive surgery
Sequential-CRT	n: n:	Patients who were stage III and did not receive surgery but had sequential-CRT Patients who were stage III and did not receive surgery
Section 3 | Safe		
3.1 | In-hospital surgical mortality	n: N:	Patients who died in-hospital during their admission Patients who had surgery
3.2 | 30-day surgical mortality	n: N:	Patients who died within 30-days of their surgery Patients who had surgery
3.3 | 90-day surgical mortality	n: N:	Patients who died within 90-days of their surgery Patients who had surgery
3.4 | Prolonged length of stay (≥12 days)	n: N:	Patients who had a length of stay of 12 days or more Patients who had surgery
Section 4 | Accessible		
4.2 | Time to first treatment within 30 days	n: N:	Patients who had any treatment as their first treatment within 30 days of diagnosis Patients who received treatment
4.3 | Time to first surgery within 30 days	n: N:	Patients who had surgery as their first treatment within 30 days of diagnosis Patients who had surgery as their first treatment after diagnosis
4.4 | Time to first radiation therapy within 30 days	n: N:	Patients who had radiation therapy as their first treatment within 30 days of diagnosis Patients who had radiation therapy as their first treatment after diagnosis
4.5 | Time to first IV systemic therapy within 30 days	n: N:	Patients who had IV systemic therapy as their first treatment within 30 days of diagnosis Patients who had IV systemic therapy as their first treatment after diagnosis
Section 5 | Equitable		

Indicator definitions		
5.1 | Received surgery within 30 days for those aged ≥75 years	n:	Patients aged ≥75 years who had surgery as their first treatment within 30 days
	N:	Patients aged ≥75 years who had surgery as their first treatment
5.1 | Received radiation therapy within 30 days for those aged ≥75	n:	Patients aged ≥75 years who had radiation therapy as their first treatment within 30 days
	N:	Patients aged ≥75 years who had radiation therapy as their first treatment
5.1 | Received IV systemic therapy within 30 days for those aged ≥75	n:	Patients aged ≥75 years who had IV systemic therapy as their first treatment within 30 days
	N:	Patients aged ≥75 years who had IV systemic therapy as their first treatment
5.2 | Received surgery within 30 days by disadvantaged status	n:	Patients with disadvantaged status who had surgery as their first treatment within 30 days
	N:	Patients with disadvantaged status who had surgery as their first treatment
5.2 | Received radiation therapy within 30 days by disadvantaged status	n:	Patients with disadvantaged status who had radiation therapy as their first treatment within 30 days
	N:	Patients with disadvantaged status who had radiation therapy as their first treatment
5.2 | Received IV systemic therapy within 30 days by disadvantaged status	n:	Patients with disadvantaged status who had IV systemic therapy as their first treatment within 30 days
	N:	Patients with disadvantaged status who had IV systemic therapy as their first treatment
5.3 | Received surgery within 30 days by rural status	n:	Patients with rural status who had surgery as their first treatment within 30 days
	N:	Patients with rural status who received surgery as their first treatment
5.3 | Received radiation therapy within 30 days by rural status	n:	Patients with rural status who received radiation therapy as their first treatment within 30 days
	N:	Patients with rural status who had radiation therapy as their first treatment
5.3 | Received IV systemic therapy within 30 days by rural status	n:	Patients with rural status who had IV systemic therapy as their first treatment within 30 days
	N:	Patients with rural status who had IV systemic therapy as their first treatment
Section 6 | Surgical survival		
6.1 | 1-year surgical survival	n:	Patients alive 1 year after surgery
	N:	Patients who had surgery
6.2 | 2-year surgical survival	n:	Patients alive 2 years after surgery
	N:	Patients who had surgery

Note:
This report contains data on intravenous systemic therapy treatments for lung cancer. Oral systemic therapy data was not available for inclusion; therefore, caution should be exercised when interpreting these results as they may be an under representation of the true number of patients treated.

Glossary

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.

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 algorithm 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 rectum 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		

Concurrent chemoradiotherapy (Concurrent-CRT)
A patient is counted as having concurrent chemoradiotherapy where they receive radiation therapy while receiving IV systemic therapy or vice versa, where the second treatment starts before the end of the first.

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 definite can be said about the parameter.

Diagnosis year
This report is structured around diagnosis years as recorded in the Queensland Cancer Register, the latest incident year being 2016. Only patients diagnosed between 2011 and 2016 will be included in this report. Patients who had surgery in 2011 but were diagnosed in an earlier year are excluded.

Flows
In-flows

In-flows show the distribution of residence for the total group of patients who receive treatment at an HHS.

Out-flows

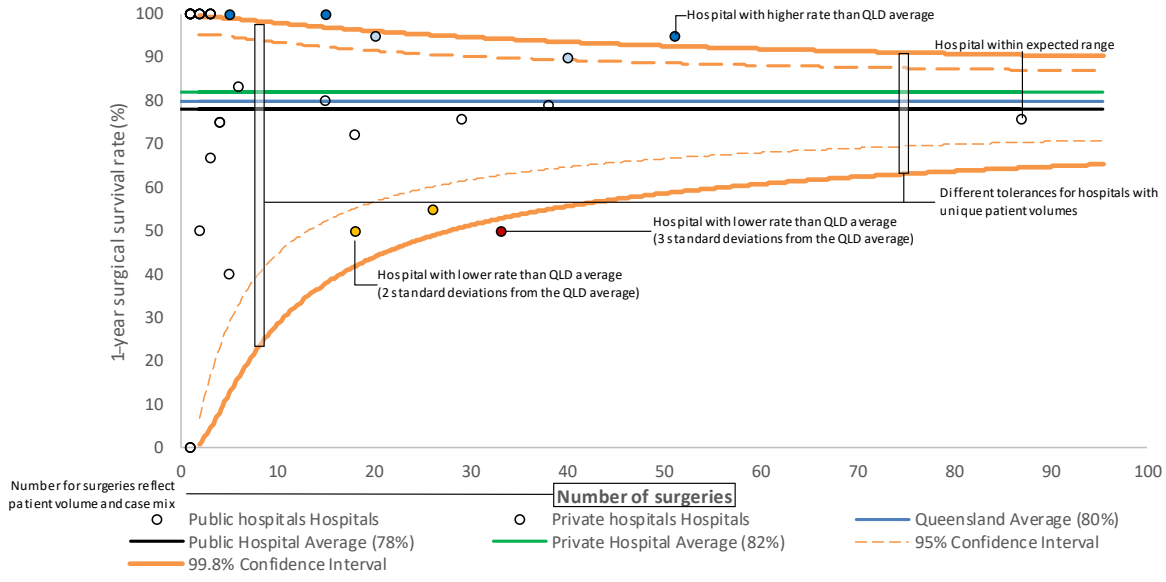
Out-flows shows the proportion of patients residing in a given HHS who receive treatment in a different HHS.

Forest plots
The forest plot is a graphical display of the results from a regression model, illustrating the hazard ratios for each covariate included in the regression model. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. A central vertical line representing no effect is also plotted, and if the confidence intervals for an estimate cross this line then the effect is considered not to be statistically significant.

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% (~3 standard deviations) have been superimposed around the overall Queensland result.

The funnel plot provides a graphical representation of individual hospital rates and where they sit in relation to the Queensland average. A hospital rate outside either of the "funnel" curves of the confidence interval lines is deemed to be statistically significant from the Queensland average.

Example funnel plot:



Hospital peer groups
The Australian Institute of Health and Welfare (AIHW) have published *The Australian hospital peer groups* report that groups public and private hospitals that share similar characteristics, providing a basis for meaningful comparisons. There are thirty peer groups, nine of which are relevant to this report.

Intravenous systemic therapy (IVST)
Systemic therapy is the use of anti-cancer drugs to destroy cancer cells. A patient is counted as having IVST as treatment if they receive intravenous systemic therapy within 365 days of lung cancer diagnosis. Note this report does not include oral chemotherapy.

Lung cancer
Lung cancer in this report refers only to patients diagnosed with non-small lung cancer (NSCLC).

Non-concurrent RT IVST
Patients that receive both radiation therapy (RT) and intravenous systemic therapy (IVST) but not concurrently or sequentially as defined in this report.

MDT Review
Cancer patients are discussed by a Multidisciplinary Team (MDT) to ensure all available treatment options are considered. Note that in this report, the MDT rate includes hospitals that use QOOL to capture MDT review data or provide MDT data to The Partnership.

Number of surgeries
Includes Queensland residents of all ages diagnosed with invasive cancer in the surgical cohort time period, 2011-2016, who underwent surgery.

Private hospital
All hospitals that are not Queensland Health hospitals.

QOOL
QOOL supports cancer multidisciplinary teams by assisting meeting preparation, communication and documentation of essential clinical information such as diagnosis, cancer stage and recommended treatment plans. QOOL provides continuity of care, statewide multidisciplinary team linkage and provides access to clinical outcomes and system performance data for quality improvement. The system provides a central view of patient data for multiple users, accessible at any location.

Radiation therapy (RT)
Radiation therapy (RT) uses X-rays to destroy or injure cancer cells so they cannot multiply. RT can be used to treat the primary cancer or advanced cancer. It can also be used to reduce the size of the cancer and relieve pain, discomfort or other symptoms. A patient is counted as having radiation therapy as treatment if they receive radiation therapy within 365 days of lung cancer diagnosis.

Relative survival (5 year)
Relative survival is a net survival measure representing cancer survival in the absence of other causes of death. Relative survival is defined as the ratio of the proportion of observed survivors in a cohort of cancer patients to the proportion of expected survivors in a comparable set of cancer free individuals.

Relative survival is calculated by dividing observed survival by expected survival, where the numerator and denominator have been matched for age, sex and calendar year.

Observed survival refers to the proportion of people alive for a given amount of time after a diagnosis of cancer; it is calculated from population-based cancer data. Expected survival refers to the proportion of people in the general population alive for a given amount of time and is calculated from life tables of the entire Australian population, assumed to be cancer free.

Changes to cancer incidence rates and the underlying life tables to may lead to fluctuations in relative survival estimates. Accordingly, caution should be used when making comparisons to historically reported rates of relative survival.

Remoteness
The relative remoteness of residence at time of diagnosis, derived from the Australian Statistical Geography Standard (ASGS). In this report, remoteness is classified into three groups based on the original ASGS grouping[40].

ASGS classifications	Modified ASGS classification	Rurality classification
Major City	Metropolitan	Urban
Inner Regional	Regional	Rural
Outer Regional	Rural and Remote	
Remote		
Very Remote		

An exception to this grouping is the metropolitan area of Townsville (originally classified as Rural). Townsville has been classified as Metropolitan because of the availability of tertiary level cancer services.

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

Sequential chemoradiotherapy (Sequential-CRT)
A patient is counted as having sequential chemoradiotherapy if they receive intravenous systemic therapy within 45 days of completing radiation therapy, or vice versa.

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 use 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)
Disadvantaged	1-2	20%
Middle	3-8	60%
Affluent	9-10	20%

Stage
Cancer stage is the way to describe the extent of a cancer – the size of the cancer and how far it has spread. Cancer stage is critical in determining the patient's prognosis and helps doctors make informed

decisions about how to treat the cancer. One of the main staging systems is TNM staging which is used globally for collaborative staging:

- T stands for the size and extent of the tumour
- N stands for the lymph nodes involved
- M stands for metastasis, or the spread of the cancer to other parts of the body.

Surgery

Refer to the Methods section: *Method for assigning a surgery record to a patient*.

Surgical survival

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

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

FOR MORE INFORMATION

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