

4

Chapter

Surgery for Non-Small Cell Lung Cancer

Infocus – access and flows
2013

Queensland Health

Queensland Cancer Control
Safety and Quality Partnership

Queensland Cancer Control Analysis Team

For more information:

Queensland Cancer Control Analysis Team
Queensland Health
Radiation Oncology Mater Centre
31 Raymond Terrace
South Brisbane Queensland 4001 Australia
Tel: (61+) (07) 3840 3200
Email: gccat@health.qld.gov.au
<https://gccat.health.qld.gov.au>

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The Manager
Queensland Cancer Control Analysis Team
Queensland Health
Radiation Oncology Mater Centre
31 Raymond Terrace
South Brisbane Queensland 4001

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Lung cancer clinical leads

Kevin Matar and Morgan Windsor

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Introduction

In 2013 an estimated 1,740 new cases of invasive non-small cell lung cancer will be diagnosed among Queensland residents¹. With the ageing population, the number of new cases is expected to reach 2,310 by 2021¹.

Non-small cell lung cancer (NSCLC) is one of five chapters in the *Cancer Surgery in Queensland: Infocus - access and flows 2013* series and should be read in conjunction with the background document, available at <https://qccat.health.qld.gov.au/>

Surgery is a critical component of the curative treatment of NSCLC. This chapter is focused on two dimensions of access to cancer care services – surgery rates and patient flows. It provides population wide information on rates of surgery provision and flows based on patient Hospital and Health Service (HHS) of residence. The chapter contains information on NSCLC surgery in Queensland from 2001 - 2010 and reflections on the trends in the data observed over the most recent three year time period 2008 - 2010.

For the first time, a population profile for NSCLC surgery in Queensland and the HHSs is described including the characteristics of NSCLC patients who receive surgery. Importantly, it provides information on the number and demographic characteristics of NSCLC patients who do not receive surgery and where they live according to HHS of residence.

The baseline information provided in this chapter will inform the planning and funding of cancer services, provide HHSs with locally meaningful information and contribute to our understanding of variation in NSCLC surgery across Queensland. This information enables Queensland to compare themselves with other Australian states and territories, internationally and published literature.

This chapter is framed around five important questions relevant to cancer surgery in Queensland.

1. How many Queenslanders who are newly diagnosed with NSCLC cancer have a surgical procedure as a result of their diagnosis?
2. What are the characteristics of Queenslanders who have a surgical procedure as a result of their NSCLC cancer diagnosis and those that do not have a surgical procedure?
3. What types of surgery are performed for patients who are diagnosed with NSCLC cancer?
4. What number of surgeries is performed by HHSs for Queenslanders newly diagnosed with NSCLC cancer?
5. Where do patients receive their surgery?

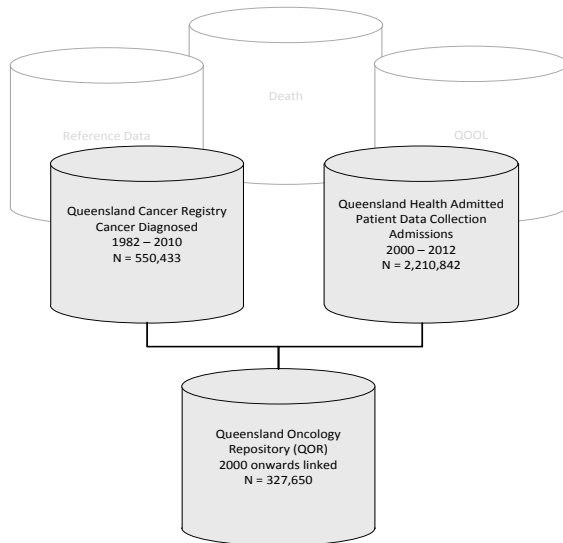
Data sources and methods

Key to QCCAT's program of work is our ability to link population based cancer information on an individual patient basis, using a master linkage key specifically developed by our team. This matched and linked data is housed in the Queensland Oncology Repository (QOR), a resource managed by QCCAT. This centralised repository, QOR, compiles and collates data from a range of source systems including Queensland Cancer Registry, hospital admissions data, death data, treatment systems, public and private pathology, hospital clinical data systems and QOOL. QOR contains approximately 32 million records between 1982 – 2013. Our matching and linking processes provide the 327, 650 matched and linked records of cancer patients between 2000 – 2010, which are the starting point for this analysis. This chapter is structured around four cohorts of patients: **Queensland Cancer Cohort; NSCLC Cohort; NSCLC Surgery Cohort** and the **No Surgery Cohort**.

¹ Queensland Health. *Oncology Analysis System (OASys)*. Queensland Cancer Control Analysis Team: Brisbane; 2013. <https://qool.health.qld.gov.au/OASys>. Accessed 18/07/2013

How the cohorts were identified

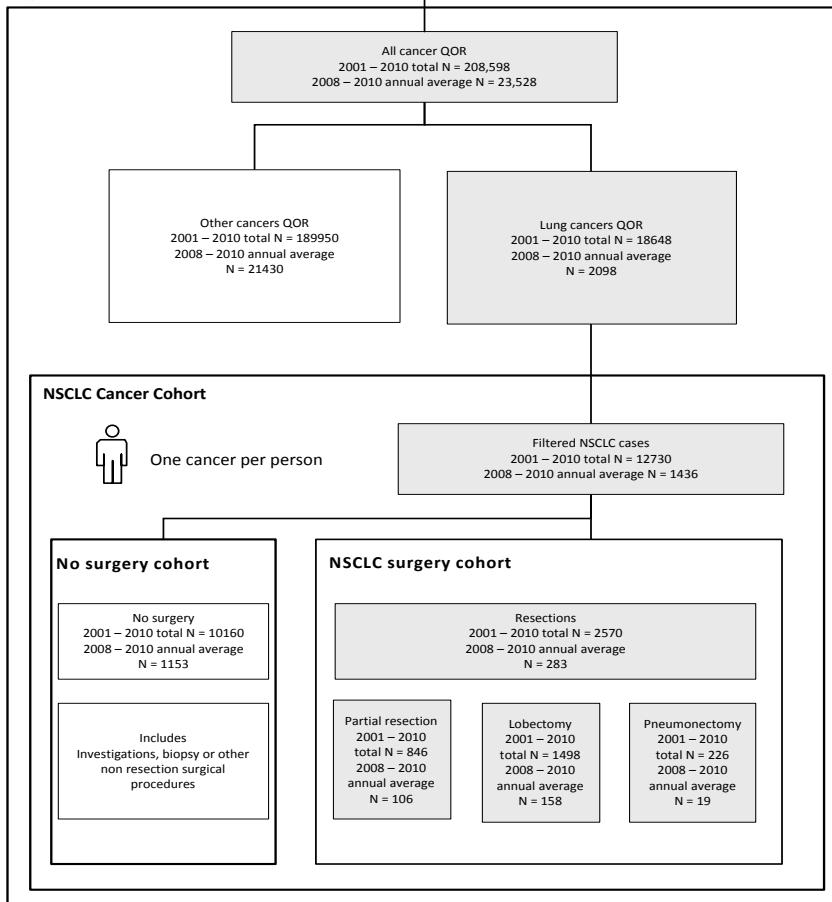
2001 – 2010 AND 2008 – 2010 ANNUAL AVERAGE



Queensland Oncology Repository
 QOR consolidates patient information for Queensland and contains data on invasive, benign and uncertain cancers, patient demographics, surgery, chemotherapy, radiotherapy and death. QOR also contains data collected by clinicians at MDT meetings

Sophisticated matching and linking is performed to identify all persons with cancer who had surgery

Queensland Cancer Cohort



Queensland Cancer Cohort
 Includes: Queensland Invasive Cancer incidence

Lung cancer
 Discharged patients from public or private hospitals
 Queensland residents
 All ages

NSCLC Cancer Cohort
 Filtered cases
 Potential duplicate records removed
 NSCLC records retained
 If 2 or more diagnosis of NSCLC cancer earliest retained

NSCLC Surgery Cohort
 Rules
 1. Surgery included if performed one month prior to diagnosis date or within twelve months of diagnosis date
 2. If person had more than one surgery in different groups then person allocated to the most complex group
 3. If person had more than one surgery in the same group then the most recent surgery counted

No Surgery Cohort
 Includes: Qld residents of all ages diagnosed with invasive NSCLC cancer who did not undergo surgery as an admitted patient in the NSCLC surgery cohort time period as outlined on page 3

Rules
 Persons are allocated into one surgical group according to the counting rules applied. See identification and categorisation of cancer surgeries for more detail

Time periods

Time period – 01 December 2000 to 31 December 2011

Diagnosis year - 01 January 2001 to 31 December 2010

Cancer definitions - the site and morphology of the cancers have been coded according to the International Classification of Diseases for Oncology, 3rd edition (ICD-O-3).

Site	ICD-O-3	Morphology
Trachea, Bronchus & Lung	C33, C34	NSCLC

Exclusions

The following exclusions apply:

- Non Queensland residents
- People diagnosed with lung cancers such as: small-cell lung cancer, carcinoid, mesothelioma and other carcinoma
- People not admitted to a hospital in Queensland for invasive NSCLC

Identification and categorisation of cancer related procedures

Surgical procedures relevant to NSCLC performed one month prior to or within twelve months of diagnosis were included. The following process was used to assign surgical procedures to patients with cancer:

- Potential cancer related procedures were identified for NSCLC from the Australian Classification of Health Interventions (ACHI) International Classification of Diseases (ICD-10-AM) 7th Edition, 2010
- Identified procedures were reviewed by expert clinicians for completeness and accuracy
- The following procedures were selected and categorised into groups referred to as partial resection, lobectomy and pneumonectomy (see Definitions for further explanation)

Number of NSCLC ICD-10-AM 7th edition coded procedures

ICD-10-AM	PROCEDURE/GROUPING	NUMBER OF PROCEDURES		
		2001-2010	Annual average 2008 -2010	2010
	PARTIAL RESECTION	1112	131	130
9016900	Endoscopic wedge resection of lung	265	33	36
3844001	Radical wedge resection of lung	11	1	0
3843800	Segmental wedge resection of lung	527	63	56
3844000	Wedge resection of lung	309	34	38
	LOBECTOMY OF LUNG	1554	162	176
3843801	Lobectomy of lung	1070	116	128
3844100	Radical lobectomy	484	46	48
	PNEUMONECTOMY	176	21	17
3843802	Pneumonectomy	128	12	9
3844101	Radical pneumonectomy	48	9	8

Surgery rate for NSCLC

ANNUAL AVERAGE YEAR OF DIAGNOSIS 2008 – 2010

DEFINITIVE
SURGERY
MUTUALLY
EXCLUSIVE

Characteristic	Annual average		Had surgery		No surgery	
	NSCLC cohort	(Qld %)	n	(row %)	n	(row %)
Queensland	1436	(100%)	283	(20%)	1153	(80%)
Gender						
Male	876	(61%)	165	(19%)	711	(81%)
Female	560	(39%)	118	(21%)	442	(79%)
Age Group						
< 65	514	(36%)	120	(23%)	391	(76%)
65-74	481	(33%)	105	(22%)	376	(78%)
75-84	364	(25%)	54	(15%)	310	(85%)
85+	78	(5%)	4	(5%)	74	(95%)
Indigenous Status						
Indigenous	28	(2%)	2	(7%)	26	(93%)
Non-Indigenous	1352	(94%)	254	(19%)	1098	(81%)
Not Stated/Unknown	56	(4%)	26	(46%)	30	(54%)
Socioeconomic Status						
Affluent	177	(12%)	33	(19%)	144	(81%)
Middle	1036	(72%)	211	(20%)	825	(80%)
Disadvantaged	214	(15%)	39	(18%)	175	(82%)
Unknown	9	(1%)			9	(100%)
Remoteness						
Major City	724	(50%)	145	(20%)	579	(80%)
Inner Regional	464	(32%)	90	(19%)	374	(81%)
Outer Regional	208	(14%)	43	(21%)	165	(79%)
Remote & Very Remote	32	(2%)	5	(16%)	27	(84%)
Qld Unknown	8	(1%)			8	(100%)
Diagnosis Basis						
Histology	963	(67%)	272	(28%)	691	(72%)
Cytology	382	(27%)	10	(3%)	372	(97%)
Clinical	77	(5%)	1	(1%)	76	(99%)
Other	13	(1%)	1	(8%)	12	(92%)
Comorbidity						
0	793	(56%)	173	(22%)	620	(78%)
1	422	(29%)	78	(18%)	344	(82%)
2+	221	(15%)	32	(14%)	189	(86%)

In the interest of completeness, annual average numbers have been included with fewer than 16 cases. Numbers < 16 should be interpreted with caution due to poor reliability of calculations based on small numbers. Annual average numbers have been rounded up to the nearest whole number for those with less than one, therefore the totals may not add up.

Surgery rate for NSCLC

ANNUAL AVERAGE YEAR OF DIAGNOSIS 2008 – 2010

DEFINITIVE
SURGERY
MUTUALLY
EXCLUSIVE

5

Lung

	Annual average		Had surgery		No surgery	
	NSCLC cohort	(Qld %)	n	(row %)	n	(row %)
Queensland	1436	(100%)	283	(20%)	1153	(80%)
HHS (patient residence)						
Metro South	317	(22%)	65	(21%)	252	(79%)
Metro North	285	(20%)	57	(20%)	228	(80%)
Gold Coast	160	(11%)	33	(21%)	127	(79%)
Sunshine Coast	147	(10%)	33	(22%)	114	(78%)
Wide Bay	111	(8%)	20	(18%)	91	(82%)
Darling Downs	73	(5%)	13	(18%)	60	(82%)
West Moreton	73	(5%)	14	(19%)	59	(81%)
Townsville	61	(4%)	14	(23%)	47	(77%)
Central Queensland	68	(5%)	10	(15%)	58	(85%)
Cairns and Hinterland	58	(4%)	12	(21%)	46	(79%)
Mackay	46	(3%)	10	(22%)	36	(78%)
North West	10	(1%)	2	(20%)	8	(80%)
Qld Unknown	8	(1%)			8	(100%)
South West	6	(0%)	1	(17%)	5	(83%)
Central West	8	(1%)	1	(13%)	7	(88%)
Cape York	2	(0%)			2	(100%)
Torres Strait-Northern Peninsula	2	(0%)			2	(100%)

In the interest of completeness, annual average numbers have been included with fewer than 16 cases. Numbers < 16 should be interpreted with caution due to the poor reliability of calculations based on small numbers. Annual average numbers have been rounded up to the nearest whole number for those with less than one. For example if a HHS performed one surgery from 2008 - 2010 the annual average will be rounded up to one to reflect that this HHS is performing surgery. Therefore the totals may not add up.

Type of definitive surgery for NSCLC

ANNUAL AVERAGE YEAR OF DIAGNOSIS 2008 – 2010

DEFINITIVE
SURGERY
MUTUALLY
EXCLUSIVE

Characteristic	Annual average		Had surgery		Lobectomy		Partial Resection		Pneumonectomy	
	NSCLC cohort	(Qld %)	n	(col %)	n	(row %)	n	(row %)	n	(row %)
Queensland	1436	(100%)	283	(20%)	158	(56%)	106	(37%)	19	(7%)
Gender										
Male	876	(61%)	165	(58%)	92	(56%)	60	(36%)	13	(8%)
Female	560	(39%)	118	(42%)	66	(56%)	46	(39%)	6	(5%)
Age Group										
<65	514	(36%)	120	(42%)	70	(58%)	39	(33%)	11	(9%)
65-74	481	(33%)	105	(37%)	56	(53%)	41	(39%)	7	(7%)
75-84	364	(25%)	54	(19%)	30	(56%)	23	(43%)	2	(4%)
85+	78	(5%)	4	(1%)	1	(25%)	3	(75%)		
Indigenous Status										
Indigenous	28	(2%)	2	(1%)	2	(100%)	1	(50%)		
Non-Indigenous	1352	(94%)	254	(90%)	143	(56%)	94	(37%)	18	(7%)
Not Stated/Unknown	56	(4%)	26	(9%)	14	(54%)	11	(42%)	1	(4%)
Socioeconomic Status										
Affluent	177	(12%)	33	(12%)	19	(58%)	13	(39%)	1	(3%)
Middle	1036	(72%)	211	(75%)	118	(56%)	79	(37%)	14	(7%)
Disadvantaged	214	(15%)	39	(14%)	21	(54%)	14	(36%)	4	(10%)
Unknown	9	(1%)								
Remoteness										
Major City	724	(50%)	145	(51%)	80	(55%)	58	(40%)	8	(6%)
Inner Regional	464	(32%)	90	(32%)	52	(58%)	31	(34%)	6	(7%)
Outer Regional	208	(14%)	43	(15%)	24	(56%)	15	(35%)	4	(9%)
Remote & Very Remote	32	(2%)	5	(2%)	2	(40%)	2	(40%)	1	(20%)
Qld Unknown	8	(1%)								
Comorbidity										
0	793	(55%)	173	(61%)	97	(56%)	62	(36%)	14	(8%)
1	422	(29%)	78	(28%)	46	(59%)	29	(37%)	4	(5%)
2+	221	(15%)	32	(11%)	15	(47%)	15	(47%)	1	(3%)

In the interest of completeness, annual average numbers have been included with fewer than 16 cases. Numbers < 16 should be interpreted with caution due to poor reliability of calculations based on small numbers. Annual average numbers have been rounded up to the nearest whole number for those with less than one, therefore the totals may not add up.

Type of definitive surgery for NSCLC

ANNUAL AVERAGE YEAR OF DIAGNOSIS 2008 – 2010

DEFINITIVE
SURGERY
MUTUALLY
EXCLUSIVE

	Annual average		Had surgery		Lobectomy		Partial Resection		Pneumonectomy	
	NSCLC cohort	(Qld %)	n	(col %)	n	(row %)	n	(row %)	n	(row %)
Queensland	1436	(100%)	283	(20%)	158	(56%)	106	(37%)	19	(7%)
HHS (patient residence)										
Metro South	317	(22%)	65	(23%)	38	(58%)	22	(34%)	5	(8%)
Metro North	285	(20%)	57	(20%)	35	(61%)	20	(35%)	1	(2%)
Gold Coast	160	(11%)	33	(12%)	12	(36%)	19	(58%)	2	(6%)
Sunshine Coast	147	(10%)	33	(12%)	19	(58%)	11	(33%)	3	(9%)
Wide Bay	111	(8%)	20	(7%)	11	(55%)	8	(40%)	2	(10%)
Darling Downs	73	(5%)	13	(5%)	8	(62%)	4	(31%)	1	(8%)
West Moreton	73	(5%)	14	(5%)	7	(50%)	6	(43%)	1	(7%)
Townsville	61	(4%)	14	(5%)	7	(50%)	5	(36%)	2	(14%)
Central Queensland	68	(5%)	10	(4%)	5	(50%)	3	(30%)	2	(20%)
Cairns and Hinterland	58	(4%)	12	(4%)	8	(67%)	3	(25%)	1	(8%)
Mackay	46	(3%)	10	(4%)	7	(70%)	3	(30%)		
Qld Unknown	8	(1%)								
North West	10	(1%)	2	(1%)	1	(50%)	1	(50%)		
South West	6	(0%)	1	(0%)						
Central West	8	(1%)	1	(0%)			1	(100%)		
Cape York	2	(0%)								
Torres Strait-Northern Peninsula	2	(0%)								

In the interest of completeness, annual average numbers have been included with fewer than 16 cases. Numbers < 16 should be interpreted with caution due to the poor reliability of calculations based on small numbers. Annual average numbers have been rounded up to the nearest whole number for those with less than one. For example if a HHS performed one surgery from 2008 - 2010 the annual average will be rounded up to one to reflect that this HHS is performing surgery. Therefore the totals may not add up.

DEFINITIVE
SURGERY
MUTUALLY
EXCLUSIVE

Characteristics of NSCLC patients receiving lung surgery

ANNUAL AVERAGE YEAR OF DIAGNOSIS 2008 – 2010

	Had surgery		Male		Characteristic Median age at diagnosis	Disadvantaged		Indigenous		One or more Comorbidities		Private	
	n	(Qld %)	n	(row %)		n	(row %)	n	(row %)	n	(row %)	n	(row %)
Queensland	283	(20%)	165	(58%)	67 yrs	39	(14%)	2	(1%)	110	(39%)	140	(49%)
HHS (patient residence)													
Metro South	65	(23%)	37	(57%)	67 yrs	9	(14%)			24	(37%)	33	(51%)
Metro North	57	(20%)	32	(56%)	67 yrs	6	(11%)			23	(40%)	24	(42%)
Gold Coast	33	(12%)	15	(45%)	68 yrs					8	(24%)	18	(55%)
Sunshine Coast	33	(12%)	20	(61%)	67 yrs	2	(6%)			15	(45%)	20	(61%)
Wide Bay	20	(7%)	13	(65%)	67 yrs	10	(50%)			10	(50%)	7	(35%)
Townsville	14	(5%)	8	(57%)	63 yrs	2	(14%)			4	(29%)	7	(50%)
Darling Downs	13	(5%)	10	(77%)	68 yrs	6	(46%)	1	(8%)	5	(38%)	6	(46%)
West Moreton	14	(5%)	9	(64%)	63 yrs	1	(7%)			4	(29%)	6	(43%)
Cairns and Hinterland	12	(4%)	5	(42%)	67 yrs	2	(17%)	1	(8%)	5	(42%)	6	(50%)
Central Queensland	10	(4%)	7	(70%)	66 yrs	1	(10%)			6	(60%)	7	(70%)
Mackay	10	(4%)	7	(70%)	62 yrs	1	(10%)			3	(30%)	4	(40%)
North West	2	(1%)	1	(50%)	60 yrs	1	(50%)			1	(50%)	1	(50%)
Central West	1	(0%)	1	(100%)	58 yrs	1	(100%)			1	(100%)	1	(100%)
South West	1	(0%)	1	(100%)	65 yrs					1	(100%)	1	(100%)

*No patients from Cape York, Torres Strait-Northern Peninsula and Qld Unknown were reported as undergoing lung surgery

In the interest of completeness, annual average numbers have been included with fewer than 16 cases. Numbers < 16 should be interpreted with caution due to the poor reliability of calculations based on small numbers. Annual average numbers have been rounded up to the nearest whole number for those with less than one. For example if a HHS performed one surgery from 2008 - 2010 the annual average will be rounded up to one to reflect that this HHS is performing surgery. Therefore the totals may not add up.

Patient flows



10 year NSCLC patient flows for surgery

YEAR OF DIAGNOSIS 2001 – 2010 (COL% ROW %)

DEFINITIVE
SURGERY
MUTUALLY
EXCLUSIVE

Hospitals performing surgery* HHS (patient residence)	HHS of surgery				Qld	
	Metro South 3	Metro North 6	Gold Coast 4	Townsville 2	n 15	(%)
Metro South	373 (69% 64%)	205 (13% 35%)	4 (2% 1%)		582	(23%)
Metro North	27 (5% 5%)	485 (31% 95%)			512	(20%)
Gold Coast	27 (5% 8%)	105 (7% 32%)	193 (98% 59%)		325	(13%)
Sunshine Coast	16 (3% 6%)	273 (17% 94%)			289	(11%)
Darling Downs	17 (3% 14%)	106 (7% 86%)			123	(5%)
Wide Bay	27 (5% 14%)	162 (10% 86%)			189	(7%)
Cairns and Hinterland	2 (0% 2%)	18 (1% 17%)		86 (32% 81%)	106	(4%)
Townsville	1 (0% 1%)	5 (0% 4%)		124 (46% 95%)	130	(5%)
West Moreton	36 (7% 34%)	71 (5% 66%)			107	(4%)
Central Queensland	10 (2% 11%)	82 (5% 87%)		2 (1% 2%)	94	(4%)
Mackay	1 (0% 1%)	27 (2% 36%)		47 (18% 63%)	75	(3%)
Cape York				1 (0% 100%)	1	(0%)
Central West	2 (0% 18%)	9 (1% 82%)			11	(0%)
North West		3 (0% 30%)		7 (3% 70%)	10	(0%)
South West	2 (0% 13%)	13 (1% 87%)			15	(1%)
Torres Strait-Northern Peninsula				1 (0% 100%)	1	(0%)
Queensland (%)	541 (21%)	1564 (61%)	197 (8%)	268 (10%)	2570	(100%)
Annual average	54	156	20	27	257	

*the number of hospitals within a HHS performing lung surgery

col% is used to show the distribution of residence for the total group of patients who were operated on by a single HHS. For example: of the 541 surgeries that Metro South performed, 373 (69%) of patients were also residents of Metro South. The remaining 168 patients (31%) who received surgery in Metro South reside in twelve other HHSs.

row% is used to show the proportion of patients residing in a given HHS who also receive their surgery in the same HHS, and what proportion had their surgery in another HHS. For example: of the 582 patients who reside in Metro South, 373 (64%) also had their surgery in Metro South. The remaining 209 patients (36%) had surgery in two other HHSs.

2010 NSCLC patient flows for surgery

YEAR OF DIAGNOSIS 2010 (COL%. ROW%)

DEFINITIVE
SURGERY
MUTUALLY
EXCLUSIVE

11
Lung

Hospitals performing surgery* HHS (patient residence)	HHS of surgery				Qld	
	Metro South 3	Metro North 5	Gold Coast 4	Townsville 2	n 14	(%)
Metro South	55 (85% 74%)	19 (11% 26%)			74	(25%)
Metro North	2 (3% 4%)	55 (31% 96%)			57	19%
Gold Coast		5 (3% 17%)	24 (100% 83%)		29	(10%)
Sunshine Coast	2 (3% 5%)	36 (20% 95%)			38	(13%)
Darling Downs	2 (3% 13%)	14 (8% 88%)			16	5%
Wide Bay	1 (2% 5%)	21 (12% 95%)			22	(7%)
Cairns and Hinterland		1 (1% 14%)		6 (21% 86%)	7	(2%)
Townsville				12 (41% 100%)	12	4%
West Moreton	2 (3% 15%)	11 (6% 85%)			13	(4%)
Central Queensland	1 (2% 11%)	7 (4% 78%)		1 (3% 11%)	9	(3%)
Mackay		4 (2% 36%)		7 (24% 64%)	11	4%
Cape York						
Central West		2 (1% 100%)			2	(1%)
North West		1 (1% 25%)		3 (10% 75%)	4	1%
South West						
Torres Strait-Northern Peninsula						
Queensland (%)	65 (22%)	176 (60%)	24 (8%)	29 (10%)	294	100%

*the number of hospitals within a HHS performing lung surgery

col% is used to show the distribution of residence for the total group of patients who were operated on by a single HHS. For example: of the 65 surgeries that Metro South performed, 55 (85%) of patients were also residents of Metro South. The remaining ten patients (15%) who received surgery in Metro South reside in six other HHSs.

row% is used to show the proportion of patients residing in a given HHS who also receive their surgery in the same HHS, and what proportion had their surgery in another HHS. For example: of the 74 patients who reside in Metro South, 55 (74%) also had their surgery in Metro South. The remaining 19 patients (26%) had surgery in Metro North HHS.

Surgery rates



10 year surgery rates for lung resections

YEAR OF DIAGNOSIS 2001 – 2010

DEFINITIVE
SURGERY
MUTUALLY
EXCLUSIVE

	2001-2010		Had surgery		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010	
	NSCLC cohort	(Qld %)	n	(Qld %)	n	(%)	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Queensland	12730	(100%)	2570	(20%)	239	(23%)	230	(22%)	229	(21%)	255	(20%)	248	(19%)	264	(20%)	257	(19%)	265	(19%)	289	(20%)	294	(20%)
HHS (patient residence)																								
Metro South	2755	(22%)	582	(21%)	55	(22%)	49	(24%)	56	(24%)	59	(21%)	63	(22%)	46	(17%)	60	(21%)	63	(20%)	57	(19%)	74	(23%)
Metro North	2529	(20%)	512	(20%)	37	(21%)	50	(22%)	43	(20%)	41	(14%)	53	(22%)	55	(21%)	63	(23%)	59	(20%)	54	(19%)	57	(21%)
Gold Coast	1533	(12%)	325	(21%)	30	(25%)	29	(21%)	32	(21%)	43	(31%)	26	(16%)	41	(24%)	25	(15%)	38	(23%)	32	(19%)	29	(19%)
Sunshine Coast	1234	(10%)	289	(23%)	28	(26%)	29	(28%)	24	(26%)	28	(22%)	31	(23%)	30	(24%)	21	(19%)	26	(19%)	34	(25%)	38	(23%)
Wide Bay	928	(7%)	189	(20%)	22	(29%)	18	(23%)	19	(22%)	13	(18%)	13	(17%)	23	(23%)	20	(19%)	19	(18%)	20	(19%)	22	(18%)
Darling Downs	677	(5%)	123	(18%)	13	(27%)	12	(17%)	12	(22%)	10	(14%)	18	(23%)	11	(17%)	7	(10%)	9	(12%)	15	(23%)	16	(21%)
West Moreton	600	(5%)	107	(18%)	6	(15%)	5	(12%)	11	(20%)	16	(25%)	6	(13%)	11	(17%)	11	(15%)	13	(16%)	15	(22%)	13	(18%)
Townsville	612	(5%)	130	(21%)	11	(22%)	11	(23%)	10	(22%)	9	(15%)	16	(20%)	18	(25%)	14	(19%)	12	(24%)	17	(30%)	12	(16%)
Central Queensland	607	(5%)	94	(15%)	9	(20%)	10	(19%)	7	(13%)	14	(27%)	3	(6%)	10	(15%)	12	(14%)	9	(16%)	11	(13%)	9	(14%)
Cairns and Hinterland	558	(4%)	106	(19%)	10	(23%)	13	(22%)	8	(18%)	14	(22%)	5	(9%)	9	(17%)	12	(20%)	12	(26%)	16	(24%)	7	(11%)
Mackay	384	(3%)	75	(20%)	9	(24%)	2	(13%)	5	(17%)	4	(13%)	11	(28%)	7	(12%)	8	(23%)	4	(10%)	14	(26%)	11	(25%)
North West	69	(1%)	10	(14%)	1	(25%)					1	(20%)	1	(33%)			1	(11%)	1	(9%)	1	(10%)	4	(44%)
South West	88	(1%)	15	(17%)	3	(33%)	1	(13%)	2	(18%)	3	(23%)	2	(15%)	2	(29%)	1	(11%)			1	(25%)		
Central West	52	(0%)	11	(21%)	3	(43%)	1	(50%)							1	(13%)	2	(33%)			2	(25%)	2	(50%)
Cape York	31	(0%)	1	(3%)	1	(17%)																		
Torres Strait-Northern Peninsula	18	(0%)	1	(6%)	1	(33%)																		

Technical appendix

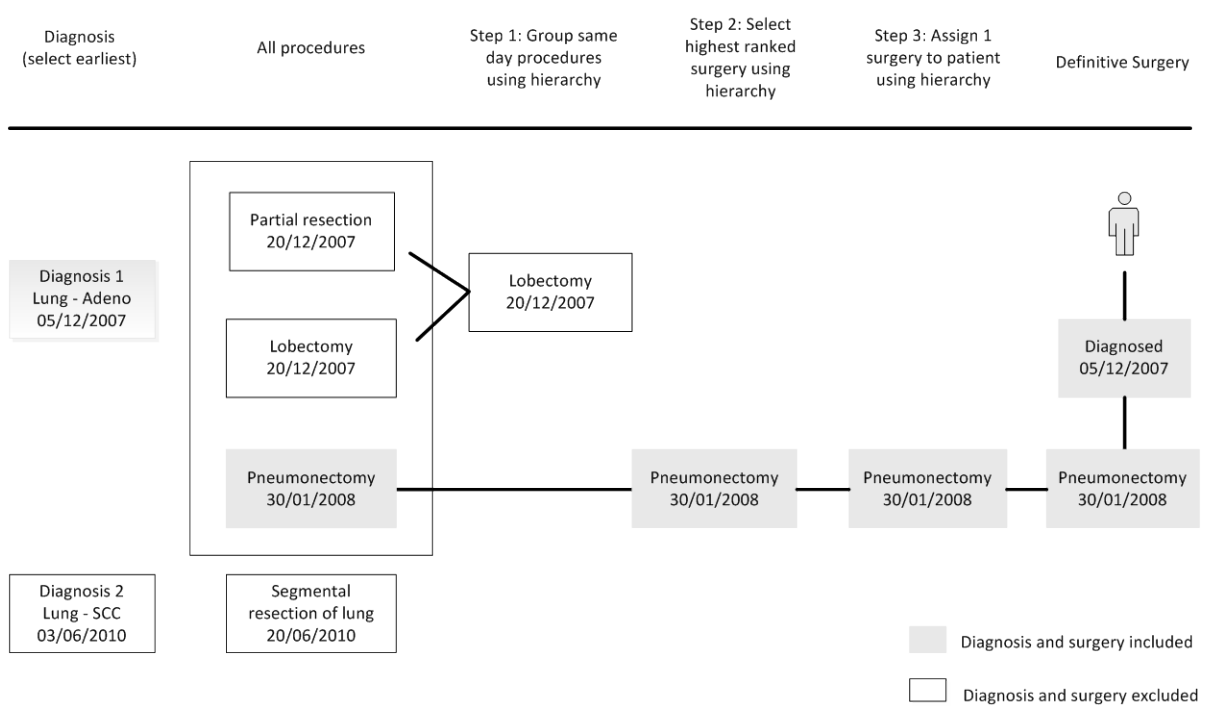
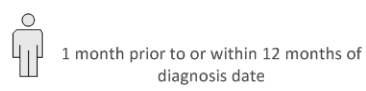


How different counting rules can be applied to a patient

The calculations of surgery counts were defined for each data sheet and were tailored to each cancer. Below are examples of how the counting rules are applied.

Patient A is diagnosed with 2 primary lung cancers on 05/12/2007 and 03/06/2010. For Diagnosis 1 the patient had 3 surgical procedures, 2 of which are on the same day. Using the hierarchy for lung procedures the highest ranked procedure is selected and attached to the patient.

Diagnosis 2 and associated procedure is excluded from the surgical cohort as only the earliest diagnosis is included.



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

1. Quan H, Sundararajan V, Halfon P, Fong A, Burnand B, Luthi JC, Duncan Saunders L, Beck CA, Feasby TE, Ghali WA. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. Med Care 2005; 43: 1073-1077

Definitions

Annual average

Annual average refers to the sum of numbers divided by the number of years being reported. In this report annual average numbers have been rounded up to the nearest whole number for those with less than 1.

Chargeable status - public and private

On admission to hospital, an eligible patient must elect to be either a public or private patient.

A public patient is a patient who:

- Elects to be treated as a public patient, and so cannot choose the doctor who treats them, or
- Is receiving treatment in a private hospital under a contract arrangement with a public hospital or health authority.

A private patient is a patient who, by choosing the doctor who will treat them (provided the doctor has 'right of private practice' or is a general practitioner/specialist with admitting rights) has elected to be treated as a private patient.

Cohort

Queensland cancer cohort

Queenslanders who were identified in Queensland Oncology Repository as being diagnosed with cancer between 1 January 2001 and 31 December 2010.

NSCLC cohort

Queenslanders who were diagnosed with NSCLC between 1 January 2001 and 31 December 2010.

NSCLC surgery cohort

Anyone in the NSCLC cohort who had any of the identified cancer related procedures, one month before or within twelve months of diagnosis as outlined on page 3.

No surgery cohort

Anyone in the NSCLC cohort who did not undergo surgery as defined by the procedures outlined on page 3.

Col %

Percentage of the column total

Comorbidity

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

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

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

For any given cancer diagnosis, comorbidity is restricted to conditions other than the primary cancer. For example: a breast cancer can be a comorbidity to a lung 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	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		

Definitive surgery

The highest ranked surgery the patient ever had defined by the NSCLC surgery hierarchy outlined on page 16.

Diagnosis Basis

Confirmation of cancer through clinical or histological tests

Had surgery

Includes Queensland residents of all ages diagnosed with invasive NSCLC in the surgical cohort time period who underwent surgery as defined by the procedures outlined on page 3. If the patient had more than one procedure in same group then the procedure is counted once. If the patient had more than one procedure in different groups, the highest ranked surgery is selected as outlined on page 16.

Hospital and Health Service (HHS)

For residence considerations, the Hospital and Health Service is a geographic area defined by a collection of Statistical Local Areas (SLA). For public hospitals and health service facilities, the term Hospital and Health Service is synonymous with a group of Queensland Health facilities and staff responsible for providing and delivering health resources and services to an area which may consist of one or more residential areas.

Queensland Unknown residence includes addresses reported as overseas, unknown or not fixed.

Indigenous Status

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

Median age

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

No surgery

Includes Queensland residents of all ages diagnosed with invasive NSCLC who did not undergo surgery as an admitted patient in the surgical cohort time period, as defined by the procedures outlined on page 3.

Number of procedures

Includes Queensland residents of all ages diagnosed with invasive NSCLC who underwent a relevant NSCLC procedure between 2001 and 2010. The procedure could have occurred at any time with no counting rules applied as outlined on page 2.

Patient flows

Col% is used to show the distribution of residence for the total group of patients who were operated on by a single HHS. Row% is used to show the proportion of patients residing in a given HHS who also receive their surgery in the same HHS, and what proportion had their surgery in another HHS.

Qld %

Percentage of the Queensland total.

Remoteness

The relative remoteness of residence at time of diagnosis, based on the Australian Standard Geographical Classification (ASGC). This document classifies remoteness into four groups: Major City, Inner Regional, Outer Regional, and Remote/Very remote.

Row %

Percentage of the row total

Sex

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

Socioeconomic status

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

The ABS uses SEIFA scores to rank regions into ten groups or deciles numbered 1 to 10, with 1 being the most disadvantaged group and 10 being the most affluent group. This ranking is useful at the national level, but the number of people in each decile often becomes too small for meaningful comparisons when applied to a subset of the population. For this reason, this document further aggregates SEIFA deciles into 3 socioeconomic groups:

SEIFA Group	Decile	Percentage of population (approximate)
Affluent	1-2	20%
Middle	3-8	60%
Disadvantaged	9-10	20%

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



For more information

Queensland Cancer Control Analysis Team

Queensland Health

Radiation Oncology Mater Centre

31 Raymond Terrace

South Brisbane Queensland 4001 Australia

Tel: (61+) (07) 3840 3200

Email: gccat@health.qld.gov.au

<https://gccat.health.qld.gov.au>