Victorian Lung Cancer Registry

QUALITY INDICATOR REPORT

1 July 2012 to 30 June 2013

MONASH University

VLCR
Victorian Lung Cancer Registry

Contents

Summary 2
Background 2
VLCR Governance 3
Methods 4
Results 5
Process and diagnostic indicators 6
Surgical indicators 17
Chemotherapy and radiotherapy indicators 21
Active treatment indictors 24
Palliative care indicators 25
Survival 26
VLCR Personnel 27
Conclusions 28
Future directions 28
References 29
Appendices 30
Appendix A: VLCR Quality indicators 30
Appendix B: VLCR Governance 32
Steering Committee 32
Management Committee 33
Appendix C: Investigation into VLCR case ascertainment completeness 34
Appendix D: VLCR Escalation policy 35
Appendix E: VLCR Publications, presentations and awards 37
Appendix F: VLCR Funding 38
Appendix G: Glossary 38

Summary

- The VLCR is a pilot disease quality registry designed to help improve the quality of care delivered to Victorians with lung cancer
- The registry aims to collect management, treatment and outcome data on all new cases of lung cancer
- Benchmarking quality indicators allows closure of the quality cycle: plan, implement, assess, review
- 25 Quality Indicators selected following extensive literature review and evaluation of established clinical practice guidelines
- 8 Victorian Hospitals established and trained: 6 metropolitan, 2 regional, 3 public, 3 private
- Minimum dataset established with standardised data collection across sites
- 690 eligible and consenting patients from 1 July 2012 to 31 June 2013
- Data collected on 25% of total new cases in Victoria

Background

Lung cancer remains a major disease burden in Victoria and requires a complex and multidisciplinary approach to ensure optimal care and outcomes. To date, no uniform mechanism is available to capture standardised population based outcomes to enable performance benchmarking. The establishment of such a data platform is therefore a primary requisite, enabling description of process and outcome in lung cancer care and to drive improvement in the quality of care provided to individuals with lung cancer.

The VLCR was developed in early 2011 to capture outcomes, patterns of care and quality of care delivered to patients diagnosed with lung cancer in Victoria and to determine the extent to which patient and health-related factors impact on variation in survival. The registry was developed as a pilot project over three years and established in eight Victorian hospitals (5 public, 3 private, 6 metropolitan, 2 regional) together comprising 25% of all lung cancer notifications in Victoria (Victorian Cancer Registry 2011).

VLCR Governance

The Governance of VLCR was established to meet the standards outlined within the operating principles by the Australian Commission for Safety and Quality in Healthcare.

The registry is governed by a Steering Committee, which is comprised of a consumer representative (n=1), thoracic physicians (3), thoracic surgeon (1), radiation oncologists (2), medical oncologists (2), palliative care physician (1), general practice doctor (1), cancer nurse (1), epidemiologists (n=3), a basic scientist (1), representatives from health departments in bioinformatics (1), tissue biobank (1), health department administration (1) and from the state cancer registry (1).

The Management Committee is responsible for managing day-to-day aspects of the clinical register. Data quality measures are reported regularly to the management committee.

(See Appendix B: VLCR Committee members)

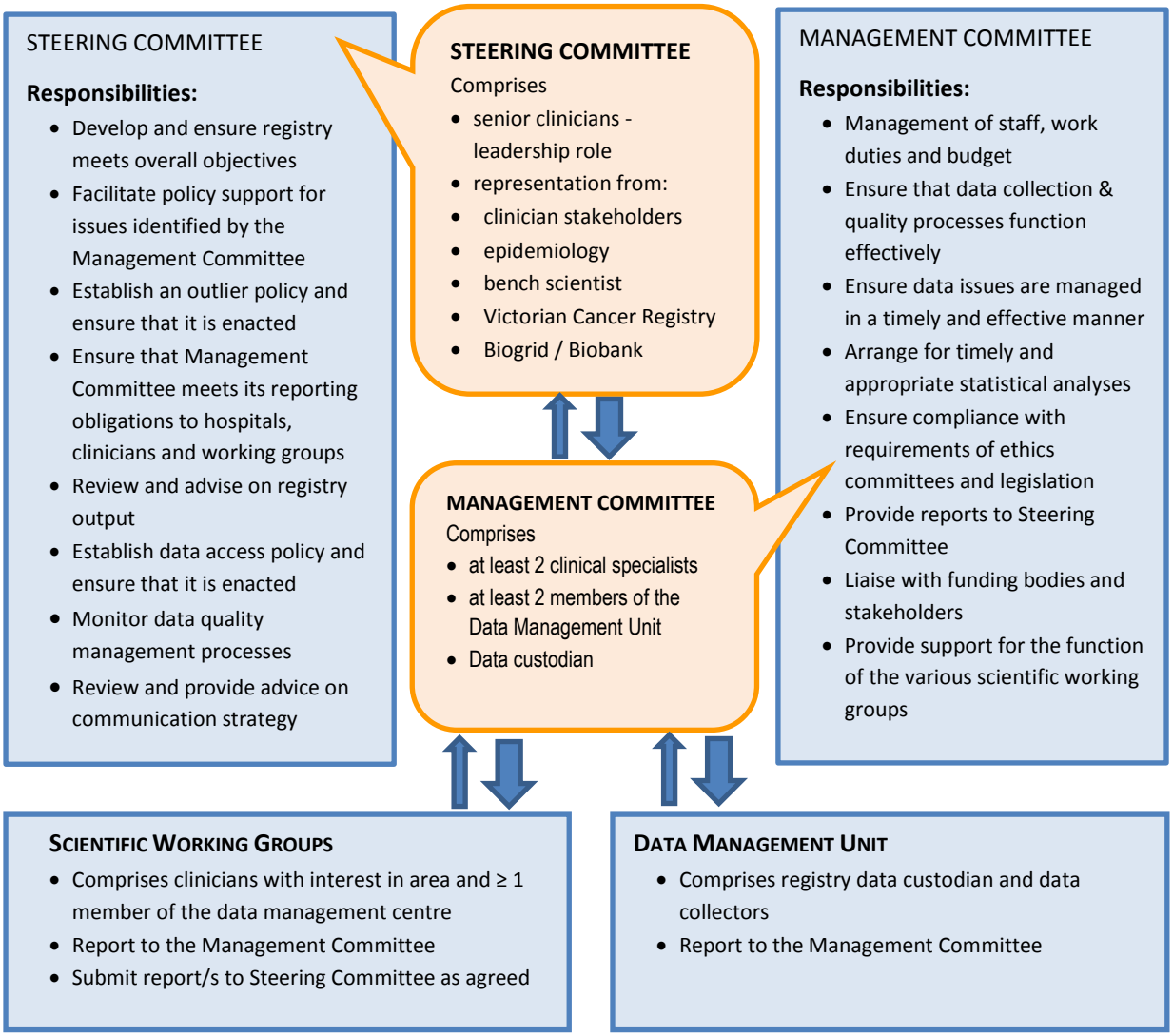


Fig 1: Overview of VLCR governance structure

Methods

Quality indicators (Appendix A) were developed by an expert working group comprising representation from thoracic surgery, respiratory medicine, medical oncology, radiation oncology, palliative care and epidemiology following an extensive review of Australian and international clinical practice guidelines.

Case ascertainment was established by regular institutional reporting of ICD-10 discharge coding. An Investigation into gaps in the current case ascertainment was completed at one public and one private metropolitan hospital. (Appendix C). The recruitment strategy uses opt out consent and waiver (for death) model which has resulted in capture of 94% of potentially eligible patients.

The collection of a standardised minimum data set optimises capacity for population-based data capture. This data set provides scope for the construction of a risk-adjusted model for outcomes. A data access policy and a mechanism for escalation policy for outcome outliers have been established. (See Appendix D)

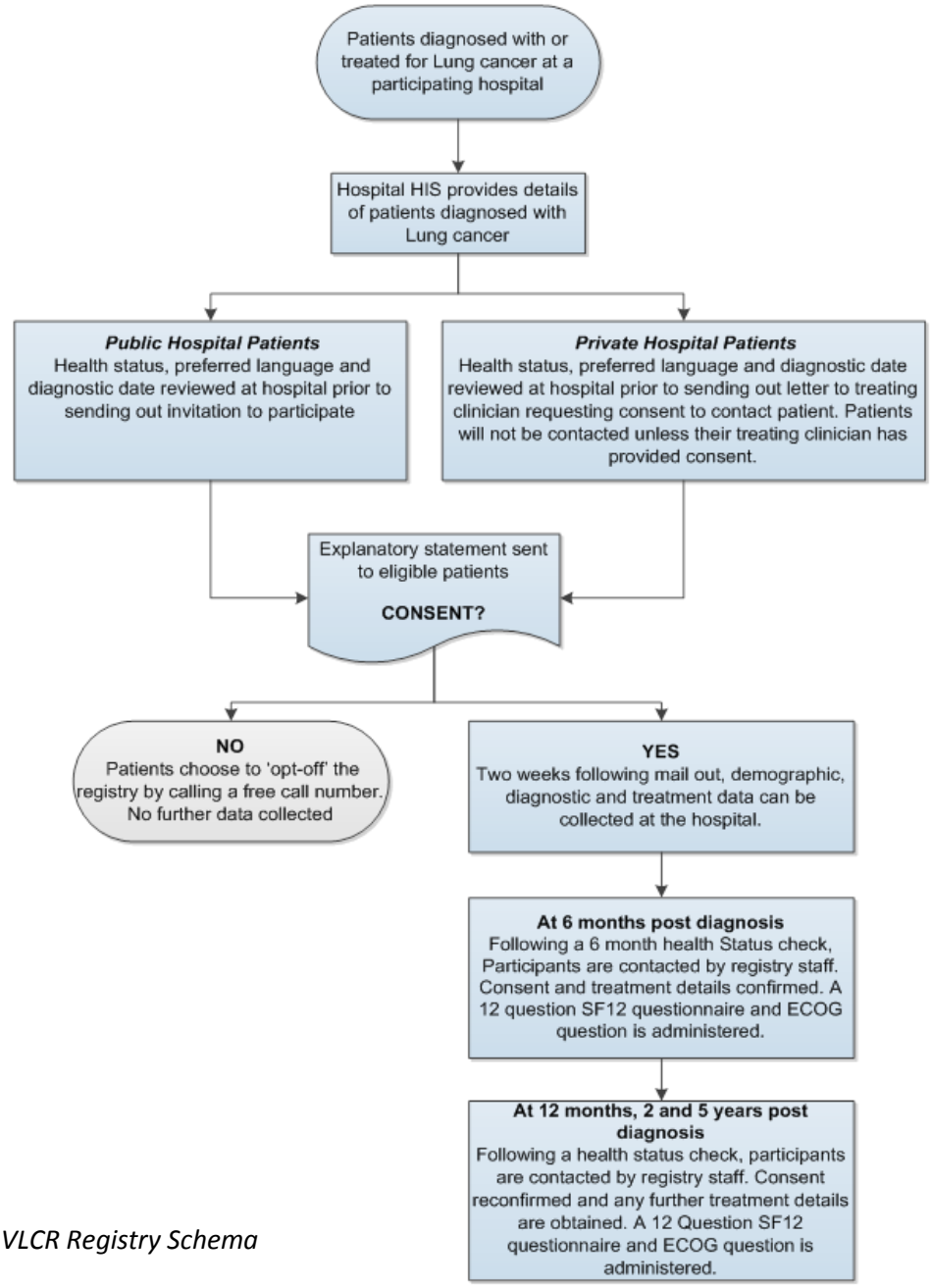


Fig 2: VLCR Registry Schema

Results

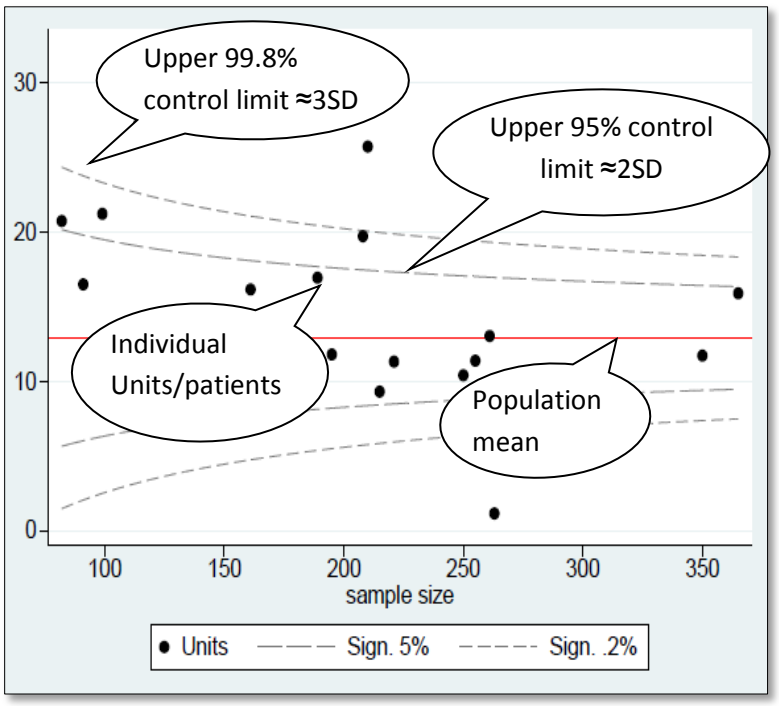
Recruitment numbers outlined below represent notifications to the VLCR from 8 participating healthcare institutions in Victoria. Quality indicators described throughout this analysis represent data collected on 690 eligible and consenting patients from July 01, 2012 to June 31, 2013.

	Metropolitan Public			Metropolitan Private			Regional		
Institution	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Total**
Registrations	105	155	124	54	101	100	47	44	730
Opt out (%)	6 (5.7)	12 (7.7)	5 (4.0)	2 (3.7)	4 (4.0)	7 (7.0)	2 (4.3)	3 (6.8)	41 (5.6)
Inclusions	99	143	119	52	97	93	45	41	689
Deaths	49	57	47	14	32	36	25	21	281
Mortality %	49.5	39.9	39.5	26.9	33.0	38.7	55.6	51.2	40.8

Interpreting the funnel plots below:

The **horizontal axis** (x-axis) measures the number of events being examined. For example, in this report that might refer to the documentation of the clinical stage in the medical record or the proportion of patients documented with loss of weight at diagnosis

The **vertical axis** (y-axis) measures treatment effect. For example, in this report this might represent the % of notes where documentation of clinical stage was recorded by hospital/clinician or the % of patients with documented loss of weight in the medical record.



A point estimate (**black dots**) of the treatment effect for a given patient number is then plotted for each hospital contributing to the registry.

The **red line** represents the pooled average % treatment effect for all hospitals combined.

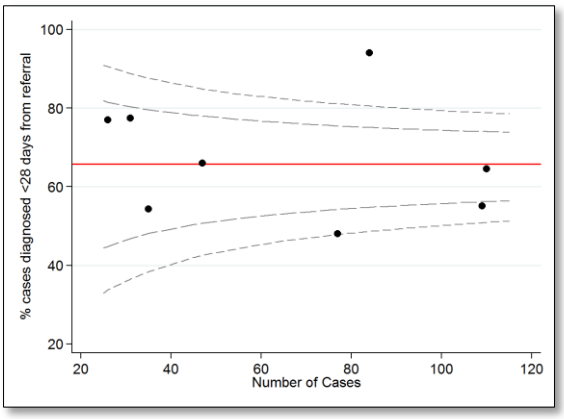
As samples/patient numbers get larger, the closer to the pooled estimate they become, as represented by the convergence of **dashed contour lines** (themselves representing 5% and 0.2% significance respectively).

*Please Note: sites with n<10 patients will not be represented in funnel plots

Process and diagnostic indicators

QI 1: NUMBER OF PATIENTS WHERE TIME FROM REFERRAL DATE TO DIAGNOSIS IS LESS THAN 28 DAYS.

No.	Numerator	Denominator
1	Number of patients where time from referral date to diagnosis is less than 28 days	Total number of patients in Registry with a referral date available

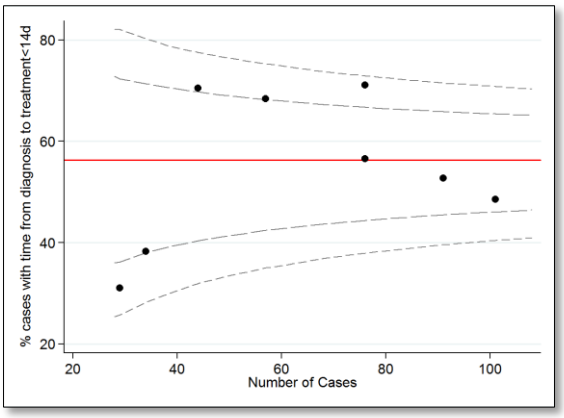


	A	B	C	D	E	F	G	H	TOTAL
Numerator	37	60	71	31	19	79	24	20	341
Denominator	77	109	110	47	35	84	31	26	519
%	48	55	65	66	54	94	77	77	66*

**mean of proportions (%)*

QI 2: NUMBER OF PATIENTS WHERE TIME FROM DIAGNOSIS DATE TO FIRST TREATMENT DATE IS LESS THAN 14 DAYS.

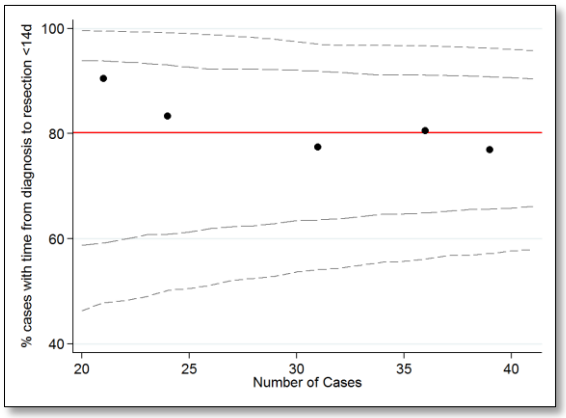
No.	Numerator	Denominator
2	Number of patients where time from diagnosis date to first treatment date is less than 14 days	Total number of patients in Registry receiving treatment



	A	B	C	D	E	F	G	H	TOTAL
Numerator	43	49	48	31	39	54	13	9	**286**
Denominator	76	101	91	44	57	76	34	29	**508**
%	57	49	53	70	68	71	38	31	**56**

QI 2A: NUMBER OF PATIENTS WHERE TIME FROM DIAGNOSIS DATE TO SURGICAL RESECTION DATE IS LESS THAN 14 DAYS.

No.	Numerator	Denominator
2a	Number of patients where time from diagnosis date to surgical resection date is less than 14 days	Total number of patients in Registry undergoing surgical resection

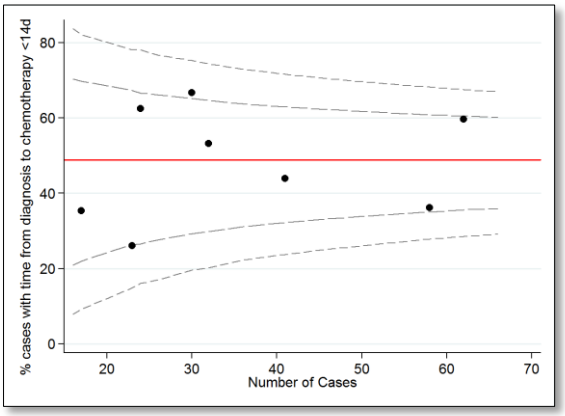


;

	A	B	C	D	E	F	G	H	TOTAL
Numerator	24	29	30	20	19	24	3	3	**152**
Denominator	31	36	39	24	21	31	6	3	**191**
%	77	81	77	83	90	77	50	100	**80**

QI 2B: NUMBER OF PATIENTS WHERE TIME FROM DIAGNOSIS DATE TO FIRST CHEMOTHERAPY TREATMENT DATE IS LESS THAN 14 DAYS.

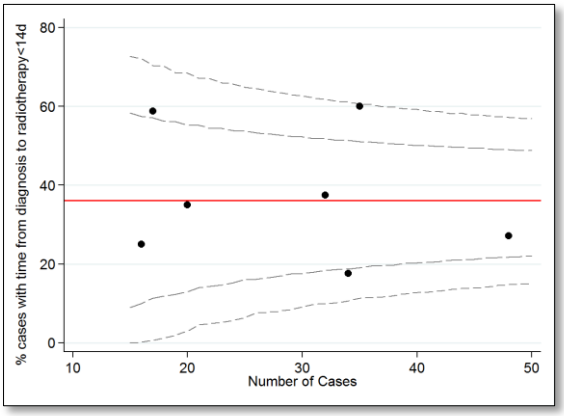
No.	Numerator	Denominator
2b	Number of patients where time from diagnosis date to first chemotherapy treatment date is less than 14 days	Total number of patients in Registry receiving chemotherapy treatment



	A	B	C	D	E	F	G	H	TOTAL
Numerator	17	18	21	6	15	37	20	6	**140**
Denominator	32	41	58	17	24	62	30	23	**287**
%	53	44	36	35	63	60	67	26	**49**

QI 2C: NUMBER OF PATIENTS WHERE TIME FROM DIAGNOSIS DATE TO FIRST RADIOTHERAPY TREATMENT DATE IS LESS THAN 14 DAYS.

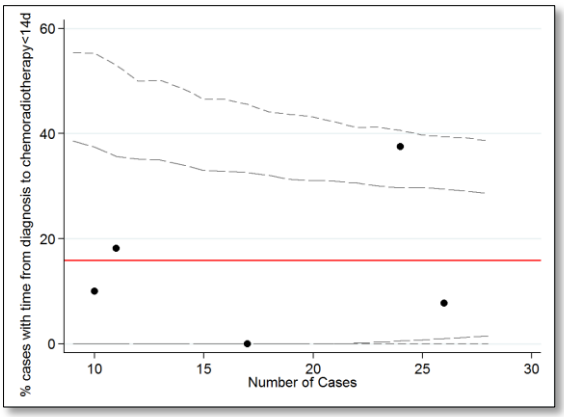
No.	Numerator	Denominator
2c	Number of patients where time from diagnosis date to first radiotherapy treatment date is less than 14 days	Total number of patients in Registry receiving radiotherapy treatment



	A	B	C	D	E	F	G	H	TOTAL
Numerator	12	13	6	1	10	21	7	4	**74**
Denominator	32	48	34	5	17	35	20	16	**207**
%	38	27	18	20	59	60	35	25	**36**

QI 2D: NUMBER OF PATIENTS TREATED WITH BOTH CHEMOTHERAPY AND RADIOTHERAPY, WHERE CHEMOTHERAPY AND RADIOTHERAPY START DATES ARE WITHIN 14 DAYS OF EACH OTHER AND TIME FROM DIAGNOSIS DATE TO FIRST TREATMENT DATE IS LESS THAN 14 DAYS.

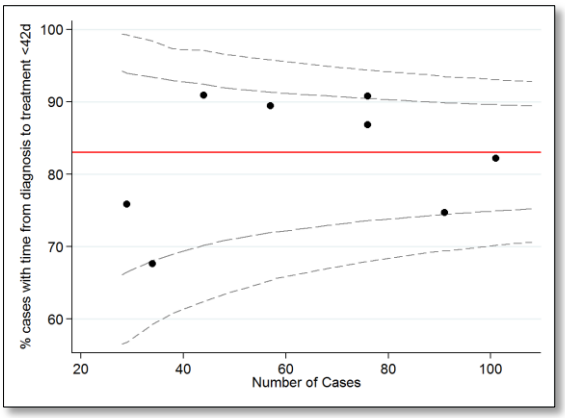
No.	Numerator	Denominator
2d	Number of patients treated with both chemotherapy and radiotherapy, where chemotherapy and radiotherapy start dates are within 14 days of each other and time from diagnosis date to first treatment date is less than 14 days	Total number of patients in Registry undergoing combined chemo-radiotherapy treatment.



	A	B	C	D	E	F	G	H	TOTAL
Numerator	2	2	0	1	4	9	1	1	**20**
Denominator	11	26	17	4	9	24	7	10	**108**
%	18	8	0	25	44	38	14	10	**19**

QI 3: NUMBER OF PATIENTS WHERE TIME FROM DIAGNOSIS DATE TO FIRST TREATMENT DATE IS LESS THAN 42 DAYS.

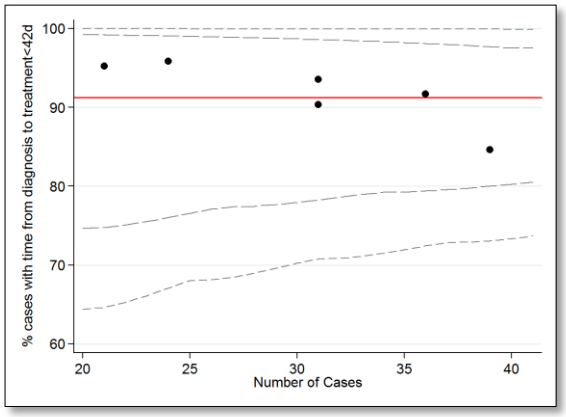
No.	Numerator	Denominator
3	Number of patients where time from diagnosis date to first treatment date is less than 42 days	Total number of patients in Registry undergoing treatment



	A	B	C	D	E	F	G	H	TOTAL
Numerator	66	83	68	40	51	69	23	22	**422**
Denominator	76	101	91	44	57	76	34	29	**508**
%	87	82	75	91	89	91	68	76	**83**

QI 3A: NUMBER OF PATIENTS WHERE TIME FROM DIAGNOSIS DATE TO SURGICAL RESECTION DATE IS LESS THAN 42 DAYS.

No.	Numerator	Denominator
3a	Number of patients where time from diagnosis date to surgical resection date is less than 42 days	Total number of patients in Registry undergoing surgical resection

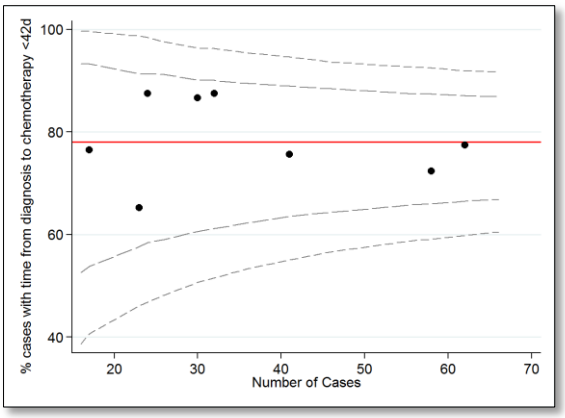


-

	A	B	C	D	E	F	G	H	TOTAL
Numerator	29	33	33	23	28	20	4	3	**173**
Denominator	31	36	39	24	31	21	6	3	**191**
%	94	92	85	96	90	95	67	100	**91**

QI 3B: NUMBER OF PATIENTS WHERE TIME FROM DIAGNOSIS DATE TO FIRST CHEMOTHERAPY TREATMENT DATE IS LESS THAN 42 DAYS.

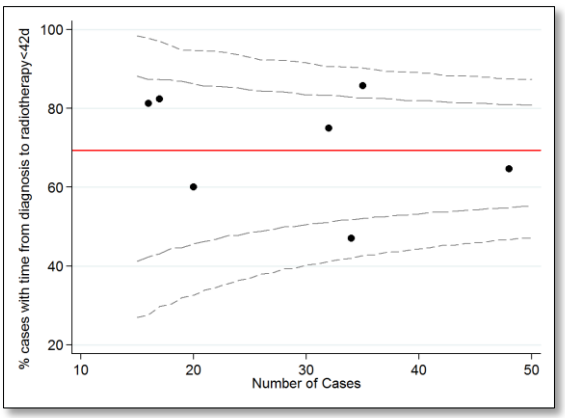
No.	Numerator	Denominator
3b	Number of patients where time from diagnosis date to first chemotherapy treatment date is less than 42 days	Total number of patients in Registry undergoing chemotherapy



	A	B	C	D	E	F	G	H	TOTAL
Numerator	28	42	31	21	26	48	13	15	**224**
Denominator	32	58	41	24	30	62	17	23	**287**
%	88	72	76	88	87	77	76	65	**78**

QI 3C: NUMBER OF PATIENTS WHERE TIME FROM DIAGNOSIS DATE TO FIRST RADIOTHERAPY TREATMENT DATE IS LESS THAN 42 DAYS.

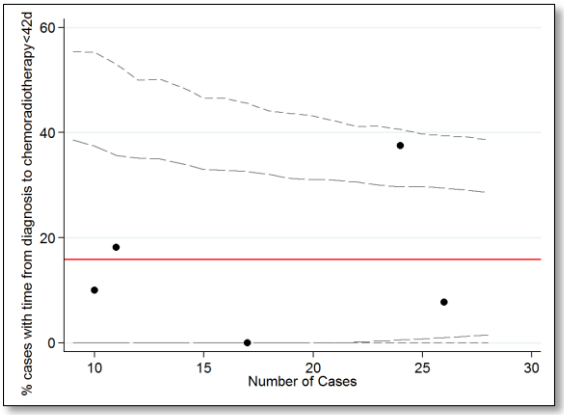
No.	Numerator	Denominator
3c	Number of patients where time from diagnosis date to first radiotherapy treatment date is less than 42 days	Total number of patients in Registry undergoing radiotherapy



	A	B	C	D	E	F	G	H	TOTAL
Numerator	24	31	16	3	14	30	12	13	**143**
Denominator	32	48	34	5	17	35	20	16	**207**
%	75	65	47	60	82	86	60	81	**69**

QI 3D: NUMBER OF PATIENTS TREATED WITH BOTH CHEMOTHERAPY AND RADIOTHERAPY, WHERE CHEMOTHERAPY AND RADIOTHERAPY START DATES ARE WITHIN 14 DAYS OF EACH OTHER AND TIME FROM DIAGNOSIS DATE TO FIRST TREATMENT DATE IS LESS THAN 42 DAYS.

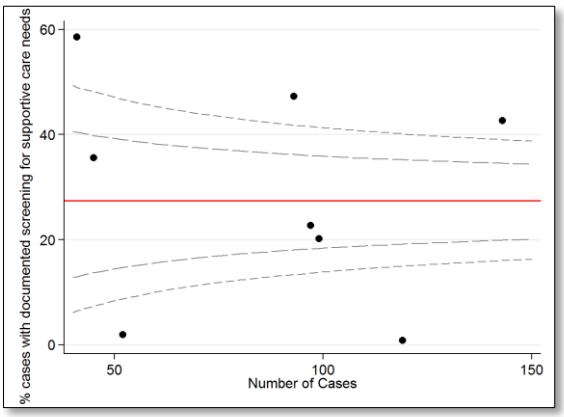
No.	Numerator	Denominator
3d	Number of patients who have been treated with both chemotherapy and radiotherapy, where chemotherapy and radiotherapy start dates are within 14 days of each other, and time from diagnosis date to first treatment date is less than 42 days	Total number of patients in Registry undergoing chemo-radiotherapy treatment



	A	B	C	D	E	F	G	H	TOTAL
Numerator	2	2	0	1	4	9	1	1	**20**
Denominator	11	26	17	4	9	24	7	10	**108**
%	18	8	0	25	44	38	14	10	**19**

QI 4: NUMBER OF PATIENTS WITH DOCUMENTED SCREENING FOR SUPPORTIVE CARE

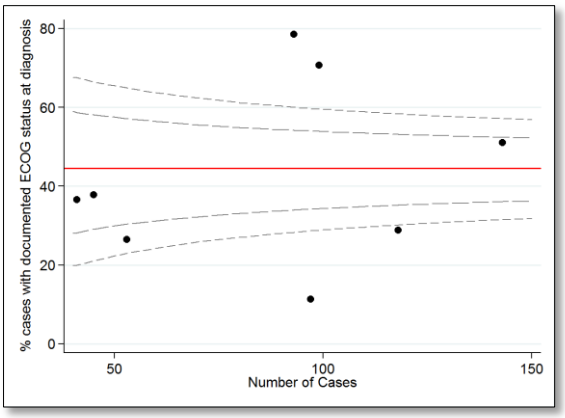
No.	Numerator	Denominator
4	Number of patients with documented screening for supportive care	Total number of patients in Registry



	A	B	C	D	E	F	G	H	TOTAL
Numerator	20	61	1	1	22	44	16	24	**189**
Denominator	99	143	119	52	97	93	45	41	**689**
%	20	43	1	2	23	47	36	59	**27**

QI 5: NUMBER OF PATIENTS WITH DOCUMENTED ECOG STATUS

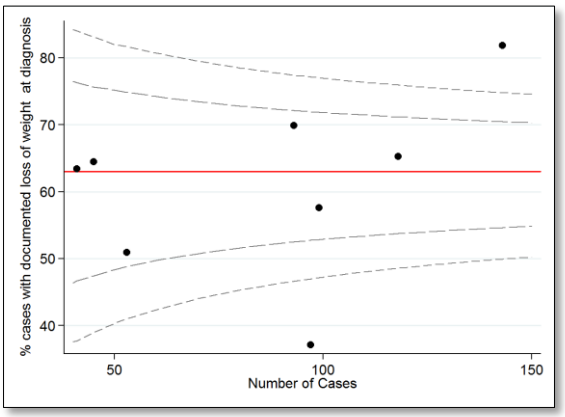
No.	Numerator	Denominator
5	Number of patients with documented ECOG status	Total number of patients in Registry



	A	B	C	D	E	F	G	H	TOTAL
Numerator	70	73	34	14	11	73	17	15	**307**
Denominator	99	143	119	52	97	93	45	41	**689**
%	70	51	29	26	11	78	38	37	**45**

QI 6: NUMBER OF PATIENTS WITH WEIGHT LOSS ASSESSMENT DOCUMENTED AT DIAGNOSIS

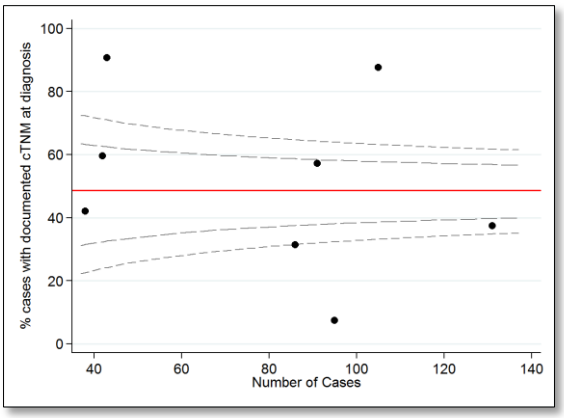
No.	Numerator	Denominator
6	Number of patients with weight loss assessment documented at diagnosis	Total number of patients in Registry



	A	B	C	D	E	F	G	H	TOTAL
Numerator	57	117	77	27	36	65	29	26	**434**
Denominator	99	143	119	52	97	93	45	41	**689**
%	58	82	65	51	37	70	64	63	**63**

QI 7: NUMBER OF PATIENTS WITH CLEARLY DOCUMENTED cTNM AT DIAGNOSIS.

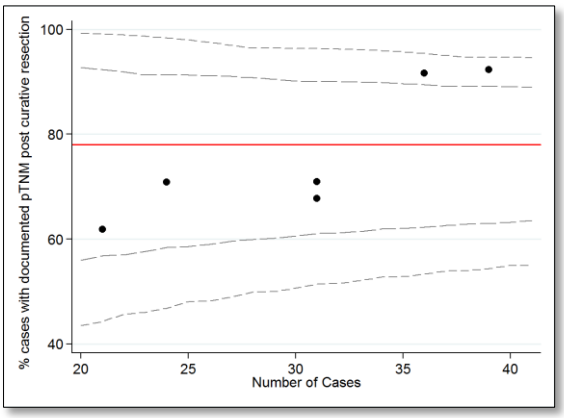
No.	Numerator	Denominator
7	Number of patients with clearly documented cTNM at diagnosis	Number of patients with NSCLC



	A	B	C	D	E	F	G	H	TOTAL
Numerator	52	49	92	39	7	27	25	16	**307**
Denominator	91	131	105	43	95	86	42	38	**631**
%	57	37	88	91	7	31	60	42	**49**

QI 8: NUMBER OF NSCLC PATIENTS + SURGICAL RESECTION WITH CLEARLY DOCUMENTED PTNM.

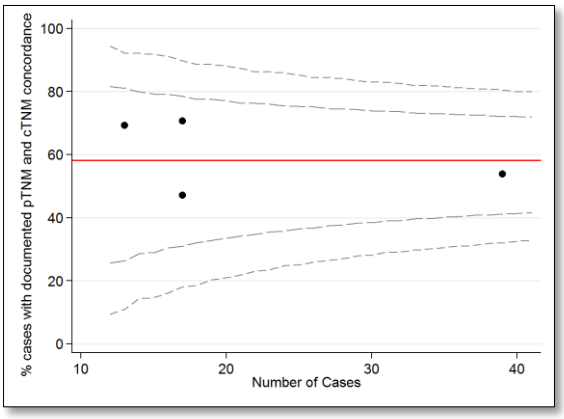
No.	Numerator	Denominator
8	Number of NSCLC patients + surgical resection with clearly documented pTNM	Number of patients with NSCLC who have undergone surgical resection



	A	B	C	D	E	F	G	H	TOTAL
Numerator	21	33	36	17	13	22	3	2	**147**
Denominator	31	36	39	24	21	31	6	3	**191**
%	68	92	92	71	62	71	50	67	**77**

QI 8A: NUMBER OF NSCLC PATIENTS + SURGICAL RESECTION WHERE cTNM AGREES WITH pTNM

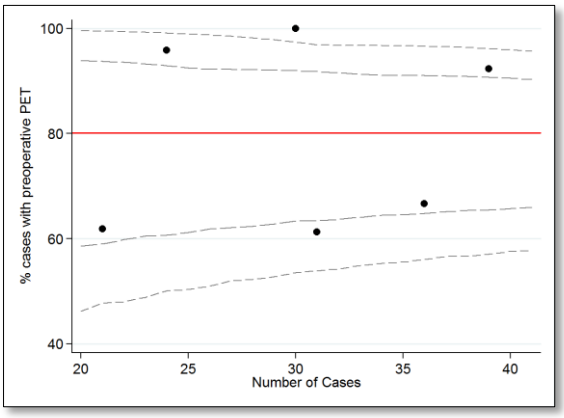
No.	Numerator	Denominator
8a	Number of NSCLC patients + surgical resection where cTNM agrees with pTNM	Number of patients with NSCLC undergoing surgical resection with cTNM and pTNM available



	A	B	C	D	E	F	G	H	TOTAL
Numerator	9	12	21	8	4	9	3	2	**68**
Denominator	13	17	39	17	4	9	3	2	**104**
%	69	71	54	47	100	100	100	100	**65**

QI 9: NUMBER OF PATIENTS UNDERGOING CURATIVE RESECTION WITH CLEARLY DOCUMENTED PET AT DIAGNOSIS

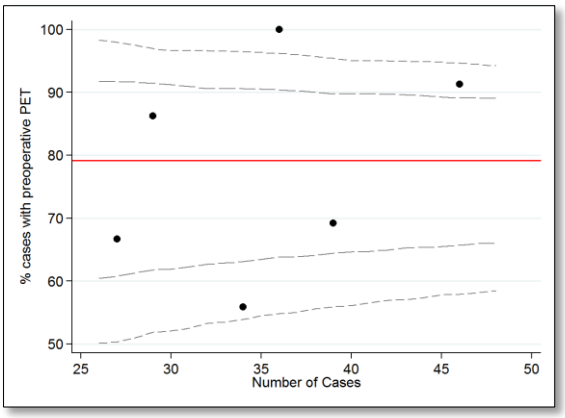
No.	Numerator	Denominator
9	Number of patients with clearly documented PET at diagnosis undergoing curative resection	Total number of patients undergoing curative resection



	A	B	C	D	E	F	G	H	TOTAL
Numerator	30	25	37	23	14	19	3	2	**153**
Denominator	31	36	39	24	21	31	6	3	**191**
%	97	69	95	96	64	61	50	66	**80**

QI 9A: NUMBER OF PATIENTS UNDERGOING CURATIVE TREATMENT.WITH CLEARLY DOCUMENTED PET AT DIAGNOSIS

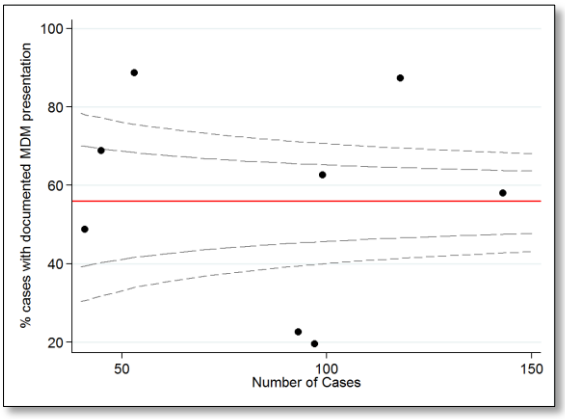
No.	Numerator	Denominator
9a	Number of patients with clearly documented PET at diagnosis undergoing curative treatment	Total number of patients undergoing curative treatment



	A	B	C	D	E	F	G	H	TOTAL
Numerator	36	27	42	25	18	19	6	5	**178**
Denominator	36	38	45	29	27	34	8	5	**222**
%	100	71	93	86	67	56	75	100	**80**

QI 10: NUMBER OF PATIENTS WITH DOCUMENTED PRESENTATION AT AN MULTIDISCIPLINARY MEETING.

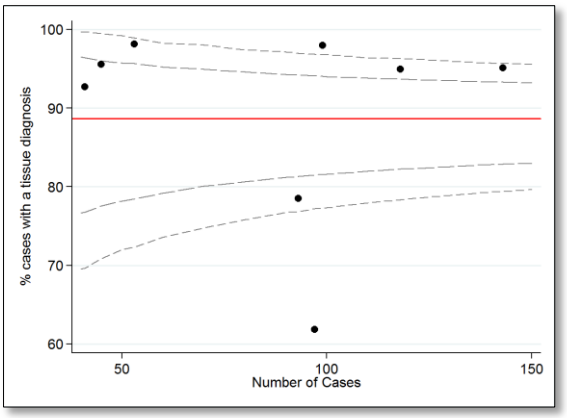
No.	Numerator	Denominator
10	Number of patients with documented presentation at an MDM	Total number of patients in Registry



	A	B	C	D	E	F	G	H	TOTAL
Numerator	62	83	103	47	19	21	31	20	**386**
Denominator	99	143	119	52	97	93	45	41	**689**
%	63	58	87	89	20	23	69	48	**56**

QI 11: NUMBER OF PATIENTS WITH A TISSUE DIAGNOSIS (POSITIVE CYTOLOGY, SPUTUM, BRONCHIAL WASHINGS).

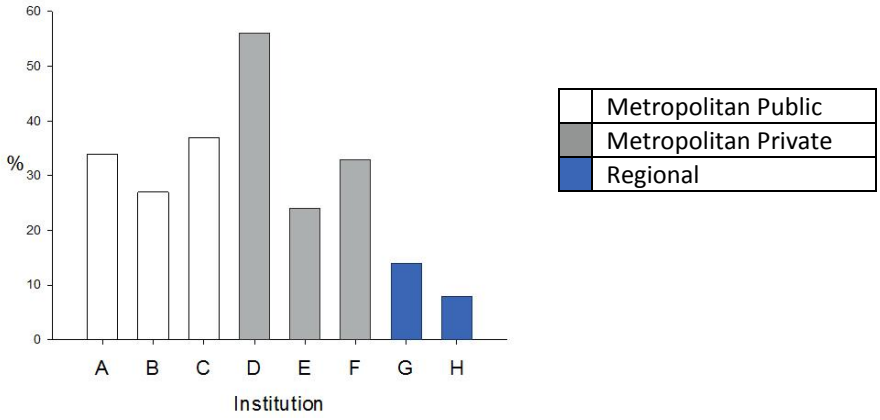
No.	Numerator	Denominator
11	Number of patients with a tissue diagnosis (Positive cytology, sputum, bronchial washings)	Total number of patients in Registry



	A	B	C	D	E	F	G	H	TOTAL
Numerator	97	136	112	52	60	73	43	38	**611**
Denominator	99	143	119	52	97	93	45	41	**689**
%	98	95	94	100	62	78	96	93	**89**

QI 12: NUMBER OF PATIENTS WITH NSCLC + RESECTION (WEDGE + LOBECTOMY + PNEUMONECTOMY).

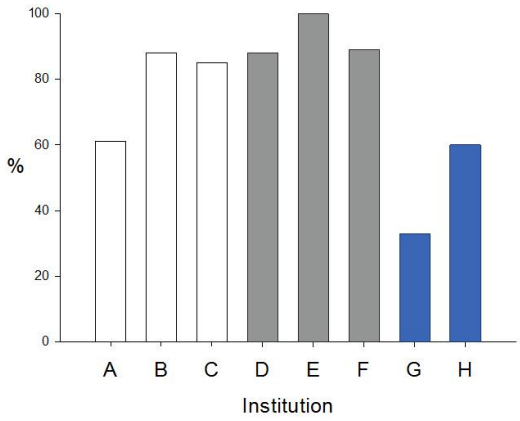
No.	Numerator	Denominator
12	Number of patients with NSCLC + resection (wedge + lobectomy + pneumonectomy)	Number of patients with NSCLC



	A	B	C	D	E	F	G	H	TOTAL
Numerator	31	36	39	24	21	31	6	3	**191**
Denominator	91	131	105	43	86	95	42	38	**631**
%	34	27	37	56	24	33	14	8	**30**

QI 12A: NUMBER OF PATIENTS WITH NSCLC + STAGE I AND II + RESECTION (WEDGE + LOBECTOMY + PNEUMONECTOMY).

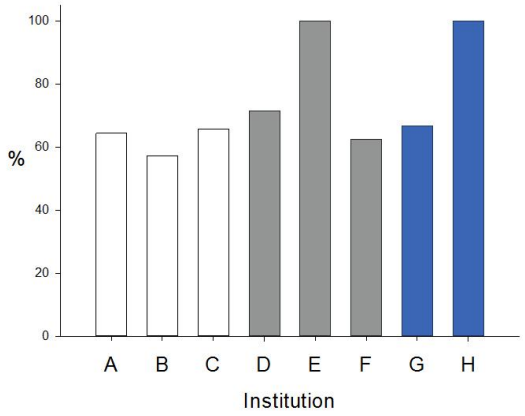
No.	Numerator	Denominator
12a	Number of patients with NSCLC + stage I and II + resection = (wedge + lobectomy + pneumonectomy)	Number of patients with NSCLC + stage I and II



	A	B	C	D	E	F	G	H	TOTAL
Numerator	14	21	35	14	3	8	3	3	**101**
Denominator	23	24	41	16	3	9	9	5	**130**
%	61	88	85	88	100	89	33	60	**78**

QI 13: NUMBER OF PATIENTS WITH NSCLC + STAGE I AND II + RESECTION (LOBECTOMY).

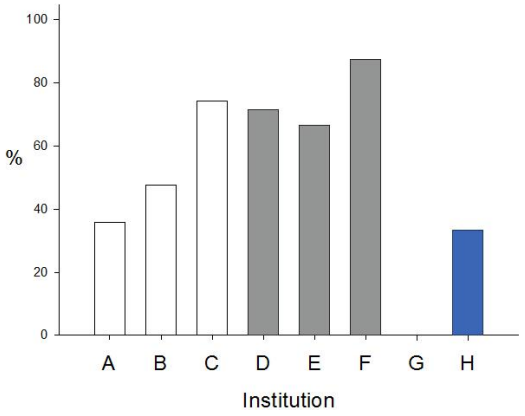
No.	Numerator	Denominator
13	Number of patients with NSCLC + stage I and II + resection (lobectomy)	Number of patients with NSCLC stage I and II undergoing surgical resection



	A	B	C	D	E	F	G	H	TOTAL
Numerator	9	12	23	10	3	5	2	3	**67**
Denominator	14	21	35	14	3	8	3	3	**101**
%	64	57	66	71	100	63	67	100	**66**

QI 14: NUMBER OF PATIENTS WITH NSCLC + STAGE I AND II + RESECTION (WEDGE + LOBECTOMY + PNEUMONECTOMY) BY VATS APPROACH.

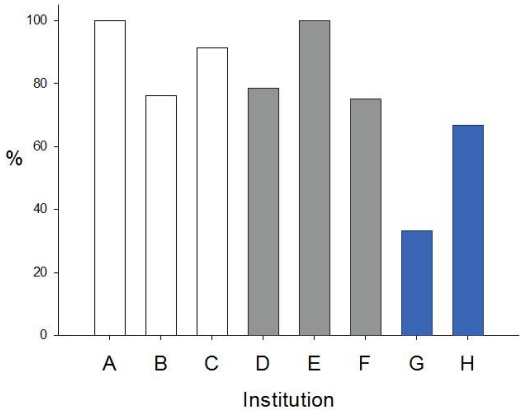
No.	Numerator	Denominator
14	Number of patients with NSCLC + stage I and II + resection (wedge + lobectomy + pneumonectomy) by VATS approach	Number of patients with NSCLC stage I and II undergoing surgical resection



	A	B	C	D	E	F	G	H	TOTAL
Numerator	5	10	26	10	2	7	0	1	**61**
Denominator	14	21	35	14	3	8	3	3	**101**
%	36	48	74	71	67	88	0	33	**60**

QI 15: NUMBER OF PATIENTS WITH NSCLC + STAGE I AND II + RESECTION (WEDGE + LOBECTOMY + PNEUMONECTOMY) WITH LYMPH NODE DISSECTION.

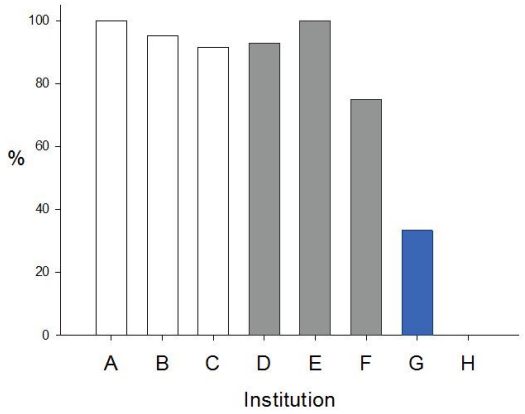
No.	Numerator	Denominator
15	Number of patients with NSCLC + stage I and II + resection (wedge + lobectomy + pneumonectomy) with lymph node dissection	Number of patients with NSCLC stage I and II undergoing surgical resection



	A	B	C	D	E	F	G	H	TOTAL
Numerator	14	16	32	11	3	6	1	2	**85**
Denominator	14	21	35	14	3	8	3	3	**101**
%	100	76	91	79	100	75	33	67	**84**

QI 15A: NUMBER OF PATIENTS WITH NSCLC + STAGE I AND II + RESECTION (WEDGE + LOBECTOMY + PNEUMONECTOMY) WITH ⩾ 5 LYMPH NODES DISSECTED.

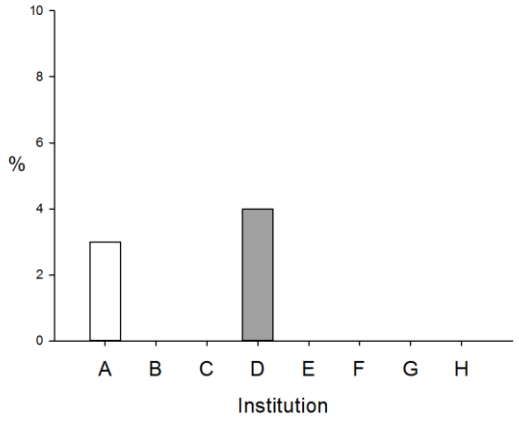
No.	Numerator	Denominator
15a	Number of patients with NSCLC + stage I and II + resection (wedge + lobectomy + pneumonectomy) with ≥ 5 lymph nodes dissected	Number of patients with NSCLC stage I and II undergoing surgical resection



	A	B	C	D	E	F	G	H	TOTAL
Numerator	14	20	32	13	3	6	1	0	**89**
Denominator	14	21	35	14	3	8	3	3	**101**
%	100	95	91	93	100	75	33	0	**88**

QI 16: NUMBER OF PATIENTS WITH NSCLC UNDERGOING CURATIVE SURGICAL RESECTION WHERE TIME BETWEEN OPERATION DATE AND DEATH DATE IS LESS THAN OR EQUAL TO 30 DAYS.

No.	Numerator	Denominator
16	Number of NSCLC patients +surgical resection with death date within 30 days of resection	Number of patients with NSCLC who have undergone surgical resection

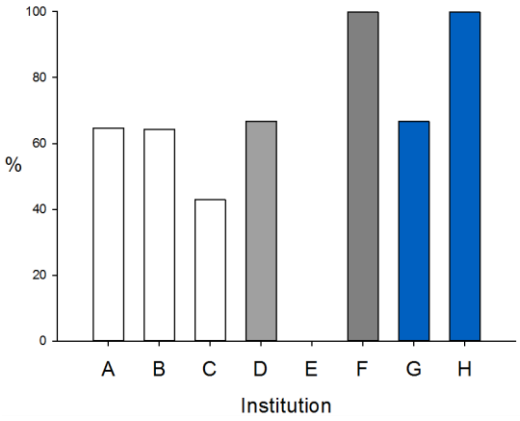


	A	B	C	D	E	F	G	H	TOTAL
Numerator	1	0	0	1	0	0	0	0	**2**
Denominator	31	36	39	24	21	31	6	3	**191**
%	3	0	0	4	0	0	0	0	**1**

Chemotherapy and radiotherapy indicators

QI 17: NUMBER OF PATIENTS WITH STAGE III and IV NSCLC + GOOD PERFORMANCE STATUS (ECOG 0-1) UNDERGOING CHEMOTHERAPY

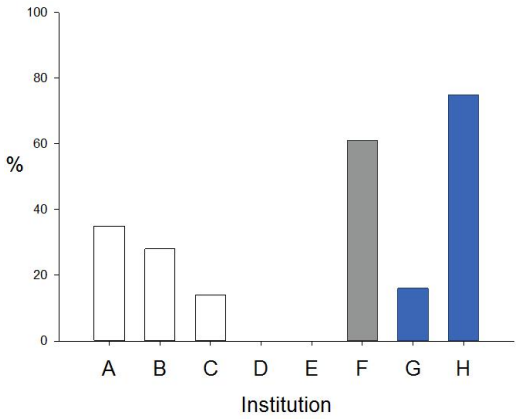
No.	Numerator	Denominator
17	Number of patients with stage III and IV NSCLC + good performance status (ECOG 0-1) + chemotherapy	Number of patients with NSCLC stage III and IV + ECOG 0-1



	A	B	C	D	E	F	G	H	TOTAL
Numerator	11	9	6	4	0	13	4	4	**24**
Denominator	17	14	14	6	2	13	6	4	**76**
%	65	64	43	67	0	100	67	100	**32**

QI 18: NUMBER OF PATIENTS WITH STAGE III+IV NSCLC + GOOD PERFORMANCE STATUS (ECOG 0-1) + PLATINUM-BASED AGENT + NON PLATINUM + RADIOTHERAPY.

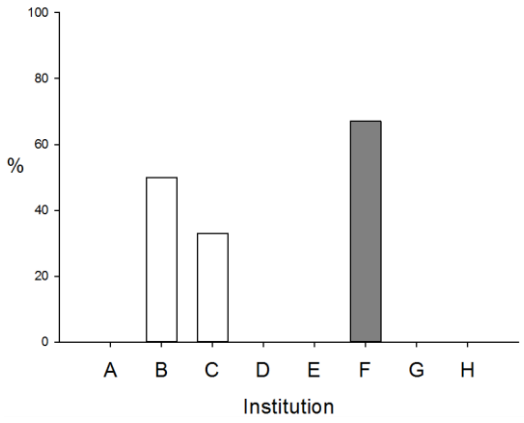
No.	Numerator	Denominator
18	Number of patients with stage III and IV NSCLC + good performance status (ECOG 0-1) + platinum-based agent + non platinum + radiotherapy	Number of patients with NSCLC stage III and IV + ECOG 0-1



	A	B	C	D	E	F	G	H	TOTAL
Numerator	6	4	2	0	0	8	1	3	**24**
Denominator	17	14	14	6	2	13	6	4	**76**
%	35	29	14	0	0	62	17	75	**32**

QI 19 NUMBER OF PATIENTS WITH COMPLETELY RESECTED PATHOLOGIC STAGE IIA AND OR IIB NSCLC + GOOD PERFORMANCE STATUS (ECOG 0-2) + LUNG RESECTION + PLATINUM BASED CHEMOTHERAPY.

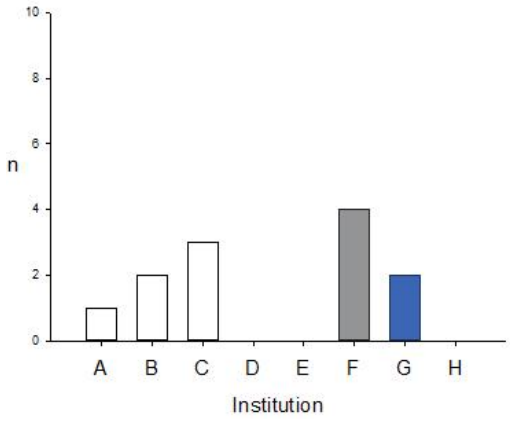
No.	Numerator	Denominator
19	Number of patients with completely resected pathologic stage IIA and or IIB NSCLC + good performance status (ECOG 0-1) + lung resection + platinum based chemotherapy	Number of patients with NSCLC + stage IIA and IIB + ECOG 0-1 + resection



	A	B	C	D	E	F	G	H	TOTAL
Numerator	0	2	1	0	0	2	0	0	**5**
Denominator	1	4	3	1	0	3	0	0	**12**
%	0	50	33	0	0	67	0	0	**40**

QI 20: NUMBER OF DECEASED PATIENTS WITH LUNG CANCER WHERE TIME BETWEEN CHEMOTHERAPY START DATE AND DEATH DATE IS LEAST THAN OR EQUAL TO 30 DAYS.

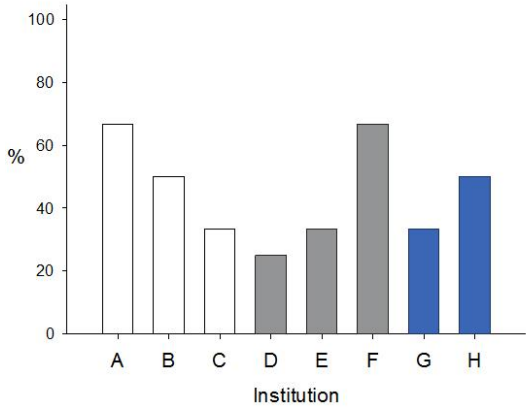
No.	Numerator	Denominator
20	Number of deceased patients with lung cancer where time between chemotherapy start date and death date Is least than or equal to 30 days	Number of patients receiving chemotherapy



	A	B	C	D	E	F	G	H	TOTAL
Numerator	1	2	3	0	0	4	1	0	**11**
Denominator	32	58	41	24	30	62	17	23	**287**
%	3	3	7	0	0	6	6	0	**4**

QI 21: NUMBER OF LIMITED STAGE (STAGE I – III) SMALL CELL LUNG CANCER PATIENTS + CHEMOTHERAPY + CONCURRENT THORACIC RADIOTHERAPY WITH FIRST CYCLE CHEMO (WHERE DAYS BETWEEN CHEMOTHERAPY START DATE AND RADIOTHERAPY START DATE IS EQUAL TO 14 DAYS OR LESS.)

No.	Numerator	Denominator
21	Number of limited stage (Stage I – III) small cell lung cancer patients + chemotherapy + concurrent thoracic radiotherapy with first cycle chemo (where days between chemotherapy start date and radiotherapy start date is equal to 14 days or less)	Number or patients with limited stage SCLC receiving chemotherapy

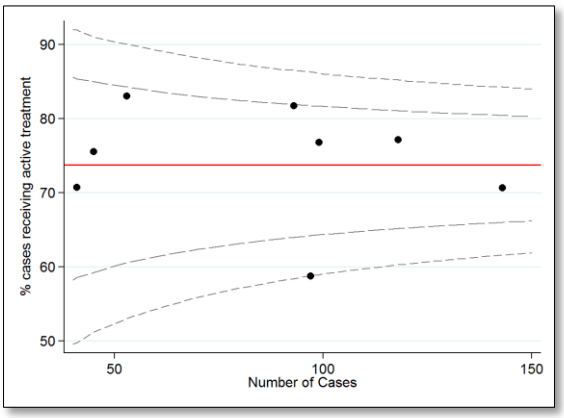


	A	B	C	D	E	F	G	H	TOTAL
Numerator	2	2	3	1	1	2	1	1	**13**
Denominator	3	4	9	4	3	3	3	2	**31**
%	67	50	33	25	33	67	33	50	**42**

Active treatment indictors

QI 22: NUMBER OF PATIENTS RECEIVING ACTIVE CANCER TREATMENT (TREATMENT IS DEFINED AS ANY INTENT SURGERY, RADIOTHERAPY, CHEMOTHERAPY, EXCLUDING PALLIATIVE CARE

No.	Numerator	Denominator
22	Number of patients receiving active cancer treatment (Treatment is defined as any intent surgery, radiotherapy, chemotherapy, excluding palliative care)	Total number of patients in Registry

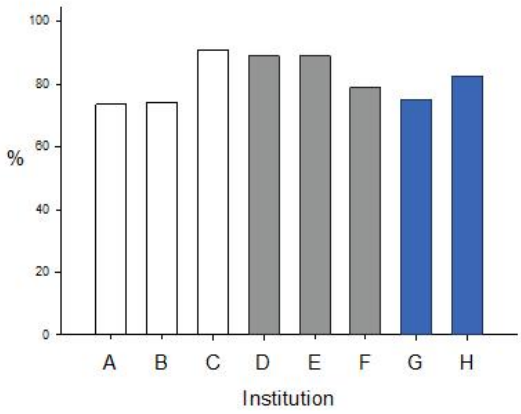


	A	B	C	D	E	F	G	H	TOTAL
Numerator	76	101	91	44	57	76	34	29	**508**
Denominator	99	143	118	53	97	93	45	41	**689**
%	77	71	77	83	59	82	76	71	**74**

Palliative care indicators

QI 23: NUMBER OF PATIENTS WITH STAGE IV NSCLC REFERRED TO PALLIATIVE CARE, WHERE TIME BETWEEN DATE OF DIAGNOSIS AND DATE OF REFERRAL IS THAN OR EQUAL TO 56 DAYS.

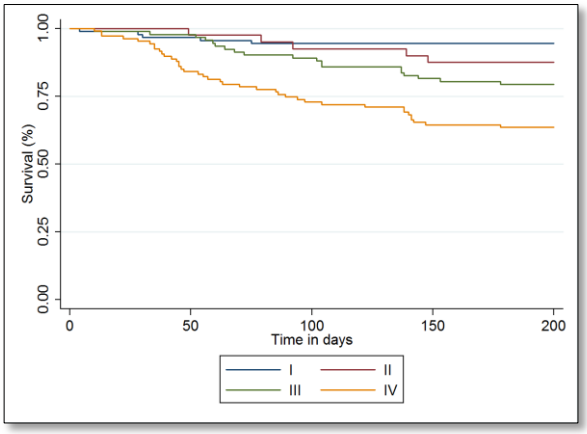
No.	Numerator	Denominator
23	Number of patients with stage IV NSCLC referred to palliative care, where time between date of diagnosis and date of referral is than or equal to 56 days	Number of patients with stage IV NSCLC



	A	B	C	D	E	F	G	H	TOTAL
Numerator	25	23	39	8	24	15	15	14	**163**
Denominator	34	31	43	9	27	19	20	17	**200**
%	74	74	91	89	89	79	75	82	**82**

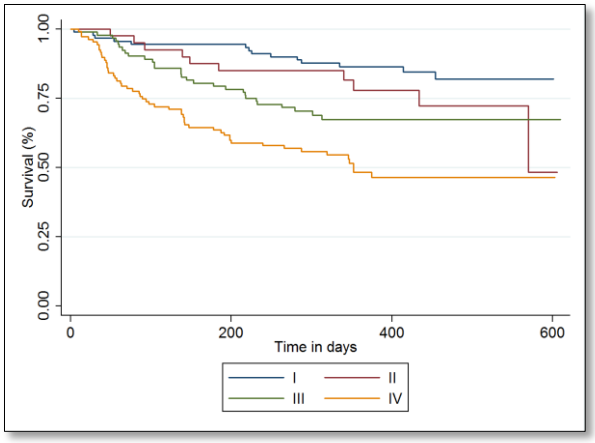
Survival

Survival curve at 6 months post diagnosis by Stage (I,II,III,IV)



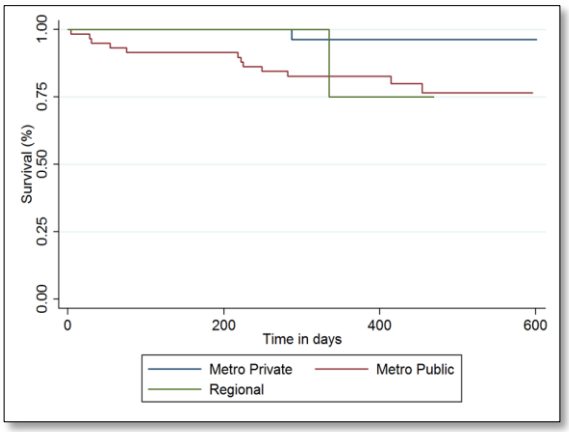
Survival			
Clinical Stage	Alive	Deaths	Total
I	85	5	90
II	36	4	40
III	73	20	93
IV	69	40	109
Total	**263**	**69**	**332**

Survival curve at 1 year post diagnosis by Stage (I,II,III,IV)



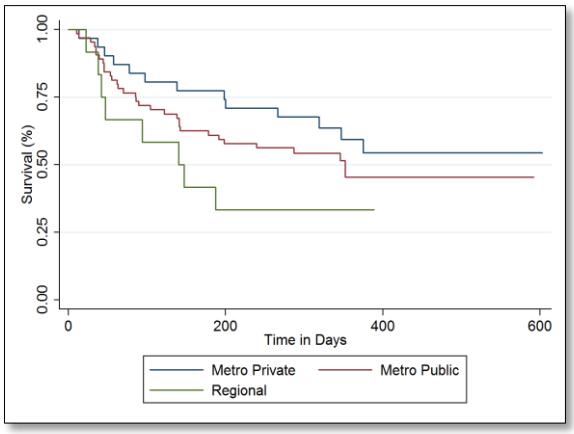
Survival			
Clinical Stage	Alive	Deaths	Total
I	76	14	90
II	30	10	40
III	64	29	93
IV	54	55	109
Total	**224**	**108**	**332**

Survival curve at 1 year post diagnosis for Stage 1 by region



Survival (Stage I)					
Met Public		**Met Private**		**Regional**	
Alive	Deaths	Alive	Deaths	Alive	Deaths
46	12	26	1	4	1

Survival curve at 1 year post diagnosis for stage IV by region



Survival (Stage IV)					
Met Public		**Met Private**		**Regional**	
Alive	Deaths	Alive	Deaths	Alive	Deaths
32	32	18	13	4	10

VLCR Personnel

The VLCR acknowledges and thanks the investigators, committee members, data collectors and hospital staff for their active involvement and support.

VLCR staff:

Dr Rob Stirling (Principal Investigator)

Dr Sue Evans (Data Custodian)

Peta McLaughlin (Project Officer)

Meera Senthuren (Research Officer)

Susan McKenna (Follow up Interviewer)

John Liman (Senior Analyst, Programmer)

Sara McLaughlin- Barrett (Epworth Cardiothoracic Nurse and VLCR Data collector)

Monica Lammers (St Vincent's' Hospital and St Vincent's' and Mercy Private Hospital, Respiratory Scientist and VLCR Data Collector)

Tina Leeuwrick (Cabrini Data Collector)

Nathan O'Shaughnessy (Alfred Data Collector)

Jessica Callaghan (Administrative Assistant)

Site Lead Investigators

A/Prof Paul Mitchell

Dr Matthew Conron

A/Prof Phillip Antippa

A/Prof Gary Richardson

A/Prof David Ashley

Conclusions

- The registry outcomes for each participating institution are summarised in a blinded fashion with each institution only able to identify their own institution.
- The performance of each institution may be compared to provide benchmarking of relative performance for participating institutions.
- Registry outcomes are reported to each institution via the CEO, Chief Medical Officer, Lung Cancer MDM lead and ethics committee.
- The evaluation of registry outcomes at governance, administrative and clinical levels may identify targets for service improvement and targets for further safety and safety evaluation.
- Registry outcomes may identify areas for improvement as targets for service innovation and development
- The comparison of performance outcomes across institutions and institution sectors may drive competitive recruitment to improve measures on a year on year basis.

Future directions

- Expanding institutional engagement in registry
- Aim for complete state-wide inclusion
- Evaluate, challenge and refine quality indicators
- Foster research initiatives around registry data
- Explore sustainable funding models
- Develop and extend statewide demand for quality data
- Evaluation of Quality of Life data and development of publication

References

1. Stirling RG. Clinical quality registries: engaging effectiveness data for quality improvement. Am J Public Health. 2014 Dec;104(12)

2. Stirling RG, Evans SM, McLaughlin P, Senthuren M, Millar J, Gooi J, Irving L, Mitchell P, Haydon A, Ruben J, Conron M, Leong T, Watkins N, McNeil JJ. The Victorian Lung Cancer Registry pilot: improving the quality of lung cancer care through the use of a disease quality registry. Lung. 2014 Oct;192(5):749-58

3. Stirling RG, Evans SM, McNeil JJ. Emerging evidence of a clinical quality registry as a driver of improvement in lung cancer outcomes. J Thorac Oncol. 2014 Mar; 9 (3):e28.

4. Evans SM, Scott IA, Johnson NP, Cameron PA, McNeil JJ. Development of clinical-quality registries in Australia: the way forward. Med J Aust. 2011 Apr 4; 194 (7):360-3.

5. McNeil JJ, Evans SM, Johnson NP, Cameron PA. Clinical-quality registries: Their role in quality improvement. Med J Aust. 2010 Mar 1;192 (5):244-5.

6. Evans SM, Bohensky M, Cameron PA, McNeil J. A survey of Australian clinical registries: can quality of care be measured? Intern Med J. 2011 Jan; 41(1a).

Appendices

Appendix A: VLCR Quality indicators

No.	Numerator	Denominator
Process Indicators:		
1	Number of patients where time from referral date to diagnosis is less than 28 days	Total number of patients in Registry with a referral date available
2	Number of patients where time from diagnosis date to first treatment date is less than 14 days	Total number of patients in Registry receiving treatment
2a	Number of patients where time from diagnosis date to surgical resection date is less than 14 days	Total number of patients in Registry undergoing surgical resection
2b	Number of patients where time from diagnosis date to first chemotherapy treatment date is less than 14 days	Total number of patients in Registry receiving chemotherapy treatment
2c	Number of patients where time from diagnosis date to first radiotherapy treatment date is less than 14 days	Total number of patients in Registry receiving radiotherapy treatment
2d	Number of patients treated with both chemotherapy and radiotherapy, where chemotherapy and radiotherapy start dates are within 14 days of each other and time from diagnosis date to first treatment date is less than 14 days	Total number of patients in Registry undergoing combined chemo-radiotherapy treatment.
3	Number of patients where time from diagnosis date to first treatment date is less than 42 days	Total number of patients in Registry undergoing treatment
3a	Number of patients where time from diagnosis date to surgical resection date is less than 42 days	Total number of patients in Registry undergoing surgical resection
3b	Number of patients where time from diagnosis date to first chemotherapy treatment date is less than 42 days	Total number of patients in Registry undergoing chemotherapy
3c	Number of patients where time from diagnosis date to first radiotherapy treatment date is less than 42 days	Total number of patients in Registry undergoing radiotherapy
3d	Number of patients who have been treated with both chemotherapy and radiotherapy, where chemotherapy and radiotherapy start dates are within 14 days of each other, and time from diagnosis date to first treatment date is less than 42 days	Total number of patients in Registry undergoing chemo-radiotherapy treatment
4	Number of patients with documented screening for supportive care	Total number of patients in Registry
5	Number of patients with documented ECOG status	Total number of patients in Registry
6	Number of patients with weight loss assessment documented at diagnosis	Total number of patients in Registry
7	Number of patients with clearly documented cTNM at diagnosis	Number of patients with NSCLC
8	Number of NSCLC patients + surgical resection with clearly documented pTNM	Number of patients with NSCLC who have undergone surgical resection
8a	Number of NSCLC patients + surgical resection where cTNM agrees with pTNM	Number of patients with NSCLC undergoing surgical resection with cTNM and pTNM available
9	Number of patients with clearly documented PET at diagnosis undergoing curative resection	Total number of patients undergoing curative resection
9a	Number of patients with clearly documented PET at diagnosis undergoing curative treatment	Total number of patients undergoing curative treatment

10	Number of patients with documented presentation at an MDM	Total number of patients in Registry
11	Number of patients with a tissue diagnosis (Positive cytology, sputum, bronchial washings)	Total number of patients in Registry
Surgical Indicators:		
12	Number of patients with NSCLC + resection (wedge + lobectomy + pneumonectomy)	Number of patients with NSCLC
12a	Number of patients with NSCLC + stage I and II + resection (wedge + lobectomy + pneumonectomy)	Number of patients with NSCLC + stage I and II
13	Number of patients with NSCLC + stage I and II + resection (lobectomy)	Number of patients with NSCLC stage I and II undergoing surgical resection
14	Number of patients with NSCLC + stage I and II + resection (wedge + lobectomy + pneumonectomy) by VATS approach	Number of patients with NSCLC stage I and II undergoing surgical resection
15	Number of patients with NSCLC + stage I and II + resection (wedge + lobectomy + pneumonectomy) with lymph node dissection	Number of patients with NSCLC stage I and II undergoing surgical resection
15a	Number of patients with NSCLC + stage I and II + resection (wedge + lobectomy + pneumonectomy) with ≥ 5 lymph nodes dissected	Number of patients with NSCLC stage I and II undergoing surgical resection
16	Number of patients with NSCLC where time between operation date and death date is less than or equal to 30 days	Number of patients with NSCLC undergoing surgical resection
Chemotherapy and Radiotherapy Indicators:		
17	Number of patients with stage III and IV NSCLC + good performance status (ECOG 0-1) undergoing chemotherapy	Number of patients with NSCLC stage III and IV + ECOG 0-1
18	Number of patients with stage III and IV NSCLC + good performance status (ECOG 0-1) + platinum-based agent + non platinum + radiotherapy	Number of patients with NSCLC stage III and IV + ECOG 0-1
19	Number of patients with completely resected pathologic stage IIA and or IIB NSCLC + good performance status (ECOG 0-2) + lung resection + platinum based chemotherapy	Number of patients with NSCLC + stage IIA and IIB + ECOG 0-2 + resection
20	Number of deceased patients with lung cancer where time between chemotherapy start date and death date Is least than or equal to 30 days	Number of patients receiving chemotherapy
21	Number of limited stage (Stage I – III) small cell lung cancer patients + chemotherapy + concurrent thoracic radiotherapy with first cycle chemo (where days between chemotherapy start date and radiotherapy start date is equal to 14 days or less)	Number or patients with limited stage SCLC receiving chemotherapy
Active treatment Indicators:		
22	Number of patients receiving active cancer treatment (Treatment is defined as any intent surgery, radiotherapy, chemotherapy, excluding palliative care)	Total number of patients in Registry
Palliative care Indicators:		
23	Number of patients with stage IV NSCLC referred to palliative care, where time between date of diagnosis and date of referral is than or equal to 56 days	Number of patients with stage IV NSCLC

Appendix B: VLCR Governance

Steering Committee

Name	Organisation and Title
A/Prof David Ashley	Director of Medical Oncology, Barwon Health.
Professor David Ball	Deputy Director, Radiation Oncology & Cancer Imaging, Chair, Lung Service, Peter MacCallum Cancer Centre.
Dr Peter Briggs	Medical Director SMICS / Head of Oncology, Southern Health.
Shirley Carvosso	Consumer Representative.
Dr Matthew Conron	Director, Department Respiratory and Sleep Medicine, St Vincent's Melbourne.
Mary Duffy	Lung nurse coordinator at Peter MacCallum Cancer Centre, Melbourne.
Dr Sue Evans	Head Clinical Registries Unit, Department of Epidemiology and Preventive Medicine (DEPM), Monash University.
Helen Farrugia	Director Victorian Cancer Registry, Cancer Council Victoria.
A/Prof Vinod Ganju	Medical Oncologist and Haematologist, Peninsula Oncology Centre.
Prof Louis Irving	Director/Respiratory & Sleep Disorders Physician, Department of Respiratory and Sleep Medicine, Royal Melbourne Hospital Melbourne.
A/Prof David Langton	Respiratory & Sleep Physician, Frankston Hospital.
Prof Michael MacManus	Associate Director (Research), Radiation Oncologist, Department of Radiation Oncology**,** Peter MacCallum Cancer Centre, Melbourne.
Prof John McNeil	Head of Department of Epidemiology & Preventive Medicine, Head of School of Public Health & Preventive Medicine, Monash University.
A/Prof Jeremy Millar	Director Radiation Oncology, William Buckland Radiotherapy Centre, Alfred Health & William Buckland Radiotherapy Centre, Gippsland.
A/Prof Paul Mitchell	Associate Professor, University of Melbourne, Director, North-Eastern Melbourne Integrated Cancer Service, President, Australasian Lung Cancer Trials Group, Olivia Newton-John Cancer and Wellness Centre.
A/Prof Jennifer Philip	Co-Deputy Director, Centre for Palliative Care & Deputy Director of Palliative Medicine, St Vincent's.
A/Prof Gary Richardson	Director of Cabrini Academic Haematology & Oncology Service, Associate Professor of Medicine, Monash University, Chairman, Foundation 4, Private Cancer Physicians of Australia, Chairman, Medical Oncology Group of Australia.
Dr Megan Robertson	Executive Director of Research, Epworth HealthCare.

A/Prof Ben Solomon	Medical Oncologist, Head Lung cancer Medical Oncology Service at Peter MacCallum Cancer Centre.
A/Prof Rob Stirling	Principal Investigator, Steering Group Chairman, Victorian Lung Cancer Registry, Consultant Physician, Department of Allergy Immunology & Respiratory Medicine, The Alfred Hospital
Maureen Turner	Chief Executive Officer, BioGrid Australia.
Prof Neil Watkins	Petre Chair in Cancer Biology, Lab Head - Cancer Developmental Biology, Garvan Institute, Sydney, NSW.
A/Prof Gavin Wright	Director of Surgical Oncology, St Vincent's Hospital Melbourne.
Professor John Zalcberg	Head, Cancer Research. School of Public Health and Preventive Medicine, Monash University.

Management Committee

Management Committee is responsible for managing the day-to-day aspects of the clinical registry. Data quality measures are reported regularly to the management committee. Management Committee members include:

Name	Organisation
A/Prof Rob Stirling	Steering Committee Chair, Principal Investigator VLCR, Respiratory Physician, Alfred Health
Dr Sue Evans	Head: Clinical Registries Unit, School of Public Health & Preventive Medicine, Monash University.
Dr Julian Gooi	Cardiothoracic Surgeon, Alfred Health.
A/Prof Jennifer Phillips	Deputy Director, Palliative Medicine & Centre for Palliative Care, St Vincent's Hospital.
Dr Andrew Haydon	Medical Oncologist, Alfred Health
Dr Jeremy Ruben	Radiation Oncologist, William Buckland Radiotherapy Centre, The Alfred, RANZCR Training Network Director, Victoria.

Appendix C: Investigation into VLCR case ascertainment completeness

Summary: A quantitative, case finding audit was employed to evaluate the case ascertainment methodology and assess capture completeness at a Victorian public and private metropolitan hospital.

Methods: Lists of lung cancer patients recorded for the period 01/07/2011 and 30/06/2012 were requested from institutional departments including; Radiotherapy, Palliative Care, Day Procedure Unit, Oncology Lung Multidisciplinary Team Meeting (MDM), Cardiothoracic Surgery (CTS), Pathology and the Victorian Cancer Registry (VCR). Comparisons were made between VLCR administrative capture versus clinical capture achieved by the use of clinical databases compared with mandated VCR capture.

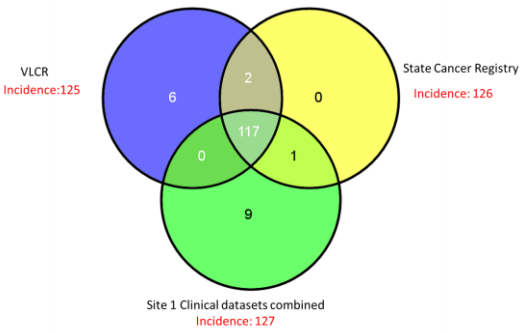
Results: The VLCR registered 125 new cases in Site A and 96 in Site B. A total of 10 (7.5%) patients in Site A and 30 (23.5%) patients in Site B had not been recruited by the registry. Investigations indicated that the underreporting of these cases was attributed to the use of the ICD10 R91 Code (when lung cancer is suspected but not confirmed) in site A and non-coded day patients (e.g. day admissions, direct admission to palliative care or MDM) in site B.

Conclusion: The completeness of capture of incident cancers occurring in a population and included in a registry database is a vital attribute of a cancer registry. Inclusion of the R code and an attempt to capture un-coded patients will ensure registry incidence rates are close to their true value.

Site 1

Database	Total presentations	Ineligible	Incidence	Already on VLCR	No of patients not in VLCR	Total number added to registry
MDM	**271**	**184**	**87**	**70**	17	8
WBRC	**163**	**104**	**59**	**52**	7	2
CTS	**124**	**86**	**38**	**34**	4	0
VCR	**192**	**64**	**126**	**119**	7	0
Pathology	**12**	**1**	**11**	**5**	6	0
Radiology	**93**	**53**	**40**	**37**	3	0
Total						10

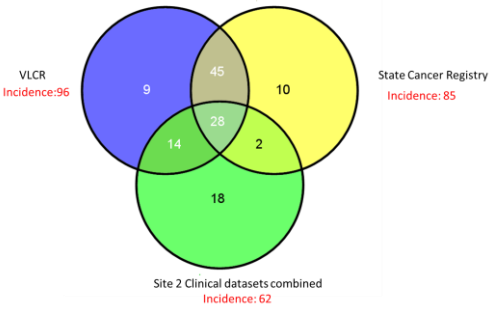
Findings: VLCR, VCR and Site 1 clinical databases



Site 2

Database	Total presentations	Ineligible	Incidence	Already on VLCR	No of patients not in VLCR	Total number (added to registry)
MDM	**97**	**59**	**35**	**24**	**11**	**9**
Pall. Care	**54**	**40**	**14**	**9**	**5**	**4**
VCR	**176**	**64**	**106**	**73**	**33**	**12**
Radiotherapy	**89**	**49**	**40**	**22**	**18**	**5**
Total						**30**

Findings: VLCR, VCR and Site 2 clinical databases



Appendix D: VLCR Escalation policy

The Lung Cancer Registry is responsible for collection and analysis of treatment and outcome data. Outcome data routinely reported by the registry includes treatment, time to treatment and mortality. With this activity comes the responsibility to act upon outliers identified by the registry.

An outlier escalation policy has been developed, in line with other clinical registries, to ensure that if any clinicians are providing sub-optimal care they may be identified and strategies are put in place to prevent patient harm.

No monitoring system can reliably separate "true inliers" from the "true outliers." This is because of the complexity and variations inherent in patients and healthcare services and the inaccuracy of monitoring methodologies. Therefore a three-stage graded response system is proposed with escalation to the next stage if an alert has occurred during the previous stage.

The escalation policy will relate to outliers in terms of increased mortality rate compared to peer organisations, following diagnosis of lung cancer. Mortality rates will adjust for factors known to impact on mortality. Disease pathology, age, staging and ECOG status will be used to categorise patients according to risk. These adjusted rates will then be compared with peer organisations.

The **Level 1** alert or "warning" trigger is set to flag at a statistically significant change from the benchmark of two standard deviations from the mean. If a Level 1 alert is reached data are checked for accuracy and the outlier clinician will be notified. Data will be reviewed for accuracy. If 'outlier status' is deemed by the Steering Committee not to be a data quality issue the Medical Director or Head of Unit will then be notified.

A **Level 2** alert or "investigation" trigger is set at three standard deviations from the mean. If a Level 2 is reached then the following processes are initiated under direction of the Steering Committee:

Data will again be checked for major errors e.g. validate against hospital records and devices, ensure data entry are correct.

Data will be checked for major shifts in that clinician's demographic and casemix. e.g. compare age, sex and comorbidity profile.

Assess whether there are casemix factors peculiar to this clinician that may explain the observed variations

Following this review, confidential communication to the relevant clinician will be provided with results of preliminary analysis and an explanatory report. If an outlier is identified, contact will be made with the Executive Medical Director or the Chairman of the relevant Ethics Committee. This report will also be made available to the Head of Unit or Medical Director. Should this investigation not produce a suitable explanation for an anomaly, investigation will proceed to Level 3.

A **Level 3** alert is flagged if the Level 2 alert persists for more than two consecutive quarters or as above. As with a Level 2 flag, the aim of this stage is to identify and exclude common factors that may have lead to a false alarm. Here is a suggested action plan:

All of Stage 2 is undertaken (if not already completed) ***and***

Check for calculation errors, such as an inadvertent model coefficient error or an incorrect risk-adjustment formula, ***and***

If necessary, extract raw data a second time and re-calculate risk-adjustment models.

Identify if there have been significant changes in the recalibrated model(s)

Should this investigation not provide a suitable explanation for the alert signal(s) a peer review process and audit will be undertaken in collaboration with the institution. The Steering Committee will recommend targeted investigation focusing on areas which are likely to be helpful including, but not limited to the following issues:

Patient factors

Is there significant variation in casemix?

Has the casemix shifted?

Have referral patterns changed?

Structure and resource availability.

Has there been a change in data collection practices e.g. personnel changes, IT software/hardware changes, data submission?

Have clinical services been substantially altered? e.g. increased workload

Has there been a change in funding?

Has there been a change in resources?

Has there been a change in clinical services?

Is there an internal clinical audit process?

Do these internal audit reports highlight areas of interest?

Within a one month period, the clinician and the Director of Medical Services or Head of Unit will be notified with a written report of the findings of this review. Recommendations will be made e.g. improvement to resources, staffing, training, clinical audit, peer review. Issues will be raised with the Chief Executive Officer if the committee is not satisfied with explanation for persistent outlier status in regard to mortality and if actions are not initiated

Appendix E: VLCR Publications, presentations and awards

Awards	
Epworth Research Institute. Small Research grant: $10,000. Improvement in quality of care provided to lung cancer patients at Epworth Healthcare through the support and development of the Victorian Lung Cancer Registry.	2014
Highly Commended Award: Alfred Health Chairman of the Board Awards for Patient Safety and Quality Improvement.	2012
Journal Publications	
The Victorian Lung Cancer Registry Pilot: Improving the Quality of Lung Cancer Care Through the Use of a Disease Quality Registry, Lung, June 2014	June, 2014
Poster Presentations	
IASLC 15th World Conference on Lung Cancer. Sydney. Determining completeness of case ascertainment to a lung cancer registry: A single institutional study.	October, 2013
HISA (Health Informatics Society of Australia), Big Data Conference, Melbourne. Development of a Secure Data Transfer Protocol Service for Australian Clinical Quality Registries. The Monash University Experience.	April, 2013
ATS, American Thoracic Society Conference, San Francisco, California. Quality in lung cancer care: The development of a population based lung cancer registry	May, 2012
ALCC – Australasian Lung Cancer Conference. Adelaide, SA. Quality in lung cancer care: development of a population based lung cancer registry.	October, 2013
ALCC Australasian Lung Cancer Conference, Brisbane QLD. Determining completeness of case ascertainment to a lung cancer registry: A case finding audit.	October,2014
Oral Presentations	
Thoracic Society of Australia and New Zealand 2012 ASM. Canberra. The development of a population based lung cancer registry.	April, 2012
Monash Comprehensive Cancer Consortium (MCCC): Cancer Registries - Joining the Dots: Linking Clinic, Laboratory and Patient Populations, Monash University, Melbourne.	April, 2012
AAQHC - Australasian Conference on Safety and Quality in Health Care. Cairns, QLD. Lung cancer: An urgent call for quality assurance. The development of a population based lung cancer registry.	September, 2012
Grands Rounds. Alfred Health, VLCR Report. Melbourne.	November, 2013
Australian Lung Cancer Conference. Brisbane, QLD • Health service variables impact timelines of care in Victorian lung cancer patients. • Quality in lung cancer care: The Victorian lung cancer registry pilot initial report. • Gap analysis of Victorian Lung Cancer Registry Data after 3 years: Evaluation of MDT variables • A comparison of the use of ICD-10 coding data and manual data extraction in comorbidity	October, 2014

Appendix F: VLCR Funding

The VLCR pilot study was established in late 2010 following a successful grant application to the Victorian Cancer Agency. The VLCR pilot study was funded for 3 years with a total budget of $608,202.

Organisation	Funding ($)		
	2012	**2013**	**2014**
Victorian Cancer Agency	$202,734	$202,734	$202,734
Total Funding received			**$608,202**

Appendix G: Glossary

cTNM	Clinical stage of primary tumour
pTNM	Pathological stage of primary tumour
PET	Positron emission tomography scan
CT	Computed tomography scan
VLCR	Victorian Lung Cancer Registry
ECOG	Eastern Cooperative Oncology Group Performance status score
ICD 10	10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD)
NSCLC	Non small cell lung cancer
SCLC	Small cell lung cancer
VATS	Video-assisted thoracoscopic surgery

Victorian
Cancer
Agency

Monash
Comprehensive
Cancer
Consortium