SCAN
South East Scotland Cancer Network

NHS SCOTLAND

Working regionally to improve cancer services

SOUTH EAST SCOTLAND CANCER NETWORK
PROSPECTIVE CANCER AUDIT

Lung Cancer 2019
QPI Comparative Audit Report

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CONTENTS

Document History

Version	Circulation	Date	Comments
Version 1	Lead Clinicians	13/11/2020	Draft results and outliers circulated.
Version 1.1	Lead Clinician & Regional Audit/Sign Off Sub Group	07/12/2020	To clarify Actions and provide and/or agree outstanding clinical commentary.
Version 2	To Lead Clinician	12/03/2021	Lead Clinician to supply “Chair Summary”.
Version 3	To SCAN Lung Group.	30/04/2021	To SCAN Lung Group for final comment, to be returned by Friday 14th May 2021 latest.
Version 4 Final SCAN Report Index SA L02/21	SCAN Lung Group SCAN Governance Framework SCAN Action Plan Board Leads	11/06/2021	Any potentially disclosive data to be removed prior to publication on SCAN Website.
Version 4W	Report published to SCAN Website	2022	

Chair Summary

SCAN Lung Cancer 2019 Quality Performance Indicators (QPIs) Comparative Report
Comment by Chair of the SCAN Lung Group

At a time of great change for lung cancer patients and options for treatment, it is very useful to look at how we are performing against national and international benchmarks. QPIs help us drive up standards by reviewing our processes and particularly examining unexplained variance. Quality Performance indicators tell us a great deal about the patient pathway and access to treatments but not yet about outcomes e.g. survival (with Public Health Scotland (PHS)) or timelines on that pathway (devolved to waiting times initiative and collected separately). QPIs should be seen within that context and with careful note of any harm (e.g. 30 and 90 day mortality) against any potential benefit.

QPI 2 and 15, around pathological diagnosis, remain very challenging across the network and throughout Scotland. I am very grateful to Dr Phil Reid and his team for performing a detailed audit of 844 patients who did not have a pathological diagnosis of lung cancer in NHS Lothian over 3 years. The results are given in appendix 4. This showed that these patients were frail (48% were PS 3 or 4) and 63% were for no active treatment (best supportive care). The reasons for not performing a biopsy in order of frequency were: Poor Performance Status and would not change management (49%); Inaccessible site or too small a lesion (12%); Patient wishes (11%); Biopsy attempted but negative (10%); Poor lung function and would not tolerate a possible pneumothorax post biopsy (9%); No obvious reason (6%). Under the new version of QPI (Formal Review, Cycle 2 (FR2)) obtaining a frozen section on the day of definitive surgery is now also considered a pre treatment biopsy. PS 3 and 4 patients have also now been removed from this QPI. Recalculating QPI 2(i) for NHS Lothian for 2019 shows a pathological confirmation rate of 81% with these new changes applied which compares very favourably to 72% similar calculation of pathology rate in NHS England 2018 report.

QPIs are always a work in progress and the second round of lung cancer QPI reviews led to publication of FR2 amendments pertaining to lung cancer QPIs applicable to 2020/2021 reporting. We make some references to the changed and new QPIs throughout the document. These new QPIs acknowledge new treatment options e.g. immunotherapy.
The QPI data have been collected, checked, considered and critiqued across the Network by many hard working individuals and my sincerest thanks to them.

With all my thanks and best for the coming year,

Melanie Mackean
April 2021

Clinical Action Points 2019

QPI	Action required	Person Responsible	Date for update
QPI 1	• Continued education for MoE, Gen Med and Respiratory Junior Doctors that *all* lung cancer patients must be brought to MDM for registration. • Replicate NHS-B and NHS-DG protocol of any CT report with suspicion of lung cancer must be sent directly to the respiratory team.	Fife: Dr Iain Murray Lothian: Dr John McCafferty (RIE), Dr Phil Reid (WGH) & Dr Fiona O'Brien (SJH)	To report to SCAN Lung Group Meeting on 20/08/2021
QPI 2 (i)	• Herder score to be documented at MDM and recorded by Audit (free text) and used to identify a particular group of outliers i.e. Stg I surgical pts: biopsy difficult due to position or size.	Borders: Dr Hosni El Taweel D&G: Dr Musa Ali Fife: Dr Iain Murray Lothian: Dr John McCafferty (RIE), Dr Phil Reid (WGH) & Dr Fiona O'Brien (SJH)	As above 20/08/2021
QPI 15 (i)	• Herder score to be documented at MDM and recorded by Audit as above for QPI 2(i). • MDMs should document reasons why no attempt to biopsy. Audit to document (free text) to aid quick identification of reasons for QPI outliers.	As per QPI 2 (i)	As above 20/08/2021
QPI 17	• **Clinical Trials:** continuation – SCAN clinicians to ensure that they register trials with SCRN. SCRN should share their lists of current open trials between the Networks to allow the possibility of cross network trial access. NRCN funding of oncology clinicians undertaken in 2018 to improve access to clinician-driven realistic trials. • To include data from Biobank studies and screening pilots • Existing trials to be documented and an updated Paper submitted to SCAN Lung Group meetings.	All clinical staff	Ongoing process

(See appendix 3 for previous years' action plans)

Lung Cancer QPI Attainment Summary 2019		Target %	Borders		D&G		Fife		Lothian		SCAN	
QPI 1 MDT discussion before definitive treatment		95	N 81 D 82	98.8%	N 140 D 145	96.6%	N 330 D 350	94.3%	N 651 D 713	91.3%	N 1202 D 1290	93.2%
QPI 2 Pathological Diagnosis	All patients with lung cancer	80	N 63 D 80	78.8%	N 94 D 142	66.2%	N 212 D 351	60.4%	N 462 D 713	64.8%	N 831 D 1286	64.6%
	NSCLC with sub-type identified	90	N 54 D 56	96.4%	N 76 D 79	96.2%	N 163 D 179	91.1%	N 330 D 361	91.4%	N 623 D 675	92.3%
	Non squamous IIIB-IV: molecular profiling	75	N 24 D 29	82.8%	N 26 D 30	86.7%	N 69 D 85	81.2%	N 136 D 158	86.1%	N 255 D 302	84.4%
QPI 4 Patients being treated with curative intent who have a PET/CT before treatment		95	N 18 D 19	94.7%	N 30 D 30	100%	N 65 D 65	100%	N 154 D 162	95.1%	N 267 D 276	96.7%
*QPI 6 Surgical resection in NSCLC patients	All NSCLC	20	N 14 D 56	25.0%	N 18 D 78	23.1%	N 32 D 168	19.0%	N 75 D 350	21.4%	N 139 D 652	21.3%
	NSCLC Stage I-II	60	N 11 D 13	84.6%	N 12 D 18	66.7%	N 30 D 40	75.0%	N 64 D 88	72.7%	N 117 D 159	73.6%
*QPI 7 Lymph node assessment for NSCLC patients having pneumonectomy or lobectomy		80	Analysis is by Hospital of Surgery: RIE						N 107 D 131	81.7%	N D	n/a
QPI 8 Radiotherapy (including SABR) for inoperable lung cancer		35	N 5 D 18	27.8%	N 12 D 41	29.3%	N 59 D 121	48.8%	N 135 D 304	44.4%	N 211 D 484	43.6%
QPI 9 Chemoradiotherapy for locally advanced NSCLC		50	N 1 D 1	100%	N 1 D 1	100%	N 5 D 7	71.4%	N 8 D 16	50.0%	N 15 D 25	60.0%
QPI 10 Chemoradiotherapy for Limited stage SCLC		70	N 0 D 1	0.0%	N 0 D 0	n/a	N 6 D 6	100%	N 24 D 32	75.0%	N 30 D 39	76.9%
QPI 11 SACT for patients with inoperable NSCLC	All types of SACT for NSCLC	35	N 15 D 38	39.5%	N 25 D 58	43.1%	N 65 D 138	47.1%	N 96 D 266	36.1%	N 201 D 500	40.2%
	Biological therapy for NSCLC stage IIIB-IV, PS 0-1	60	N 0 D 0	n/a	N 0 D 0	n/a	N 5 D 5	100%	N 17 D 27	63.0%	N 22 D 32	68.8%
QPI 12 SACT for patients with SCLC	All types of chemotherapy for SCLC	70	N 5 D 6	83.3%	N 5 D 12	41.7%	N 20 D 26	76.9%	N 69 D 89	77.5%	N 99 D 133	74.4%
	Palliative chemotherapy for SCLC patients having treatment with non-curative intent	50	N 4 D 5	80.0%	N 5 D 12	41.7%	N 13 D 19	68.4%	N 39 D 58	67.2%	N 61 D 94	64.9%

Lung Cancer QPI Attainment Summary 2019		Target %	Borders	D&G	Fife	Lothian	SCAN
*QPI 13.1 30 Day Mortality After Treatment	*Surgery	<5	Analysis is by Hospital of Surgery: RIE			N 3 D 166 1.8%	N D n/a
	Radical Radiotherapy	<5	N 0 D 3 0.0%	N 0 D 10 0.0%	N 1 D 45 2.2%	N 1 D 109 0.9%	N 2 D 167 1.2%
	Adjuvant Chemotherapy	<5	N 0 D 1 0.0%	N 0 D 2 0.0%	N 0 D 2 0.0%	N 0 D 8 0.0%	N 0 D 13 0.0%
	Chemoradiotherapy	<5	N 0 D 4 0.0%	N 0 D 2 0.0%	N 0 D 21 0.0%	N 0 D 58 0.0%	N 0 D 85 0.0%
	Palliative Chemotherapy (NSCLC)	<10	Centralised reports will be available from ChemoCare in due course.				
	Palliative Chemotherapy (SCLC)	<15					
	Biological Therapy (NSCLC)	<10					
*QPI 13.2 90 Day Mortality After Treatment	*Surgery	<5	Analysis is by Hospital of Surgery: RIE			N 4 D 164 2.4%	N D n/a
	Radical Radiotherapy	<5	N 1 D 3 33.3%	N 0 D 10 0.0%	N 5 D 45 11.1%	N 6 D 108 5.6%	N 12 D 166 7.2%
	Chemoradiotherapy	<5	N 0 D 4 0.0%	N 0 D 2 0.0%	N 1 D 21 4.8%	N 2 D 57 3.5%	N 3 D 84 3.6%
QPI 14 SABR for Inoperable Lung Cancer with Stage I Disease		35	N 0 D 7 0.0%	N 1 D 8 12.5%	N 13 D 33 39.4%	N 38 D 83 45.8%	N 52 D 131 39.7%
QPI 15 Cytological/Pathological Diagnosis Prior to Treatment	Surgery	75	N 11 D 15 73.3%	N 9 D 18 50.0%	N 26 D 34 76.5%	N 41 D 80 51.3%	N 87 D 147 59.2%
	Radical Radiotherapy	75	N 3 D 3 100%	N 9 D 9 100%	N 20 D 46 43.5%	N 73 D 109 67.0%	N 105 D 167 62.9%
	Chemoradiotherapy	75	N 3 D 4 75%	N 3 D 3 100%	N 21 D 21 100%	N 58 D 58 100%	N 85 D 86 98.8%
QPI 16 Contrast CT/MRI for N2 Pts Prior to Curative Treatment		95	N 3 D 3 100%	N 5 D 6 83.3%	N 15 D 23 65.2%	N 39 D 53 73.6%	N 62 D 85 72.9%

Lung Cancer QPI Attainment Summary 2019	Target %	Borders	D&G	Fife	Lothian	SCAN
Clinical Trials N=patients consented to trials/research and held on SCRN database. D= 5year average from Cancer Registry	15	N 1 D 106 0.9%	N 0 D 155 0.0%	N 4 D 354 1.1%	N 15 D 762 2.0%	N 20 D 1377 1.5%

Target Met	Target Not Met	Not applicable

* D&G patients have surgery at Golden Jubilee Hospital, Clydebank and are therefore included in WOSCAN's (West of Scotland Cancer Network) report for QPIs 7, 13(i) and 13(ii) – all reported by HOSPITAL OF SURGERY.
All patients in NHS Borders, Fife and Lothian have thoracic surgery at the Royal Infirmary of Edinburgh (RIE).
Some patients from outwith the SCAN area have surgery at RIE, e.g. patients referred from Tayside. These are identified throughout the report as required.
SCAN totals are therefore not appropriate for QPIs 7 & 13(i) & 13(ii) and are marked as *not applicable*.

Detailed information regarding PS, TNM and staging can be found in Appendices 6, 7 and 8 respectively.

Note: Allowance should be made where small numbers and variation may be due to chance and manifest as disproportionate percentages; which can distort results both positively and negatively. These should be viewed with a degree of caution.

See appendix 2 for historical Lung Cancer QPI Attainment Summary 2016-2018

Introduction and Methods

Cohort

This report presents analyses of data collected on patients who are newly diagnosed with lung cancer between 1st January 2019 and 31st December 2019 and; who were treated in one of the four constituent health board areas; comprising South East Scotland Cancer Network (SCAN) – Borders, Dumfries & Galloway (D&G), Fife, Lothian and the Edinburgh Cancer Centre (ECC). The results contained within this report are generally presented by NHS board of diagnosis except for surgical outcomes where they have been presented by hospital of surgery.

Datasets and Definitions

Quality Performance Indicators (QPIs) have been developed collaboratively with the three Regional Cancer Networks; Public Health Scotland (PHS); and Healthcare Improvement Scotland (HIS). QPIs will be kept under regular review and be responsive to changes in clinical practice and emerging evidence.

The overarching aim of the cancer quality work programme is to ensure that activity at NHS board level is focused on areas most important in terms of improving survival and patient experience whilst reducing variance and ensuring safe, effective and person-centred cancer care. Following a period of development, public engagement and finalisation, each set of QPIs has been published by HIS[1]. Accompanying datasets and measurability criteria for QPIs are published on the PHS (previously ISD) website[2]. NHS boards are required to report against QPIs as part of a mandatory and publicly reported programme at a national level.

QPI reporting for patients diagnosed with lung cancer was implemented from 01/04/2013; and this is the seventh publication of QPI results for lung cancer patients diagnosed in the SCAN region.

The standard QPI format is shown below:

QPI Title:	Short title of Quality Performance Indicator (for use in reports etc.)	
Description:	Full and clear description of the Quality Performance Indicator.	
Rationale and Evidence:	Description of the evidence base and rationale which underpins this indicator.	
Specifications:	Numerator:	Of all the patients included in the denominator those who meet the criteria set out in the indicator.
	Denominator:	All patients to be included in the measurement of this indicator.
	Exclusions:	Patients who should be excluded from measurement of this indicator.
	Not recorded for numerator:	Include in the denominator for measurement against the target. Present as not recorded only if the patient cannot otherwise be identified as having met/not met the target.
	Not recorded for exclusion:	Include in the denominator for measurement against the target unless there is other definitive evidence that the record should be excluded. Present as not recorded only where the record cannot otherwise be definitively identified as an inclusion/exclusion for this standard.
	Not recorded for denominator:	Exclude from the denominator for measurement against the target. Present as not recorded only where the patient cannot otherwise be definitively identified as an inclusion/exclusion for this standard.
Target:	Statement of the level of performance to be achieved.	

[1] QPI documents are available at www.healthcareimprovementscotland.org

[2] Datasets and measurability documents are available at https://www.isdscotland.org/Health-Topics/Cancer/Cancer-Audit/

Audit Process
Data was collected and analysed by audit facilitators in each NHS board according to the dataset and measurability documentation provided by PHS. SCAN data was collated by Ailsa Patrizio, SCAN Audit Facilitator for Lung Cancer.

Patients are mainly identified through registration at weekly multi-disciplinary meetings (MDMs), and through checks made against pathology listings, General Register Office (GRO) records; and via a data mart from PHS: Acute Cancer Deaths and Mental Health (ACaDMe). Oncology data is available electronically via ARIA Varian and ChemoCare databases.

Patients living closer to either Dundee or Carlisle may opt to have oncology treatment outwith the SCAN region or Scotland respectively. Collecting complete audit data for these patients remains a challenge.

The process remains dependent on audit staff for capture and entry of data, and for data quality checking. Data is entered and interrogated on a national system used by all health boards across NHS Scotland: Electronic-Cancer Audit Support Environment (e-Case) and analysed via SQL Server Reporting Services (SSRS).

Key Categories
Reporting on specific QPIs drives improvement in patients' pathways and outcomes but this should not be the sole benchmark for measuring patient care and nor should it be viewed in isolation. Key categories facilitate the measurement of data not specifically included in the QPI process. The SCAN Lung Group agreed an approach which takes into consideration a selection of key categories which are analysed and reported in appendix 1.

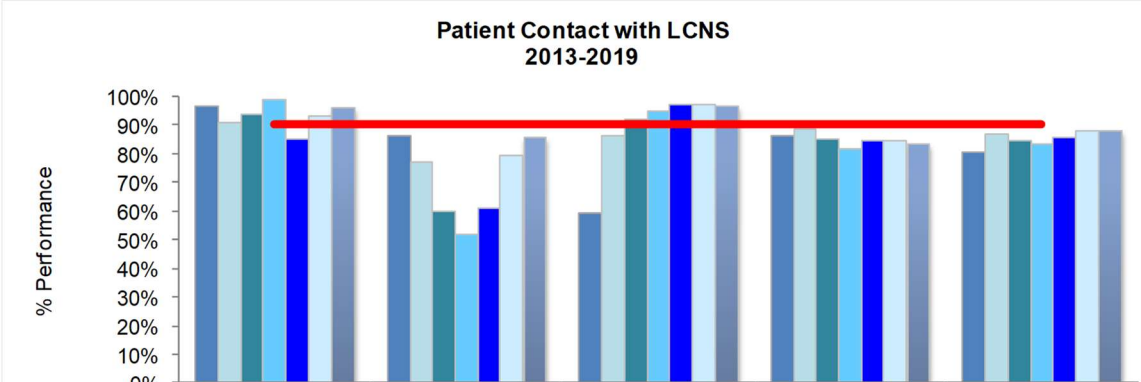
Key categories are vital to endorse standards of care and drive improvements, for example: performance status (PS), in conjunction with staging, is a key parameter for the selection of optimal management. High data completeness rates for staging and PS ensure fuller and more accurate analyses. There is not a Scottish standard but we can align with National Lung Cancer Audit (NLCA)[3] data completeness targets for staging and PS which is recommended as being at least 95% of cases.

Health Board	Stage	PS
Borders	100%	94.1%
D&G	100%	78.2%
Fife	100%	99.4%
Lothian	98.9%	92.3%

In the absence of a QPI to measure Clinical Nurse Specialist (CNS) performance, reference is made to the NLCA Report and to National Institute for Health and Care Excellence (NICE) guidelines (England & Wales) which recommend that *every patient with suspected or confirmed lung cancer should have access to a lung cancer clinical nurse specialist*[4]. The Scottish Cancer Plan, the Lung Cancer Forum for Nurses (LCFN), NLCA and NICE all agree that 90% of patients should have access to a lung cancer CNS at diagnosis and throughout their pathway. The Roy Castle Lung Cancer Foundation describes the role of the lung cancer CNS as *crucial in the provision of optimal patient care; providing support from initial presentation, through investigations to diagnosis, to treatment and thereafter*[5].

[3] The NCLA analyses and reports on data in England & Wales, with submissions from Northern Ireland and Guernsey. Scotland no longer submits data because the QPI method of reporting is not compatible with measurements and reporting utilized in the NLCA Report.
[4] NICE (2012, updated 2019): *Lung Cancer in Adults, Quality Standard [QS 17]* https://www.nice.org.uk/guidance/qs17/chapter/Quality-statement-3-Lung-cancer-clinical-nurse-specialist
[5] The Roy Castle Lung Cancer Foundation & National Lung Cancer Forum for Nurses (January 2013) *Understanding the Value of Lung Cancer Nurse Specialists.*

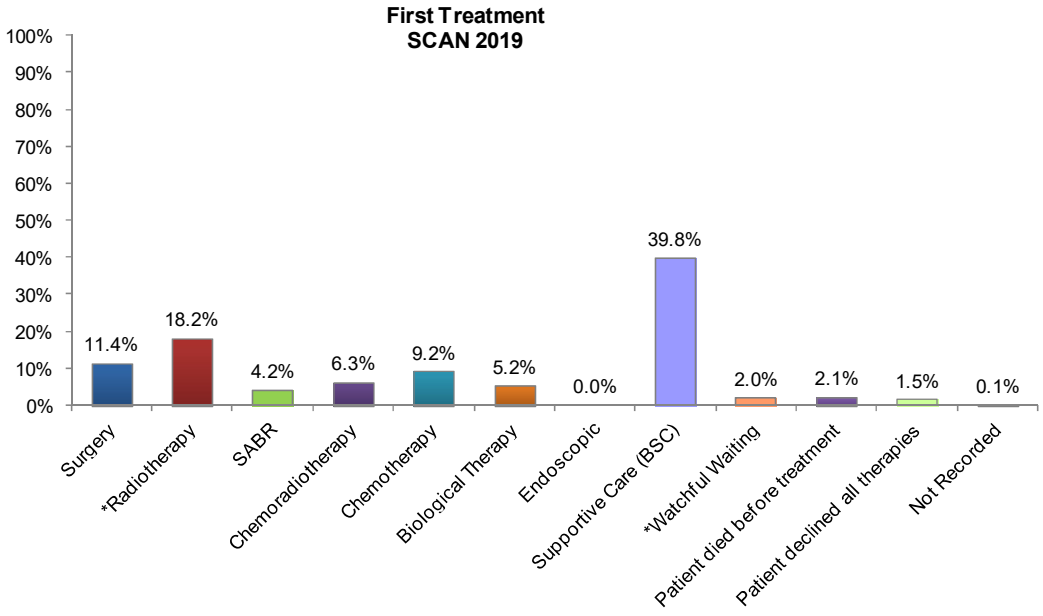
Results by Health Board between 2013 and 2019 are shown below set against the recommended target of 90%:



	Borders	D&G	Fife	Lothian	SCAN
2013-14	96.6%	86.0%	59.3%	86.5%	80.6%
2014-15	90.9%	77.1%	86.2%	88.5%	86.7%
2015	93.8%	60.0%	92.0%	85.2%	84.8%
2016	98.8%	51.7%	94.7%	81.8%	83.5%
2017	84.9%	60.8%	97.3%	84.3%	85.6%
2018	93.0%	79.5%	97.1%	84.8%	87.7%
2019	96.5%	85.7%	96.7%	83.7%	88.3%
Target	90%	90%	90%	90%	90%

88% of lung cancer patients in the SCAN region saw a CNS in 2019. Performance, however, must be considered in the context of CNS provision in SCAN which for circa 1300 patients equates to 8.6WTE[6] (equivalent to one nurse for every 150 new patients). Distribution is as follows: Borders 1 WTE; D&G 1 WTE; Fife 1.6 WTE; and Lothian 5 WTE. The NLCA Report 2018 quotes the national commissioning guidance recommendation, *that there should be the equivalent of 1 whole-time-equivalent specialist nurse for every 80 patients*[7]. This would be 16.4 WTE for SCAN region, a deficit of 7.8 WTE nurses.

Summary of all patients and first treatments:



[6] WTE: Whole Time Equivalent.
[7] NLCA 2018 Report: https://nlca.azurewebsites.net/AnnualReport

At the national review meeting in 2019 it was agreed to include a chart summarising all first treatments for the entire SCAN population to allow regional comparisons. The above chart clearly shows that sadly in SCAN, for 40% of patients the commonest experience of lung cancer is that they are too unwell for any active interventions (BSC). This is also seen in NHS England's latest report for 2018 (42% no active treatment rate)[8]. This gives a clear message that more needs to be done to detect lung cancer early (DCE Scottish Government Campaign[9]) and give consideration in the future to the role of targeted lung health checks (a lung cancer screening pilot is due to start in 2021 in NHS Lothian).

Lead Clinicians and Audit Personnel

SCAN Region	Hospital or Designation	Lead Clinician	Audit Support
SCAN	Clinical Lead Chair of SCAN Lung Group	Dr Melanie Mackean	Ailsa Patrizio
NHS Borders	Borders General Hospital (BGH)	Dr Hosni El Taweel	Leanne Robinson
NHS Dumfries & Galloway	Dumfries & Galloway Royal Infirmary (DRI)	Dr Musa Ali	Campbell Wallis
NHS Fife	Queen Margaret Hospital (QMH) Victoria Hospital (VHK)	Dr Iain Murray	Mimi Bjelogrlic
NHS Lothian	Royal Infirmary of Edinburgh (RIE) Western General Hospital (WGH) St John's Hospital (SJH)	Dr K Skwarski	Ailsa Patrizio
SCAN & NHS Lothian	Edinburgh Cancer Centre (ECC)	Dr Colin Barrie	

Acknowledgements
Thanks must go to the Lung Cancer Multi-Disciplinary Team: respiratory, radiology, pathology, cardio-thoracic surgery consultants, the Edinburgh Cancer Centre consultant oncologists, the lung cancer nurse specialists' team, and to audit colleagues for their collaborations and enthusiasm which have resulted in a very comprehensive report. For a full list of those who have contributed to this report, see appendix 9.

Data Quality

Case Ascertainment & Scottish Cancer Registry

Case ascertainment levels are assessed by comparing the number of new cases identified by Audit with those identified by Scottish Cancer Registry. Comparisons will, however, be subject to a small amount of variation. The 'year' in Audit is based on the date of diagnosis whereas cancer registration defines their cohort as the date the patient first became known to secondary health service.

Estimated Case Ascertainment is based on the most recent 5 year average available from Scottish Cancer Registry data and excludes death certificate only registrations.

[8] See footnote 7.
[9] Information regarding the DCE Scottish Government Campaign can be found at https://www.isdscotland.org/Health-Topics/Cancer/Detect-Cancer-Early/

High levels of case ascertainment provide confidence in the completeness of audit recording and contribute to the reliability of results presented. Cases that have been diagnosed in the private sector but received any part of their treatment in NHS hospitals are included.

In the most recent period (1st January to 31st December 2019) 1319 patients were diagnosed with lung cancer (ICD-codes: C33, C34) in the SCAN region.

Number of patients recorded in audit:

	Patients diagnosed 01/01/2019 to 31/12/2019				
	Borders	D&G	Fife	Lothian	SCAN
Number of cases in audit cohort	85	147	361	726	1319

Estimate of case ascertainment: calculated using the average of the most recent available 5 years of Cancer Registry data (2014-2018).

	Borders	D&G	Fife	Lothian	SCAN
Number of cases from audit	85	147	361	726	1319
Cases from Cancer Registry (2014-2018)	106	155	354	762	1377
Case Ascertainment	**80.2%**	**94.8%**	**102.0%**	**95.3%**	**95.8%**

Source: Scottish Cancer Registry, PHS. Data extracted from ACaDMe: 07/12/2020

Quality Assurance

All hospitals participate in a Quality Assurance (QA) programme appraised by PHS to investigate the accuracy of recording of Lung Cancer data items which are used to report against national Quality Performance Indicators (QPIs) and, to highlight where data definitions may require further clarification. The most recent QA of lung data was carried out in August 2020: *Assessment of Lung Cancer QPI Dataset, Patients Diagnosed January to December 2018, Scotland Summary*. SCAN results are by health boars and are highlighted in the table below: All NHS Boards exceeded the PHS recommended minimum standard of 90%.

NHS Board	Number of records assessed	Number of discrepancies	Percentage accuracy (%)
Ayrshire and Arran	26	13	96.2
Borders	8	3	97.1
Dumfries and Galloway	11	6	95.8
Fife	24	0	100.0
Forth Valley	19	12	95.1
Grampian	33	9	97.9
Greater Glasgow & Clyde	99	43	96.7
Highland	15	0	100.0
Lanarkshire	38	11	97.8
Lothian	49	1	99.8
Orkney	3	0	100.0
Shetland	4	2	96.2
Tayside	27	25	92.9
Western Isles	5	1	98.5
SCOTLAND	**361**	**126**	**97.3**

Clinical Sign-off
This report compares current and historical data jointly and separately for each of the four SCAN Health Boards. The collated SCAN results are reviewed jointly by lead clinicians from SCAN Health Boards to assess variances and provide comments on results as per the following processes:

- Individual Health Board results are reviewed and signed-off locally.
- Collated results were presented and discussed at the SCAN Lung Sign off Meeting on 9th December 2020, at which point clinical recommendations were agreed.
- The final draft, complete with agreed amendments from the Sign-off meeting on 9th December 2020, was circulated to the SCAN Lung Group on 30/04/2021 for final comments.
- The Final report was circulated to Clinical Governance Groups and SCAN Action Plan Board Leads on 11/06/2021.
- The report will be placed on the SCAN website once it has been fully signed-off and checked for disclosive material.

Actions for Improvement
Lung cancer teams in SCAN (clinicians, nurses, and audit staff) work collaboratively to review data regularly to identify possible areas for improvement and to actively participate in driving improvements and, where appropriate, making changes to the ways care is delivered. Action plans and details of their progress are completed at health board level.

Quality Performance Indicators
Diagnosis and Staging Investigations

QPI 1 Multi-disciplinary Team (MDT) Meeting **Target = 95%**

Numerator = Number of patients with lung cancer discussed at MDT before definitive treatment.
Denominator = All patients with lung cancer.
Exclusions = Patients who died before first treatment.

Target 95%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI[10]	3	2	11	13	29
Numerator	81	140	330	651	1202
Not recorded for numerator	0	0	0	2	2
Denominator	82	145	350	713	1290
Not recorded for exclusions	0	0	0	1	1
Not recorded for denominator	0	0	0	0	0
% Performance	**98.8%**	**96.6%**	**94.3%**	**91.3%**	**93.2%**

Comments
The target was not met by NHS Fife or NHS Lothian. Outliers fall under two distinct groups: (1) patients who have urgent radiotherapy prior to being discussed at MDM, i.e. for spinal cord compression, compromised airways, and other urgent medical conditions. (2) patients who are not brought to MDM which includes patients who attend through A&E and are admitted to various specialties, for example, Medicine of Elderly (MoE), General Medicine (GenMed), and/or Respiratory (Resp) or Oncology (Onc). These are often older, frail patients with significant comorbidities and/or advanced disease. They are often not fit for invasive procedures and in reality a pathological diagnosis would not alter treatment management. Decisions made on the ward are generally for Best Supportive Care (BSC) and MDM discussion might not take place.

The Action Plan in 2018 sought to address this and was primarily focused on NHS Lothian, where the target had not been met with a shortfall of 6.3% in 2018. Concentrating initially at the Royal Infirmary of Edinburgh (RIE) the objective was to ensure that all patients, regardless of how they presented to secondary care, were discussed by the Multi-Disciplinary Team (MDT). This was highlighted to colleagues in A&E, MoE and GenMed and all junior doctors were made aware of the importance of bringing *all* patients diagnosed with lung cancer, with or without histology, to the Lung Cancer MDM. Improvements have been demonstrated at RIE: in 2018 the percent of outliers (i.e. those who were *not* discussed at the MDM) reached 70% at the RIE MDM. Following implementation of the Action Plan this fell to 28.6% in 2019.

NHS Fife: The target was not met with a shortfall of 0.7% (20 cases).
NHS Lothian: The target was not met with a shortfall of 3.7% (62 cases).

MDM/No MDM Outliers 2019	**Fife**	**Lothian**
Patients discussed at MDM after definitive Tx	5	8
Pts discussed at MDM (RIP): BSC on ward	15	24
Pts discussed at MDM: awaiting treatment		2
No MDM – GenMed/ Onc input: Urgent radiotherapy		1
No MDM – IP MoE with Resp or Onc input: BSC		17
No MDM – IP MoE, GenMed: BSC		10
TOTAL	**20**	**62**

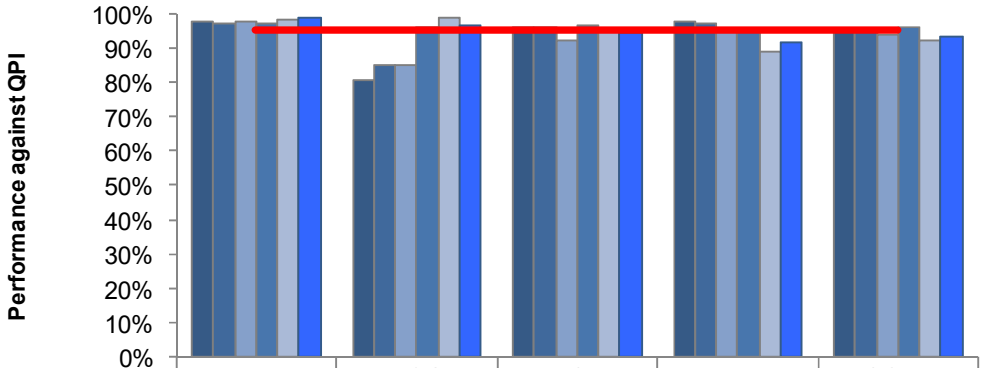
[10] Ineligible for analysis refers to those cases where data does not meet the denominator criteria; the ineligible figure, in addition, includes relevant exclusions (e.g. died before treatment) as laid out in QPI definitions.
[11] SCC: Spinal Cord Compression

Lung cancer QPIs have recently undergone Formal Review Cycle 2 (FR2), a requirement after 6 years of reporting. FR1 was carried out after 3 years. The numerator for QPI 1 will be amended going forward so that the *date of definitive treatment* is no longer a criterion to measure against and, the QPI will simply report *all patients discussed at MDT*. Patients who have, for example, emergency radiotherapy before being discussed at MDM will no longer be classed as outliers. Re-assessment of QPI 1, as per FR2, raises Lothian's performance from 91.3% to 96.2% and, Fife from 94.3% to 100%.

ACTION PLAN 2019

- Replicate NHS Borders and NHS D&G protocol that all CT reports suspicious of lung cancer must be sent directly to Respiratory.
- Continued education for MoE, GenMed, Respiratory, and junior doctors, to ensure that *all* lung cancer patients must be brought to MDM for registration.

QPI 1: Multidisciplinary Team Meeting 2014 - 2019



	Borders	D&G	Fife	Lothian	SCAN
2014-15	97.7%	80.8%	95.9%	97.7%	95.1%
2015	96.8%	84.8%	96.0%	97.0%	95.4%
2016	97.4%	85.1%	92.2%	95.4%	93.5%
2017	97.0%	95.8%	96.6%	95.6%	96.0%
2018	98.1%	98.6%	95.2%	88.7%	92.3%
2019	98.8%	96.6%	94.3%	91.3%	93.2%
Target	95%	95%	95%	95%	95%

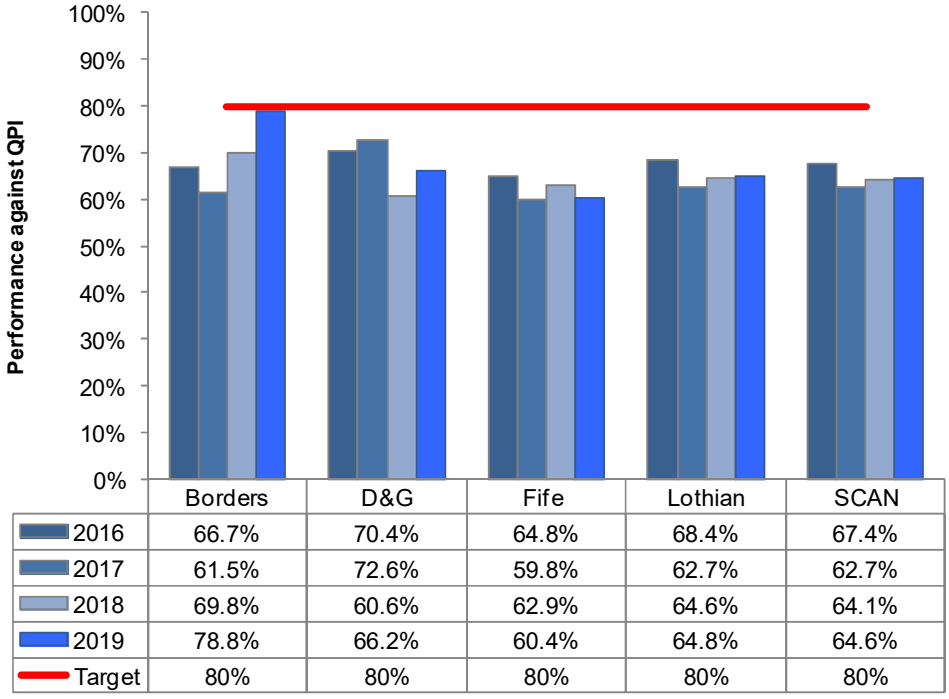
QPI 2 Pathological Diagnosis

2 (i) Pathological Diagnosis of Lung Cancer **Target = 80%**

Numerator = Number of patients with lung cancer who have a pathological diagnosis (including following surgical resection).
Denominator = All patients with lung cancer.
Exclusions = Patients who decline investigations or surgical resection.

Target 80%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	5	5	10	13	33
Numerator	63	94	212	462	831
Not recorded for numerator	0	0	0	0	0
Denominator	80	142	351	713	1286
Not recorded for exclusions	0	0	0	1	1
Not recorded for denominator	0	0	0	0	0
% Performance	**78.8%**	**66.2%**	**60.4%**	**64.8%**	**64.6%**

QPI 2 (i) Pathological Diagnosis
2016-2019



	Borders	D&G	Fife	Lothian	SCAN
2016	66.7%	70.4%	64.8%	68.4%	67.4%
2017	61.5%	72.6%	59.8%	62.7%	62.7%
2018	69.8%	60.6%	62.9%	64.6%	64.1%
2019	78.8%	66.2%	60.4%	64.8%	64.6%
Target	80%	80%	80%	80%	80%

Comments

This QPI has, consistently, **not** been met across SCAN health boards since its introduction; and similarly, not met by the majority of health boards across Scotland. It has been subject to several reviews; with amendments ranging from revisions of performance targets to varying exclusions but it continues to be challenging and somewhat controversial. Analyses show there exist a group of patients who cannot undergo invasive investigations due to poor fitness levels and/or comorbidities and while treatment choices can be limited, invasive procedures have been shown not to alter outcomes for this group. It is vital to recognise the limitations of this QPI; so that we do not strive to attain targets which might drive clinically inappropriate or potentially unsafe procedures; which arguably are redundant when pathology would not influence or alter clinical management or patient outcomes.

Following from results in 2018 an action was raised to review cases in NHS Lothian where tissue diagnosis had not been achieved. An audit has been undertaken that focused on patients with a radiological diagnosis of lung cancer from 2016 to 2018[12]. In conclusion, the reviewers found that appropriate clinical decisions had been made and that results matched anecdotal evidence: (1) poor fitness and/or comorbidities precluded biopsies; (2) biopsy had been attempted but with negative result where repeated biopsies were avoided as being potentially detrimental to the patient, (3) lesions inaccessible or too small to biopsy and (4) patient choice. See appendix 4 for Audit of all *Lung Cancer Patients without Tissue Diagnosis in NHS Lothian 2016 – 2018*.

QPI 2 (i) has come under further scrutiny in the most recent QPI review (FR2). Frozen sections prior to definitive surgery are currently excluded from this QPI. The Review team concluded that *positive frozen section* prior to definitive surgery should be included as pre-treatment pathology. PS 3 and 4, previously part of the denominator, should be excluded going forward. These changes will align Scottish measurement of pathological confirmation rate with that of NHS England, Wales and Northern Ireland, all of which do not include patients with poor fitness levels, i.e. PS 3-4 in pre-treatment pathological analyses. To illustrate the effects of these changes the QPI was recalculated for 2019 with new QPI amendments in place for NHS Lothian. The resulting performance of 81% compares favourably to the NHS England rate of 72% of patients with pathological confirmation rate for patients of PS 0-2[13].

Although patients with PS 3 and 4 will no longer be formally assessed for this QPI, they will continue to be reviewed locally to ensure that all proper processes take their course and patients continue to receive appropriate investigations and treatment.

[12] Bain L, Hainey S, Henderson W, Reid PA (Respiratory dept, Western General Hospital, Edinburgh), 2020: *Lung Cancer Patients Without Tissue Diagnosis in NHS Lothian 2016 – 2018*. [See appendix 4]
[13] Bain L et al, 2020: *Lung Cancer Patients Without Tissue Diagnosis in NHS Lothian 2016 – 2018*, p2

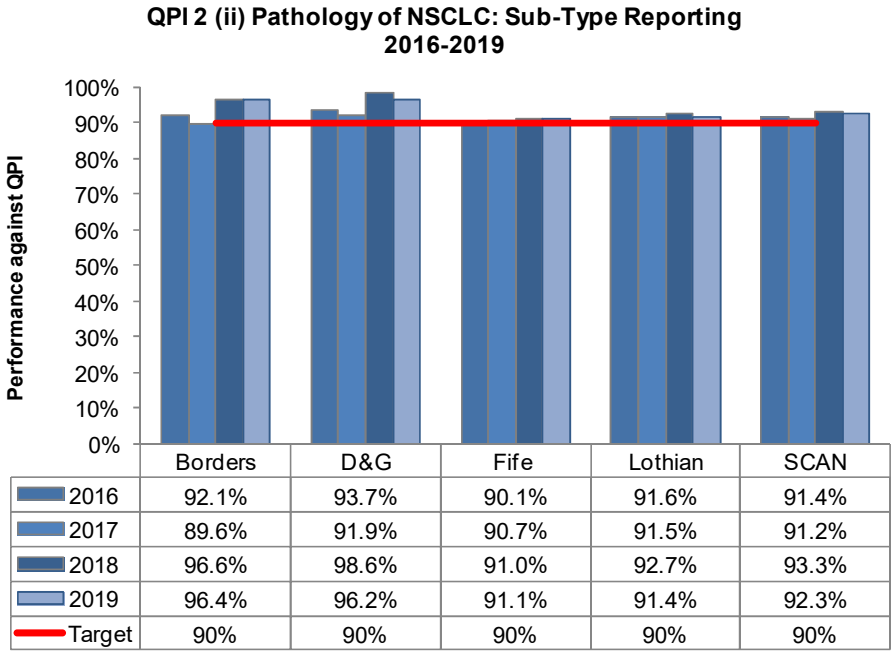
2 (ii) Pathological Diagnosis of NSCLC: Sub-type Identified Target = 90%

Numerator = Number of patients with a pathological diagnosis of Non Small Cell Lung Cancer (NSCLC[14]) who have a tumour sub-type identified[15].
Denominator = All patients with a pathological diagnosis of NSCLC (no exclusions).

Target 90%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	29	68	182	365	644
Numerator	54	76	163	330	623
Not recorded for numerator	0	0	0	0	0
Denominator	56	79	179	361	675
Not recorded for exclusions	2	3	16	31	52
Not recorded for denominator	0	0	0	0	0
% Performance	**96.4%**	**96.2%**	**91.1%**	**91.4%**	**92.3%**

Comments

The QPI was passed by all health boards and no action is required.



	Borders	D&G	Fife	Lothian	SCAN
2016	92.1%	93.7%	90.1%	91.6%	91.4%
2017	89.6%	91.9%	90.7%	91.5%	91.2%
2018	96.6%	98.6%	91.0%	92.7%	93.3%
2019	96.4%	96.2%	91.1%	91.4%	92.3%
Target	90%	90%	90%	90%	90%

The target was changed at FR1 from 80% to 90% and took effect for patients diagnosed from 1st January 2016 onwards.

[14] NSCLC = Squamous, Adenocarcinoma, NSCLC (Not Otherwise Specified, (NOS)) and Other Specific NSCLC. *QPI Measurability Document, Version 3.4*: ISD Scotland: March 2019
[15] NSCLC sub types = Squamous, Adenocarcinoma, Other Specific NSCLC as specified in *Lung Cancer Measurability of Quality Performance Indicators, Version 3.4*: ISD Scotland: March 2019.

2 (iii) Non-Squamous, Stage IIIB to IV: Molecular Profiling Analysis Target = 75%

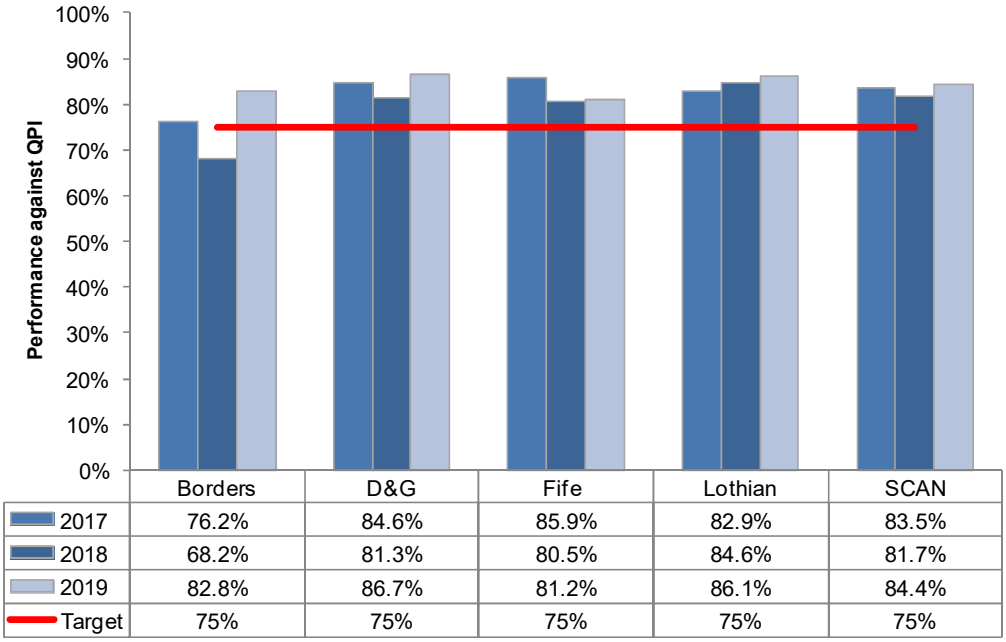
Numerator = Number of patients with a pathological diagnosis of non-squamous NSCLC, Stage IIIB, IIIC or IV who have molecular profiling[16] undertaken.
Denominator = All patients with a pathological diagnosis of non-squamous NSCLC, Stage IIIB, IIIC or IV.
Exclusions = Patients with PS 4.

Target 75%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	56	117	276	558	997
Numerator	24	26	69	136	255
Not recorded for numerator	0	0	0	0	0
Denominator	29	30	85	158	302
Not recorded for exclusions	0	1	0	6	7
Not recorded for denominator	0	9	1	10	20
% Performance	**82.8%**	**86.7%**	**81.2%**	**86.1%**	**84.4%**

Comments

The QPI was passed by all health boards and no action is required.

QPI 2 (iii) Analysis of Molecular Profiling of Non-Squamous IIIB-IV 2017-2019



	Borders	D&G	Fife	Lothian	SCAN
2017	76.2%	84.6%	85.9%	82.9%	83.5%
2018	68.2%	81.3%	80.5%	84.6%	81.7%
2019	82.8%	86.7%	81.2%	86.1%	84.4%
Target	75%	75%	75%	75%	75%

The denominator was changed at FR1 in 2016 from *NSCLC patients with stage IIIB-IV* to *non-squamous NSCLC, stage IIIB-IV*. In addition, molecular profiling was extended to include Oncogenic Anaplastic Lymphoma Kinase (ALK) and an accompanying new data field [ALK] which was introduced from 1st January 2017.

[16] QPI 2 (iii) reports on two types of molecular profiling: EGFR (Epidermal Growth Factor Receptor) and ALK (Oncogenic Anaplastic Lymphoma Kinase). It is acknowledged by the QPI Development and Review teams that there are several markers and other genetic mutations, for example ROS1 (a type of receptor tyrosine kinase) & PD-L1 (A protein found on T cells (a type of immune cell)). Developments and modifications will be continually reviewed going forward.

QPI 4 PET CT in Patients being treated with Curative Intent **Target 95%**

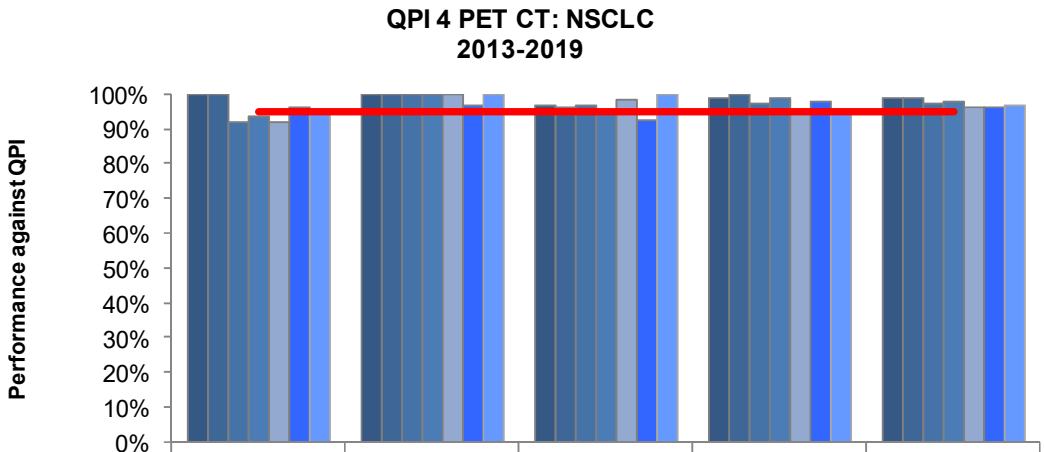
Numerator = Number of patients diagnosed with NSCLC who are treated with curative intent[17] who undergo PET CT[18] prior to start of treatment.
Denominator = All patients diagnosed with NSCLC who are treated with curative intent, (no exclusions).

Target 95%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	66	117	296	563	1042
Numerator	18	30	65	154	267
Not recorded for numerator	0	0	0	0	0
Denominator	19	30	65	162	276
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	1	1
% Performance	**94.7%**	**100.0%**	**100.0%**	**95.1%**	**96.7%**

Comments
PET scanning is important in the management of NSCLC. It is appropriate in the investigation of solitary pulmonary nodules to determine malignant potential and is essential in the assessment of occult metastases in patients being considered for curative treatment.

The target was met in 3 of the 4 SCAN health boards and was only just missed by NHS Borders.

NHS Borders: The target was not met with a shortfall of 0.3% (1 case). This patient had oligometastatic disease, i.e. a single metastasis; in this instance a single brain metastasis. The patient had brain surgery (first treatment) followed by PET in April and then treatment to the lung primary (definitive treatment).



	Borders	D&G	Fife	Lothian	SCAN
2013-14	100.0%	100.0%	96.9%	98.9%	98.6%
2014-15	100.0%	100.0%	95.9%	100.0%	99.0%
2015	91.7%	100.0%	96.8%	97.2%	97.1%
2016	93.3%	100.0%	95.2%	98.8%	97.8%
2017	91.7%	100.0%	98.3%	95.2%	96.0%
2018	96.0%	96.4%	92.4%	97.6%	96.2%
2019	94.7%	100.0%	100.0%	95.1%	96.7%
Target	95%	95%	95%	95%	95%

[17] Curative Intent/Treatment = Surgical Resection, Radical Radiotherapy (including SABR) or Chemoradiotherapy.
[18] PET CT (Positive Emissions Tomography) scan and CT (Computerised Tomography).

Treatment Management

QPI 6 Surgical Resection in Non-Small Cell Lung Cancer

6 (i) NSCLC and Surgical Resection Target = 20%

Numerator = Number of patients with NSCLC who undergo surgical resection.
Denominator = All patients with NSCLC.
Exclusions = Patients who undergo SABR[19], who decline surgery or who die before surgery.

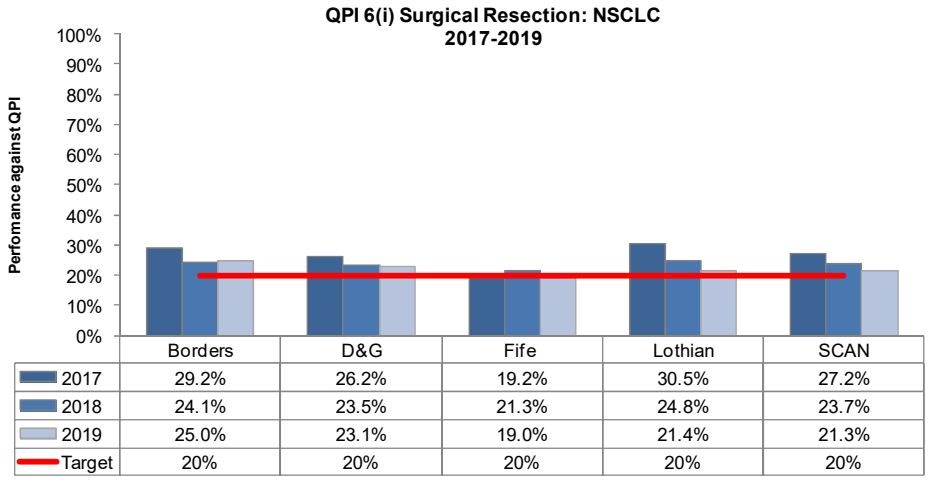
Target 20%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	29	69	193	376	667
Numerator	14	18	32	75	139
Not recorded for numerator	0	0	0	0	0
Denominator	56	78	168	350	652
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0
% Performance	**25.0%**	**23.1%**	**19.0%**	**21.4%**	**21.3%**

Comments
Lung cancer surgery includes pneumonectomy, lobectomy, segmentectomy and wedge resection. Wedge procedures should be kept to a minimum and any patients referred for surgical resection but only suitable for wedge resection should be re-evaluated. The patient should be referred back to the MDT and the alternative, and less invasive, radiotherapy treatment i.e. SABR, should be considered

The target was exceeded by NHS Borders, D&G, Lothian and SCAN overall.

NHS Fife: The target was not met with a shortfall of 1% (136 cases). Of the total number of outliers, 64% were found to be stage IV at presentation. NHS Fife has a high proportion of patients with stage IV (51%) which may account for not meeting this QPI.

The numerical breakdown is as follows: 30 patients received radical treatment; 14 of these were given chemoradiotherapy while 16 received radical radiotherapy. A further 5 patients opted for a "watch & wait" approach. The remaining 101 patients were treated with palliative intent: 22 palliative chemotherapy, 19 biological (targeted) therapy, 24 palliative radiotherapy and the remaining 36 patients were referred for BSC.



	Borders	D&G	Fife	Lothian	SCAN
2017	29.2%	26.2%	19.2%	30.5%	27.2%
2018	24.1%	23.5%	21.3%	24.8%	23.7%
2019	25.0%	23.1%	19.0%	21.4%	21.3%
Target	20%	20%	20%	20%	20%

QPI 6 (i) was amended at FR1, with effect from 1st January 2017. The target was raised from 17% to 20% and an additional exclusion '*patients who undergo SABR'* was applied.

[19] SABR: Stereotactic Ablative Radiotherapy

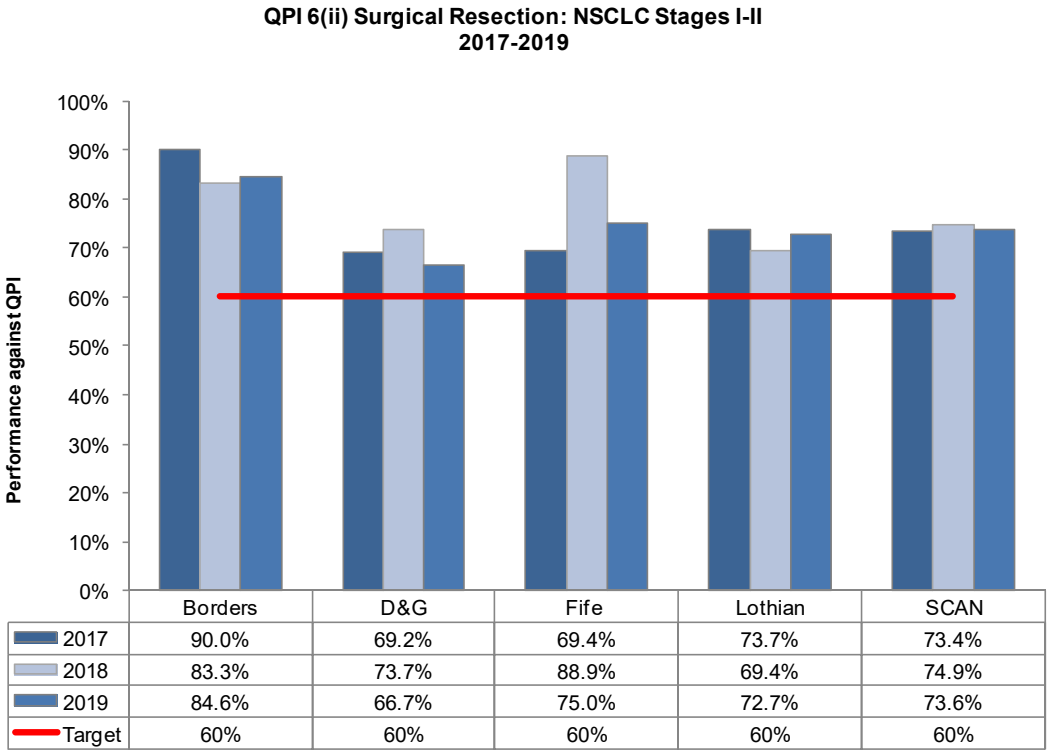
6 (ii) NSCLC, Stage I-II and Surgical Resection Target = 60%

Numerator = Number of patients with NSCLC, Stage I-II[20] who undergo surgical resection.
Denominator = All patients with NSCLC, Stage I-II only.
Exclusions = Patients who decline surgery, who die before surgery or who undergo SABR.

Target 60%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	72	129	321	633	1146
Numerator	11	12	30	64	117
Not recorded for numerator	0	0	0	0	0
Denominator	13	18	40	88	159
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	9	0	5	14
% Performance	**84.6%**	**66.7%**	**75.0%**	**72.7%**	**73.6%**

Comments

The QPI was passed by all health boards and no action is required.



QPI 6 (ii) was amended at FR1 with effect from 1st January 2017. The target was raised from 50% to 60% and an additional exclusion '*patients who undergo SABR'* was applied.

[20] Stage I-II: T1 (mi) or T1 or T1a-1c N0 M0; or T2 or T2b N0 M0; or T1a-c or T2a-b N1 M0; or T3N0M0.

QPI 7 Lymph Node Assessment Target = 80%

Numerator = Number of patients with NSCLC undergoing surgical resection by lobectomy or pneumonectomy that have at least 1 node from at least *3 x N2 stations* sampled at the time of resection or at previous mediastinoscopy.
Denominator = All patients with NSCLC undergoing surgical resection by lobectomy or pneumonectomy (no exclusions).

Royal Infirmary of Edinburgh (RIE)

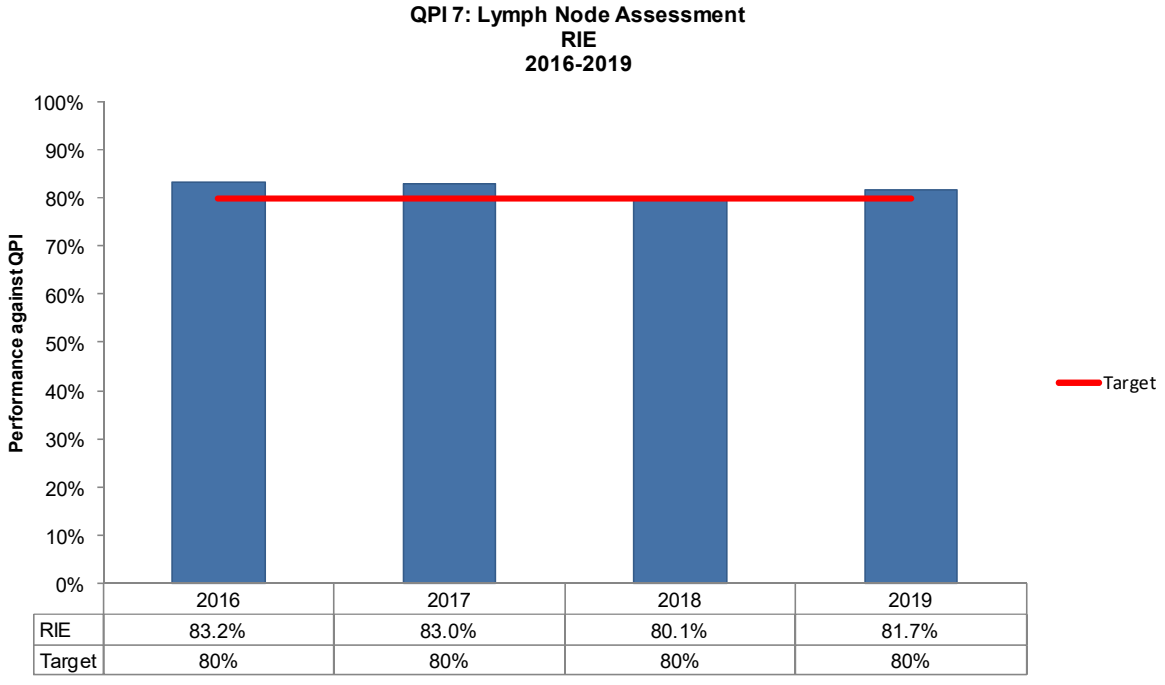
Target 80%	2017	2018	2019
Numerator	137	121	107
Not recorded for numerator	0	14	0
Denominator*	165	151	131
Not recorded for exclusions	0	0	0
Not recorded for denominator	0	0	0
% Performance	**83.0%**	**80.1%**	**81.7%**

* The denominator includes 32 (2017), 43 (2018) and 24 (2019) patients who were diagnosed in NHS Tayside and had surgery at RIE. Patients from NHS D&G (17 patients) are not included; they have surgery at the Golden Jubilee Hospital, Clydebank and are reported by WOSCAN.

QPI 7 is analysed by *Hospital of Surgery* as compared to most other QPIs which are analysed by *Board of Diagnosis*. Surgical outcomes are the responsibility of the hospital where the surgery was undertaken. Responsibility does not lie with the Health Board (HB) who referred patients (often outwith their HB area) for surgical resection.

Comment

The target has been consistently met in all 4 years of reporting and no action is required.



QPI 8 Radiotherapy for Inoperable Lung Cancer **Target = 35%**

Numerator = Number of patients with lung cancer not undergoing surgery who receive radical radiotherapy[21] +/- chemotherapy, or SABR.
Denominator = All patients with lung cancer not undergoing surgery.
Exclusions = Patients with SCLC, patients who decline radiotherapy, who die prior to treatment and those with stage IV disease.

Target 35%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	67	106	240	421	834
Numerator	5	12	59	135	211
Not recorded for numerator	0	0	0	0	0
Denominator	18	41	121	304	484
Not recorded for exclusions	0	11	2	37	50
Not recorded for denominator	0	0	0	1	1
% Performance	**27.8%**	**29.3%**	**48.8%**	**44.4%**	**43.6%**

Note: Patients "not recorded for exclusions" are those whose M stage could not be assessed or was not documented. As such, it is impossible to identify their cancer as stage IV or, as any other stage. These patients, however, are retained in the denominator and are shown under 'Not recorded for exclusion' for information purposes.

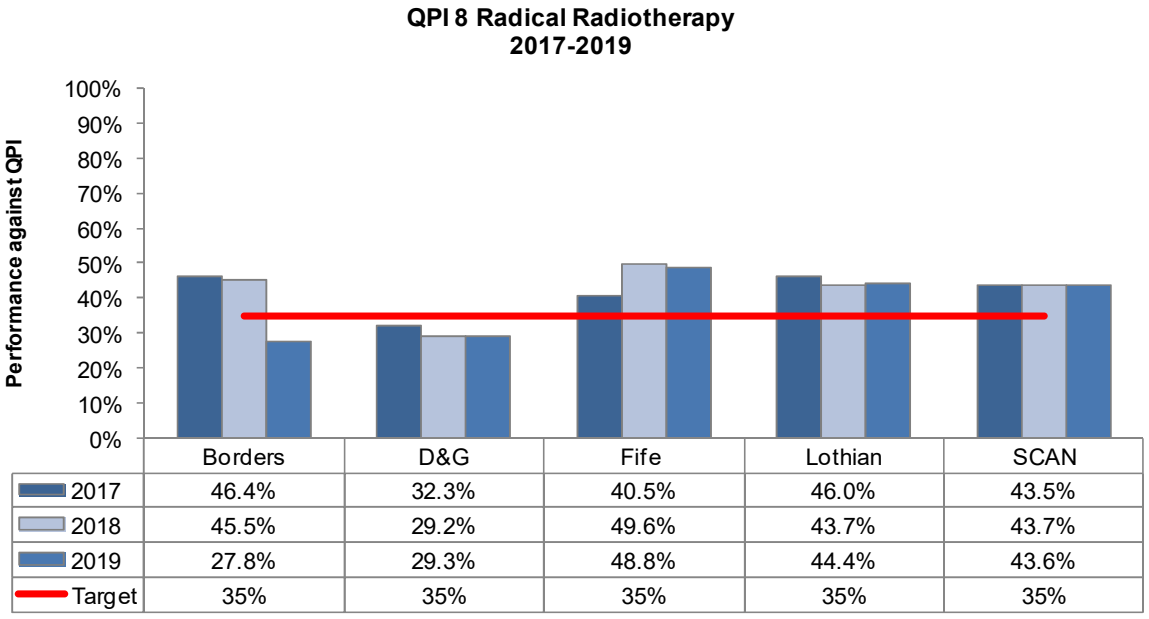
Comments
The target was met by NHS Fife and Lothian.

NHS Borders: The target was not met with a shortfall of 7.2% (13 cases). Of the 13 patients, 7 had comorbidities that precluded radiotherapy while another 1 had both comorbid conditions and poor fitness levels. Disease was not encompassable in a radical radiotherapy field for a further 4 patients. The remaining patient had a large volume tumour and while it was hoped to shrink the tumour with chemotherapy and offer sequential chemoradiotherapy; progression was found at CT scan after 4 cycles of chemotherapy and the radiotherapy component had to be cancelled.

NHS D&G: The target was not met with a shortfall of 5.7% (29 cases). Of the 29 patients, 4 had comorbidities that precluded radiotherapy. The majority of patients (17 out of 29) were not fit enough to have treatment while an additional 1 patient was unfit with several comorbidities. Radical radiotherapy could not be given to the remaining 7 patients due to large volume disease which was too great to be encompassed within a radical radiotherapy field.

The target for this QPI was found to be challenging for the more peripheral health boards. Patient fitness, comorbidities and large volume disease accounted for the majority of cases. Interestingly, travel to Edinburgh was not specifically identified as a reason for not having radical treatment although anecdotally this can be surmised from the reasons above.

21 Radical Radiotherapy = Dose given for NSCLC ≥54Gy.



	Borders	D&G	Fife	Lothian	SCAN
2017	46.4%	32.3%	40.5%	46.0%	43.5%
2018	45.5%	29.2%	49.6%	43.7%	43.7%
2019	27.8%	29.3%	48.8%	44.4%	43.6%
Target	35%	35%	35%	35%	35%

At FR1, it was agreed to increase the target to 35% and to include a relatively recent treatment SABR (Stereotactic Ablative Radiotherapy) as part of the criteria for the numerator. A new data field [SABR] was introduced to the lung cancer data set from 1st January 2017 to facilitate reporting.

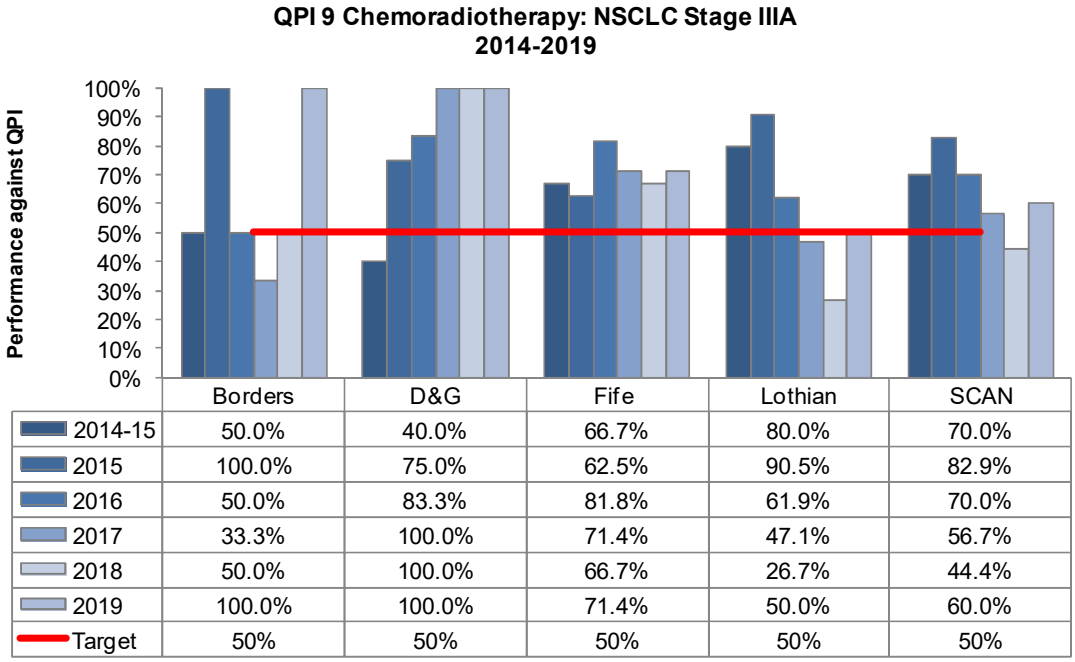
QPI 9 Chemoradiotherapy: Locally Advanced NSCLC **Target = 50%**

Numerator = Number of patients with NSCLC, Stage IIIA[22] and PS 0-1, not undergoing surgery and who receive Chemoradiotherapy[23].
Denominator = All patients with NSCLC, Stage IIIA and PS 0-1 not undergoing surgery who receive radical radiotherapy[24].
Exclusions = Patients who decline treatment, patients who die before treatment, patients who receive Continuous Hyperfractionated Radiotherapy (CHART).

Target 50%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	84	146	354	709	1293
Numerator	1	1	5	8	15
Not recorded for numerator	0	0	0	0	0
Denominator	1	1	7	16	25
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	1	1
% Performance	**100.0%**	**100.0%**	**71.4%**	**50.0%**	**60.0%**

Comments

The QPI was passed by all health boards and no action is required.



	Borders	D&G	Fife	Lothian	SCAN
2014-15	50.0%	40.0%	66.7%	80.0%	70.0%
2015	100.0%	75.0%	62.5%	90.5%	82.9%
2016	50.0%	83.3%	81.8%	61.9%	70.0%
2017	33.3%	100.0%	71.4%	47.1%	56.7%
2018	50.0%	100.0%	66.7%	26.7%	44.4%
2019	100.0%	100.0%	71.4%	50.0%	60.0%
Target	50%	50%	50%	50%	50%

[22] Stage IIIA NSCLC includes: T1a-c N2 M0; T1b N2; T2a-b N2M0; T3 N1 M0; T4 N0-1 M0.
[23] NSCLC Chemoradiotherapy: radiotherapy ≥ 54Gy and concurrent or sequential chemotherapy.
[24] Radical radiotherapy: dose given for NSCLC ≥ 54Gy.

QPI 10 Chemoradiotherapy in Limited Stage Small Cell Lung Cancer Target = 70%

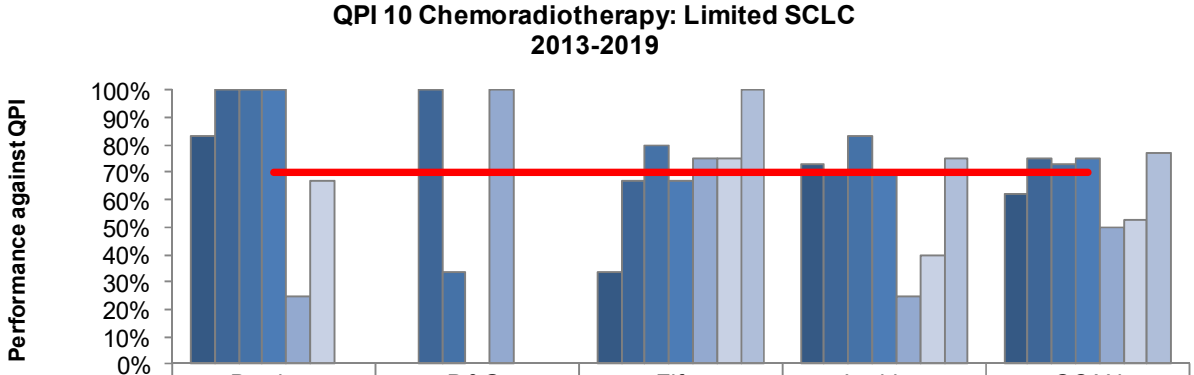
Numerator = Number of patients with SCLC, Stage I-IIIB[25] and PS 0-1 who receive Chemoradiotherapy[26].
Denominator = All patients with SCLC, Stage I-IIIB and PS 0-1.
Exclusions = Patients who decline treatment, die before treatment, and those who undergo surgery.

Target 70%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	84	147	355	693	1279
Numerator	0	0	6	24	30
Not recorded for numerator	0	0	0	0	0
Denominator	1	0	6	32	39
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	1	1
% Performance	**0.0%**	**n/a**	**100.0%**	**75.0%**	**76.9%**

Comments

NHS Borders: There was only 1 patient in the denominator. This patient was unable to complete chemoradiotherapy due to clinical contraindication to platinum chemotherapy and, unfortunately, when given alternative chemotherapy their cancer progressed.

NHS D&G: The denominator criteria did not apply to any patients in D&G and the result must therefore be regarded as not applicable.



	Borders	D&G	Fife	Lothian	SCAN
2013-14	83.3%	0.0%	33.3%	73.3%	62.1%
2014-15	100.0%	100.0%	66.7%	70.0%	75.0%
2015	100.0%	33.3%	80.0%	83.3%	73.3%
2016	100.0%	0.0%	66.7%	69.2%	75.0%
2017	25.0%	100.0%	75.0%	25.0%	50.0%
2018	66.7%	0.0%	75.0%	40.0%	52.4%
2019	0.0%	0.0%	100.0%	75.0%	76.9%
Target	70%	70%	70%	70%	70%

*D&G 2013/14: the target was not met when 0 out of 2 patients received chemoradiotherapy; similarly in 2018 the result was 0 out of 1 patient. Conversely, in 2016 and 2019 the denominator criteria did not apply to any patients diagnosed in D&G and zero in these cases represents “inapplicable”.

[25] Patients with $T_xN_{1-3}M_0$ disease will be included within the measurement of this QPI.
[26] SCLC Chemoradiotherapy: radiotherapy ≥ 40Gy and concurrent or sequential platinum-based chemotherapy.

QPI 11 Systemic Anti-Cancer Therapy (SACT) in Non-Small Cell Lung Cancer

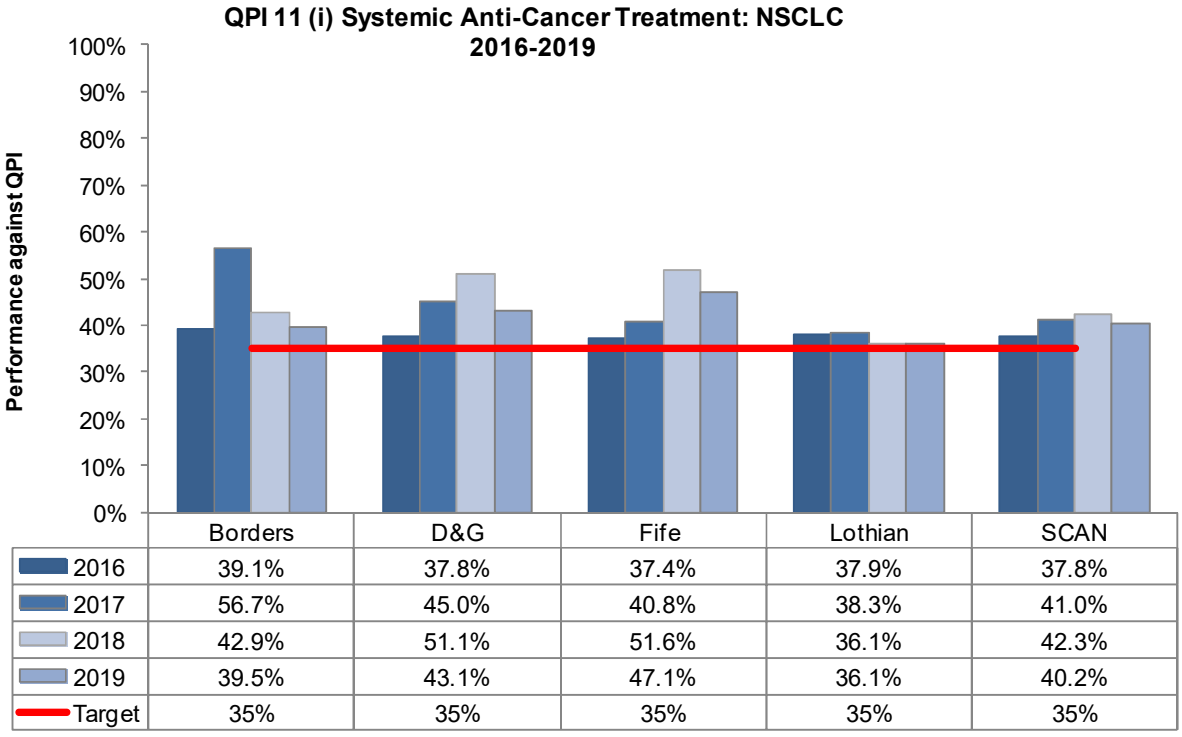
11 (i) Patients with NSCLC who receive SACT Target = 35%

Numerator = Number of patients with NSCLC not undergoing surgery who receive SACT.
Denominator = All patients with NSCLC not undergoing surgery.
Exclusions = Patients who decline chemotherapy and patients who die before treatment.

Target 35%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	47	89	223	460	819
Numerator	15	25	65	96	201
Not recorded for numerator	0	0	0	0	0
Denominator	38	58	138	266	500
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0
% Performance	**39.5%**	**43.1%**	**47.1%**	**36.1%**	**40.2%**

Comments

The QPI was passed by all health boards and no action is required.



	Borders	D&G	Fife	Lothian	SCAN
2016	39.1%	37.8%	37.4%	37.9%	37.8%
2017	56.7%	45.0%	40.8%	38.3%	41.0%
2018	42.9%	51.1%	51.6%	36.1%	42.3%
2019	39.5%	43.1%	47.1%	36.1%	40.2%
Target	35%	35%	35%	35%	35%

At review, the exclusion criteria were amended and *patients participating in clinical trials* were removed. This took effect for patients diagnosed from 1st January 2016. The results are therefore presented from 2016 onwards.

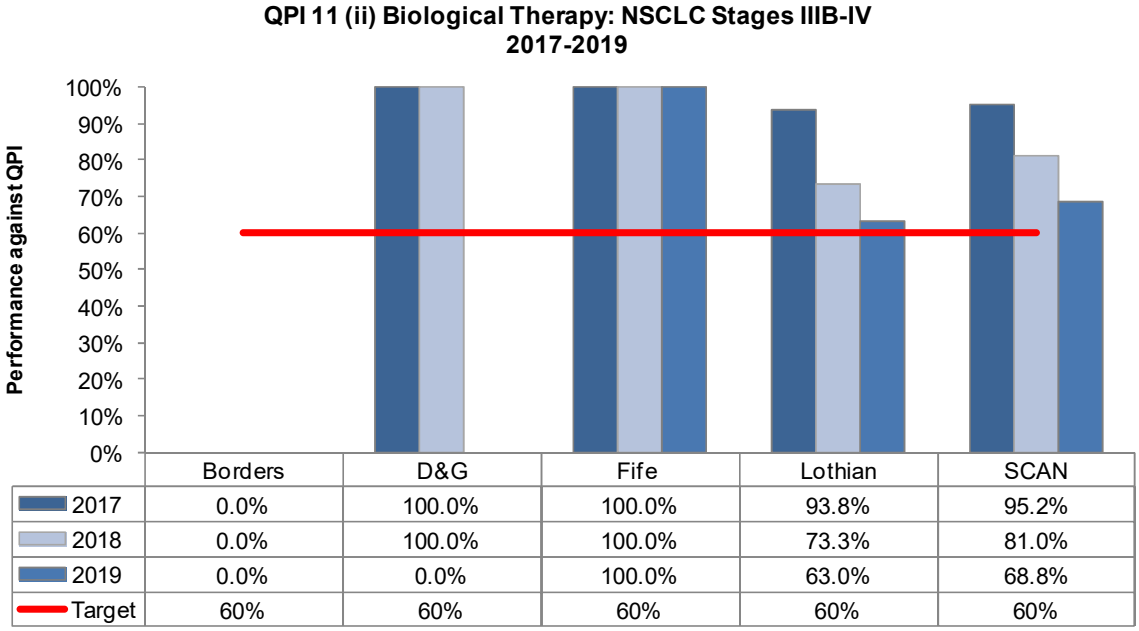
11 (ii) NSCLC, Stage IIIB, IIIC and IV who have Biological Therapy Target = 60%

Numerator = Number of patients with NSCLC, Stage IIIB-IV, PS 0-2 not undergoing surgery, that are EGFR[27] or ALK[28] positive who receive biological therapy.
Denominator = All patients with NSCLC, Stage IIIB-IV, PS 0-2 not undergoing surgery that are EGFR or ALK positive.
Exclusions = Patients who decline SACT, who die before treatment, and those participating in clinical trials.

Target 60%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	85	147	356	699	1287
Numerator	0	0	5	17	22
Not recorded for numerator	0	0	0	0	0
Denominator	0	0	5	27	32
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0
% Performance	**n/a**	**n/a**	**100.0%**	**63.0%**	**68.8%**

Comments

The target was met by NHS Fife and NHS Lothian. There were no EGFR or ALK positive patients in NHS Borders or NHS D&G and consequently the QPI performance in these HBs should be interpreted as *inapplicable*.



This QPI was implemented for patients diagnosed with lung cancer from 1st January 2017.
The denominator criteria was not applicable to any patients in NHS Borders in 2017, 2018 or 2019 and the zero in the chart therefore represents *inapplicable*; and similarly for NHS D&G in 2019.

[27] EGFR: Epidermal Growth Factor Receptor
[28] ALK: Oncogenic Anaplastic Lymphoma Kinase status

QPI 12 Chemotherapy for Small Cell Lung Cancer

At Baseline Review it was agreed to amend QPI 12 and as from 1st April 2014 it was divided into 2 parts: (i) Chemotherapy ± radiotherapy and (ii) palliative chemotherapy only.

QPI 12 (i) Patients with SCLC who receive chemotherapy ± radiotherapy Target = 70%

Numerator = Number of patients with SCLC who receive chemotherapy[29] ± radiotherapy.
Denominator = All patients with SCLC.
Exclusions = Patients who decline chemotherapy, patients who die before treatment and patients who are participating in clinical trials.

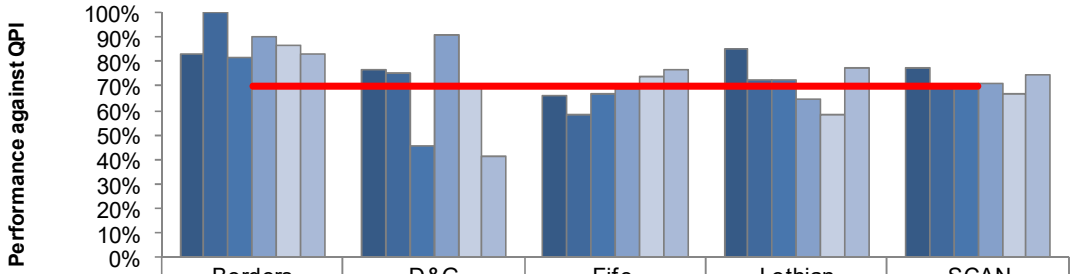
Target 70%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	79	135	335	637	1186
Numerator	5	5	20	69	99
Not recorded for numerator	0	0	0	0	0
Denominator	6	12	26	89	133
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0
% Performance	**83.3%**	**41.7%**	**76.9%**	**77.5%**	**74.4%**

Comments

The target was not met by NHS D&G with a shortfall of 28.3% (7 cases). The low-ish performance of 41.7% is representative of denominators of small number and, should be viewed in this context. Valid clinical reasons were provided for all of the 7 patients who did not receive chemotherapy.

NHS D&G: The chemotherapy component of chemoradiotherapy was contraindicated due to comorbidities for 3 of the 7 patients; 2 were treated with palliative radiotherapy while the third was not suitable for active treatment and received BSC. An additional 1 patient was unable to receive chemoradiotherapy due to poor performance status and frailty from cancer. SCLC has a propensity to show considerable growth in a very short period and, opportunities for treatment can unfortunately be missed. The remaining 3 patients of the 7 in NHS D&G deteriorated post MDM and prior to oncology review and, as such, the opportunity for chemotherapy was missed.

QPI 12 (i) Chemotherapy ± Radiotherapy: SCLC 2014-2019



	Borders	D&G	Fife	Lothian	SCAN
2014-15	83.3%	76.5%	65.9%	85.5%	77.3%
2015	100.0%	75.0%	58.6%	72.7%	70.5%
2016	81.8%	45.5%	66.7%	72.3%	68.7%
2017	90.0%	90.9%	69.2%	64.4%	70.8%
2018	86.7%	70.0%	73.5%	58.5%	66.9%
2019	83.3%	41.7%	76.9%	77.5%	74.4%
Target	70%	70%	70%	70%	70%

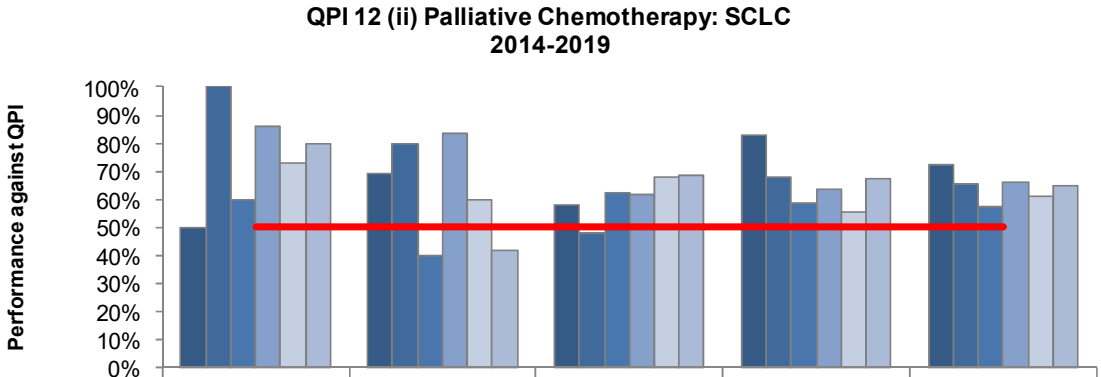
[29] Chemotherapy includes neoadjuvant, adjuvant, chemoradiotherapy or palliative chemotherapy.

QPI 12 (ii) Palliative Chemotherapy: Patients with SCLC **Target = 50%**

Numerator = Number of patients with SCLC not undergoing treatment with curative intent who receive palliative chemotherapy.
Denominator = All patients with SCLC not undergoing treatment with curative intent.
Exclusions = Patients who decline chemotherapy, patients who die before treatment and patients who are participating in clinical trials.

Target 50%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	80	135	342	667	1224
Numerator	4	5	13	39	61
Not recorded for numerator	0	0	0	0	0
Denominator	5	12	19	58	94
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	1	1
% Performance	**80.0%**	**41.7%**	**68.4%**	**67.2%**	**64.9%**

Comments
The target was not met by NHS D&G with a shortfall of 8.3% (7 cases). Again and as shown for QPI 12 (i), small numbers impact results. The same valid clinical reasons outlined under QPI 12 (i) *Chemotherapy ± radiotherapy*, apply to the 7 patients in NHS D&G who, for this QPI did not receive palliative chemotherapy. The target was met by the other 3 health boards.



	Borders	D&G	Fife	Lothian	SCAN
2014-15	50.0%	69.2%	57.7%	82.9%	72.0%
2015	100.0%	80.0%	47.6%	67.9%	65.1%
2016	60.0%	40.0%	62.5%	58.5%	57.5%
2017	85.7%	83.3%	61.9%	63.5%	66.3%
2018	72.7%	60.0%	67.9%	55.2%	60.7%
2019	80.0%	41.7%	68.4%	67.2%	64.9%
Target	50%	50%	50%	50%	50%

This QPI was introduced at Baseline Review and the chart covers the 6-year period commencing at Year 2 (2014-15).

QPI 13 Mortality following Active Treatment: 30- and 90-Day

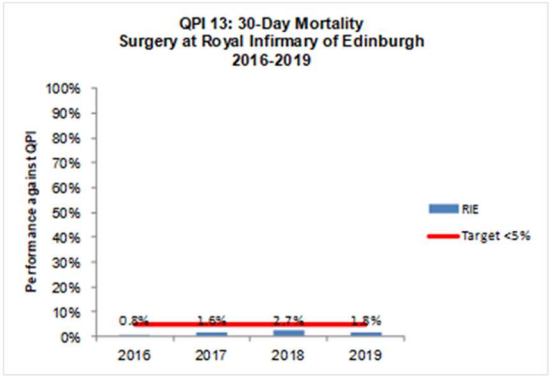
All patients who die within 30 and 90 days of completion of treatment are discussed and reported at regularly held Mortality and Morbidity (M&M) meetings. It is standard QPI practice to report reasons only for outliers but for completeness, and in line with M&M protocols, reasons are given here for *all* patients who die within 30- and 90-days of treatment regardless of whether results remain within the accepted parameters or if they are exceeded. Patients for whom 30- or 90- days have not passed since treatment are not included in the denominator.

13 (i) A: Surgery: 30-Day Mortality — Target <5%

Numerator = Number of patients who receive surgery who die within 30 days of treatment.
Denominator = All patients with lung cancer who receive surgery (no exclusions).

Royal Infirmary of Edinburgh

30 Day Target <5%	2019	2018	2017
Numerator	3	5	3
Not recorded for numerator	0	0	0
Denominator*	166	188	192
Not recorded for exclusions	0	0	0
Not recorded for denominator	0	0	0
% Performance	**1.8%**	**2.7%**	**1.6%**



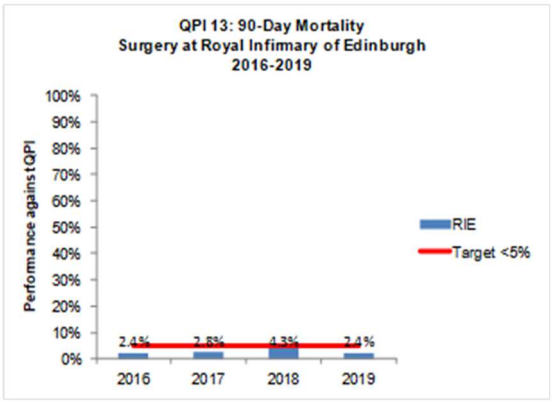
* The denominator includes 35 (2019); 52 (2018); and 44 (2017) patients who were diagnosed in NHS Tayside and who had surgery at RIE. Patients from NHS D&G are not included in the denominator; they have surgery at the Golden Jubilee Hospital, Clydebank and are reported by WOSCAN.

13 (i) B: Surgery: 90-Day Mortality — Target <5%

Numerator = Number of patients who receive surgery who die within 90 days of treatment.
Denominator = All patients with lung cancer who receive surgery (no exclusions).

Royal Infirmary of Edinburgh

90 Day Target <5%	2019	2018	2017
Numerator	4	8	38
Not recorded for numerator	0	0	0
Denominator*	164	187	181
Not recorded for exclusions	0	0	0
Not recorded for denominator	0	0	0
% Performance	**2.4%**	**4.3%**	**2.8%**



* The denominator includes 35 (2019); 52 (2018); and 44 (2017) patients who were diagnosed in NHS Tayside and who had surgery at RIE. Patients from NHS D&G are not included in the denominator; they have surgery at the Golden Jubilee Hospital, Clydebank and are reported by WOSCAN.

Comments

Surgical outcomes are the responsibility of the hospital where the surgical procedure was undertaken and not with the HB who referred patients (often outwith their HB area) for surgical resection. As a consequence, 30- and 90-day mortality post surgery are analysed by *Hospital of Surgery*.

There were 4 deaths within 90 days of surgery (which includes 3 patients who died at 30-day post surgery). Results remain within the accepted target parameters and are in line with good clinical practice. The reasons are detailed below:

All 4 patients died of complications or infections following surgery

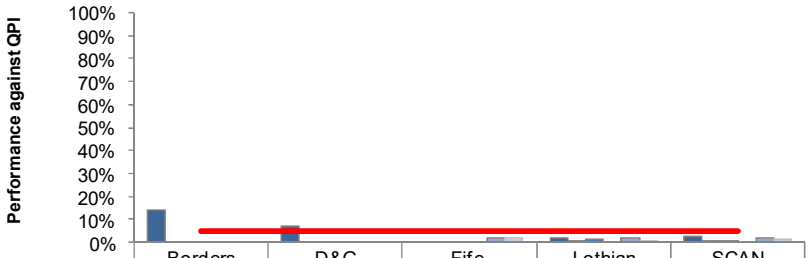
13 **(ii) Radical Radiotherapy: 30- & 90- Day Mortality** **Target <5%**

Numerator = Number of patients who receive radical radiotherapy who die within 30 and 90 days of treatment.
Denominator = All patients with lung cancer who receive radical radiotherapy (no exclusions).

Target <5%	Borders		D&G		Fife		Lothian		SCAN	
	30	90	30	90	30	90	30	90	30	90
2019 cohort	85	85	147	147	361	361	726	726	1319	1319
Ineligible for this QPI	82	82	137	137	316	316	617	618	1152	1153
Numerator	0	1	0	0	1	5	1	6	2	12
Not recorded for numerator	0	0	0	0	0	0	0	0	0	0
Denominator	3	3	10	10	45*	45*	109	108**	167	166
Not recorded for exclusions	0	0	0	0	0	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0	0	0	0	0	0
% Performance	**0.0**	**33.3**	**0.0**	**0.0**	**2.2**	**11.1**	**0.9**	**5.6**	**1.2**	**7.2**

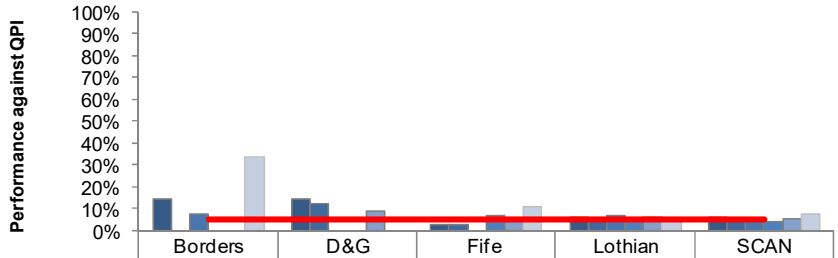
* Radical Radiotherapy was given to 46 patients in Fife. However, for 1 patient, neither 30 nor 90 days had elapsed since treatment (at the time of reporting) and this patient is therefore not included in the denominator.
** The denominator in Lothian for 30 day mortality is 109 compared to 108 for 90 days. 90 days had not elapsed since treatment for 1 patient who is therefore not included in the denominator for 90-day analysis.

QPI 13 30-Day Mortality
Radical Radiotherapy
2014 - 2019



	Borders	D&G	Fife	Lothian	SCAN
2014-15	14.3%	7.1%	0.0%	2.0%	2.5%
2015	0.0%	0.0%	0.0%	1.0%	0.6%
2016	0.0%	0.0%	0.0%	1.3%	0.8%
2017	0.0%	0.0%	0.0%	0.0%	0.0%
2018	0.0%	0.0%	2.3%	2.0%	1.8%
2019	0.0%	0.0%	2.2%	0.9%	1.2%
Target <5%	5%	5%	5%	5%	5%

QPI 13 90-Day Mortality
Radical Radiotherapy
2014-2019



	Borders	D&G	Fife	Lothian	SCAN
2014-15	14.3%	14.3%	2.4%	6.0%	6.1%
2015	0.0%	12.5%	2.4%	4.8%	4.4%
2016	7.7%	0.0%	0.0%	6.6%	5.1%
2017	0.0%	0.0%	6.7%	4.0%	4.1%
2018	0.0%	9.1%	4.5%	5.9%	5.4%
2019	33.3%	0.0%	11.1%	5.6%	7.2%
Target <5%	5%	5%	5%	5%	5%

Comments
There were 2 deaths within 30 days of patients receiving radical radiotherapy and a further 10 within 90 days. The accepted target parameters were exceeded in NHS Borders, Fife & Lothian. These results should, however, be viewed with some caution in that small numbers can produce disproportionate percentages, as demonstrated in NHS Borders where 1 out of 3 patients died within 90 days resulting in an artificially high 33.3%. There were no deaths in NHS D&G in this time frame.

NHS Borders: The target was exceeded by 28.3% (1 case).
- The patient died from progressive disease.

NHS Fife: The target was exceeded by 6.1% (5 cases).
- 3 patients died of pneumonia not thought to be treatment related.
- 2 patients died of pneumonia or Covid19 with possible radiation pneumonitis. Both were treated appropriately.

NHS Lothian: The target was exceeded by 0.6% (6 cases).
- 2 patients died with complications thought to be secondary to treatment
- 1 died from comorbidities unrelated to treatment or cancer.
- 1 died from a community acquired infection
- A further 2 patients, whose radiotherapy was completed without issue, died at home, this was felt unlikely related to recent treatment. Cancer itself is known to increase the risk of blood clots which may have been responsible.

(See appendix 5 *Glossary* for definitions of medical terms, acronyms and abbreviations).

QPI 13 (iii) Adjuvant Chemotherapy: 30-Day Mortality **Target <5%**

Numerator = Number of patients who receive adjuvant chemotherapy who die within 30 days of treatment..
Denominator = All patients with lung cancer who receive adjuvant chemotherapy (no exclusions).

Target <5%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	84	145	359	718	1306
Numerator	0	0	0	0	0
Not recorded for numerator	0	0	0	0	0
Denominator	1	2	2	8	13
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0
% Performance	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Comments

There were no deaths within 30 days for patients diagnosed with lung cancer in 2019 who received adjuvant chemotherapy in the SCAN region. This has been the pattern over the past 7 years of QPI reporting and therefore a chart is not deemed necessary. 90-day analysis is not undertaken for adjuvant chemotherapy.

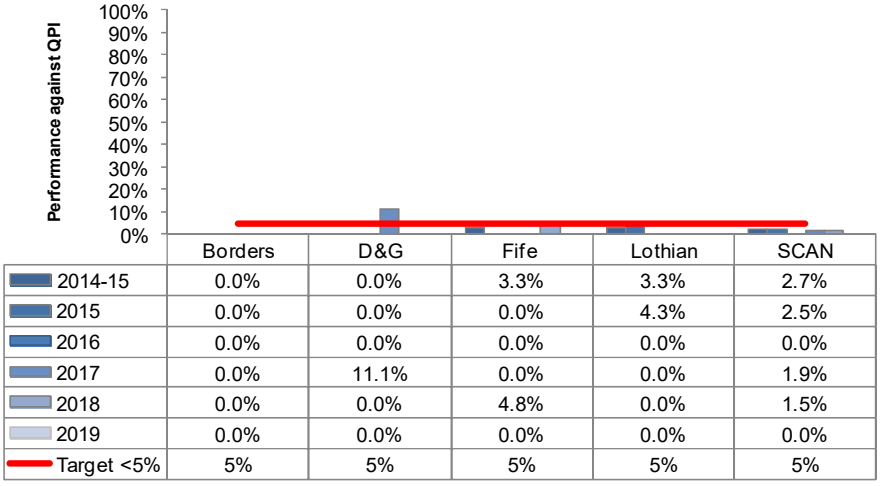
QPI 13 (iv) Chemoradiotherapy: 30-and 90-Day Mortality Target <5%

Numerator = Number of patients who receive chemoradiotherapy who die within 30- and 90-days of treatment.
Denominator = All patients with lung cancer who receive chemoradiotherapy (no exclusions).

Target <5%	Borders		D&G		Fife		Lothian		SCAN	
	30	90	30	90	30	90	30	90	30	90
2019 cohort	85	85	147	147	361	361	726	726	1319	1319
Ineligible for this QPI	81	81	145	145	340	340	668	669	1234	1235
Numerator	0	0	0	0	0	1	0	2	0	3
Not recorded for numerator	0	0	0	0	0	0	0	0	0	0
Denominator	4	4	2	2	21	21	58	57	85	84
Not recorded for exclusions	0	0	0	0	0	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0	0	0	0	0	0
% Performance	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4.8**	**0.0**	**3.5**	**0.0**	**3.6**

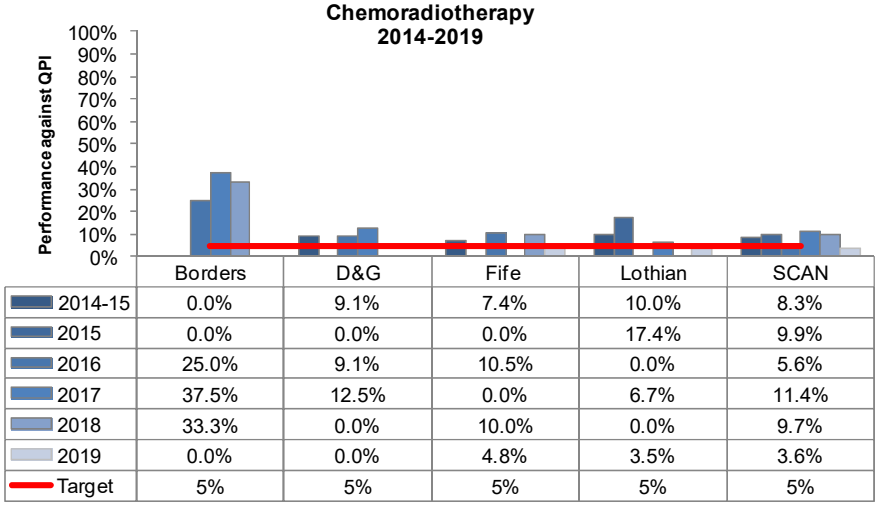
*90 days since treatment had not elapsed for 1 patient from Lothian (at the time of reporting); therefore the denominator is 57 (compared to 58 for 30 day mortality chemoradiotherapy).

QPI 13 30-Day Mortality Chemoradiotherapy 2014-2019



	Borders	D&G	Fife	Lothian	SCAN
2014-15	0.0%	0.0%	3.3%	3.3%	2.7%
2015	0.0%	0.0%	0.0%	4.3%	2.5%
2016	0.0%	0.0%	0.0%	0.0%	0.0%
2017	0.0%	11.1%	0.0%	0.0%	1.9%
2018	0.0%	0.0%	4.8%	0.0%	1.5%
2019	0.0%	0.0%	0.0%	0.0%	0.0%
Target <5%	5%	5%	5%	5%	5%

QPI 13 90-Day Mortality Chemoradiotherapy 2014-2019



	Borders	D&G	Fife	Lothian	SCAN
2014-15	0.0%	9.1%	7.4%	10.0%	8.3%
2015	0.0%	0.0%	0.0%	17.4%	9.9%
2016	25.0%	9.1%	10.5%	0.0%	5.6%
2017	37.5%	12.5%	0.0%	6.7%	11.4%
2018	33.3%	0.0%	10.0%	0.0%	9.7%
2019	0.0%	0.0%	4.8%	3.5%	3.6%
Target	5%	5%	5%	5%	5%

Comments

There were no deaths within 30 days following chemoradiotherapy in SCAN. For 2 of the 4 HBs, NHS Borders and D&G, there were no deaths within 90 days following chemoradiotherapy.

Results remained within the accepted target parameters for NHS Fife and Lothian, with 1 and 2 deaths respectively.

2 patients died of progressive disease and the third developed infections, deteriorated and died.

QPI 13 (v-vii): 30-Day Mortality: Palliative SACT

It was agreed at FR2 that 30-day mortality post palliative SACT (palliative chemotherapy for NSCLC and SCLC, and biological therapy for NSCLC only) will no longer be under Audit's remit but will be analysed and reported centrally using ChemoCare. Results will be available in due course.

Mortality within 30 days of systemic therapy is subject to M+M peer review on a regular basis (as per CEL 30) and action plans developed each year. These are reported separately for all tumour types to the SACT lead. There were no cases requiring escalation for external review identified for cases in 2019.

QPI 14 SABR in Inoperable Stage I Lung Cancer **Target = 35%**

Numerator = Number of patients with Stage I[30] lung cancer not undergoing surgery who receive SABR[31].
Denominator = All patients with Stage I lung cancer not undergoing surgery.
Exclusions = Patients with SCLC, patients who decline SABR and patients who die before treatment.

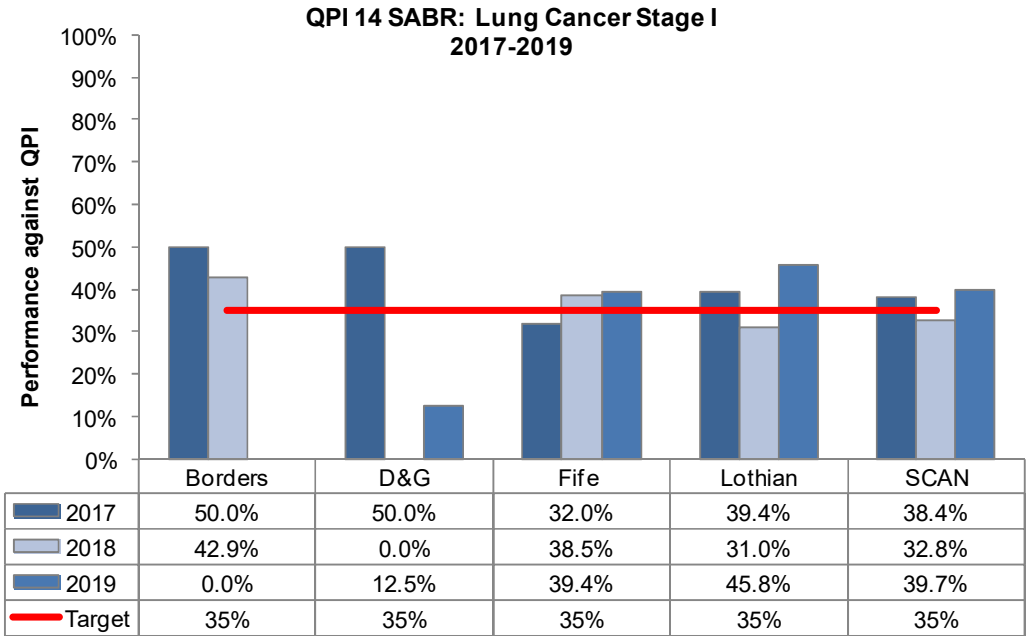
Target 35%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	78	139	327	622	1159
Numerator	0	1	13	38	52
Not recorded for numerator	0	0	0	0	0
Denominator	7	8	33	83	131
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	7	1	21	29
% Performance	**0.0%**	**12.5%**	**39.4%**	**45.8%**	**39.7%**

Comments

As the population ages so the incidence of lung cancer is increasing. Often patients have multiple medical co-morbidities which preclude surgical resection or they may decide to decline surgery. Radiotherapy, including SABR, provides an alternative treatment mode to these patients.

In 2019 the target was met by NHS Fife and Lothian although not met in the more peripheral boards, NHS Borders and D&G, where allowance should be made for small numbers.

NHS Borders and NHS D&G: The target was not met because SABR was not appropriate for these 14 cases. Lesions were too central or too close to critical structures, or patients had high volume disease or comorbidities precluding SABR.



	Borders	D&G	Fife	Lothian	SCAN
2017	50.0%	50.0%	32.0%	39.4%	38.4%
2018	42.9%	0.0%	38.5%	31.0%	32.8%
2019	0.0%	12.5%	39.4%	45.8%	39.7%
Target	35%	35%	35%	35%	35%

This QPI was new to our reporting programme following FR1 and was implemented on 1st January 2017, coinciding with the implementation of a new data field [SABR]; a specialised type of radiotherapy which precisely targets the tumour with radiation whilst lowering the risk of damage to surrounding tissue.

[30] Stage I: T1 or T1(mi) or T1a-1c, N0, M0
[31] SABR: Stereotactic Ablative Radiotherapy

QPI 15 Pre-Treatment Diagnosis

15 (i) Cytology or Histology Prior to Thoracic Surgery **Target = 75%**

Numerator = Number of patients with lung cancer receiving surgery who have a cytological/histological diagnosis prior to treatment.
Denominator = All patients with lung cancer who receive surgery.
Exclusions = Patients who decline investigations.

Target 75%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	70	129	327	644	1171
Numerator	11	9	26	41	87
Not recorded for numerator	0	0	0	0	0
Denominator	15	18	34	80	147
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	1	1
% Performance	**73.3%**	**50.0%**	**76.5%**	**51.3%**	**59.2%**

Comments

Obtaining histology or cytology prior to surgery is not always considered the most appropriate course of action nor always in the patient's best interest. Lesions might be too small or peripheral therefore inaccessible to biopsy and it can be hard to justify multiple invasive attempts which all demonstrate negative or inconclusive histologies. All patients are discussed fully at MDM so that all approaches are considered and that all proper processes take their course. A study by Bain, L et al[32] recommended the use of Herder Score (based on PET, size, characteristics of the tumour and smoking status). The Herder Score looks at the probability of cancer as an alternative option and indeed, reporting this has recently become common practice at most MDMs in the SCAN region in response to the Action Plan for the 2018 cohort.

The target was met by NHS Fife, marginally missed by NHS Borders and not met by the remaining two HBs. At Report Sign-Off it was acknowledged that the basis for not meeting the target represented valid clinical reasons for not pursuing histology or cytology.

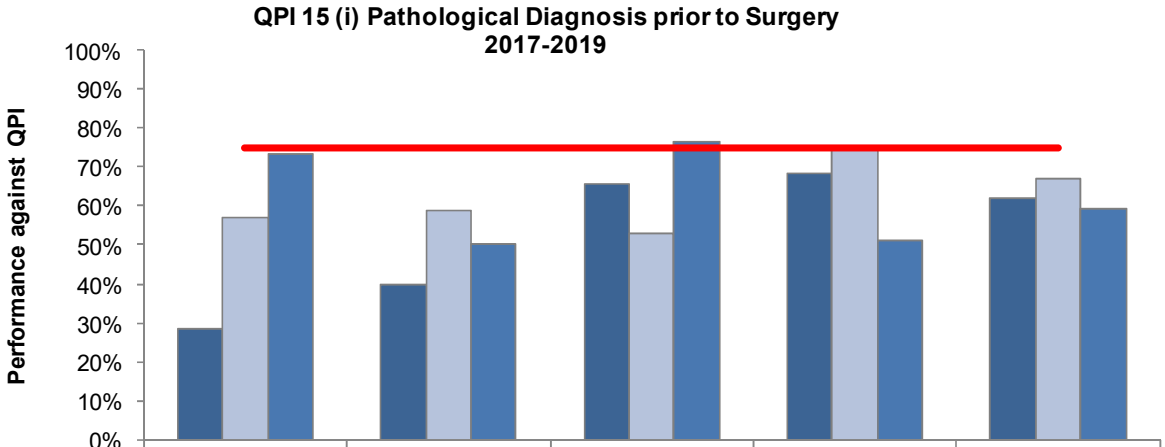
NHS Borders: The target was not met with a shortfall of 1.7% (4 cases). The MDT recommended that biopsy would be of too high a risk to 2 patients and decided to proceed to surgery without tissue in these instances. For the remaining 2 patients, lesions were too small for biopsy.

NHS D&G: The target was not met with a shortfall of 25% (9 cases). An incidental finding at surgery for 1 patient whose tumour was assumed, at referral, to be of a different morphology proved to be lung cancer. Lesions were too small to biopsy for 3 patients and, inaccessible to biopsy for a further 2 of the 9 patients. Another patient's biopsy was attempted but abandoned due to a significant risk of pneumothorax. Finally, while the remaining 2 patients' biopsies returned negative results they radiologically merited surgical resection. The artificially high shortfall (25%) is likely a consequence of small numbers.

NHS Lothian: The target was not met with a shortfall of 23.7% (39 cases). 13 of these patients did not undergo biopsy. 10 patients' lesions were inaccessible to biopsy; a further 2 patients' lesions were considered too small. For 1 of the 13 cases the lesion was both too small and inaccessible. 12 of the remaining 39 patients had frozen section which demonstrated lung cancer and they continued to surgical resection on the same day. The MDT concluded that biopsy was too risky for an

[32] Bain L, Hainey S, Henderson W, Reid PA (Respiratory dept, Western General Hospital, Edinburgh), 2020: *Lung Cancer Patients Without Tissue Diagnosis in NHS Lothian 2016 – 2018*. [See appendix 4]

additional 12 patients and elected to proceed to surgery without tissue. Biopsies for the remaining 2 of the 39 were attempted but had to be abandoned.



	Borders	D&G	Fife	Lothian	SCAN
2017	28.6%	40.0%	65.5%	68.2%	61.8%
2018	57.1%	58.8%	52.8%	75.0%	67.1%
2019	73.3%	50.0%	76.5%	51.3%	59.2%
Target	75%	75%	75%	75%	75%

This QPI was introduced at FR1 and was implemented from 1st January 2017.

Outliers in NHS Lothian included 12 patients who had frozen section biopsy (FSB) prior to surgery. FSB allows intraoperative distinction between benign and malignant lung lesions and serves to minimise surgery for benign disease and additionally ensures that surgical resection is the appropriate choice of treatment for these patients. Arguably, FSB should be classified as a pre-treatment biopsy and indeed, consensus was reached at the most recent QPI review (FR2) that this should be the case. Going forward FSBs will be counted as pre-treatment biopsies. This would change NHS Lothian's performance for QPI 15 (i) in 2019 from 51.3% to 66.3%, a result now closer to the 75% target.

15 (ii) Cytology or Histology prior to Radical Radiotherapy **Target = 75%**

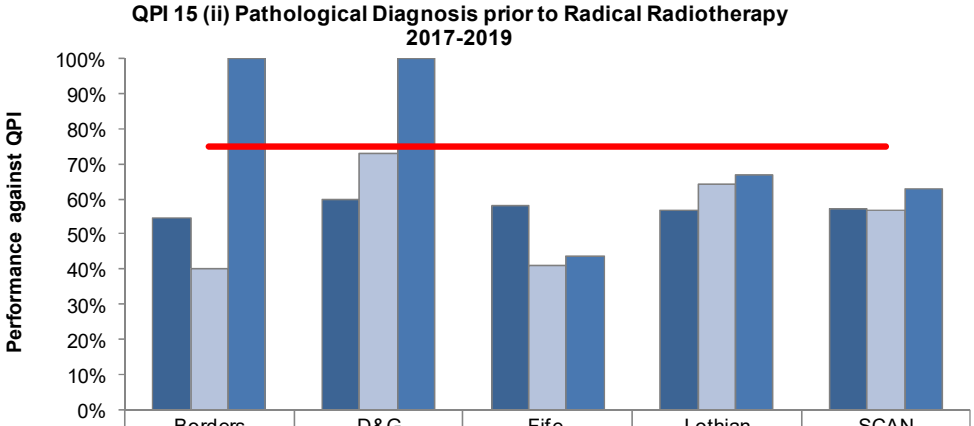
Numerator = Number of patients with lung cancer receiving radical radiotherapy who have a cytological/histological diagnosis prior to treatment.
Denominator = All patients with lung cancer who receive radical radiotherapy.
Exclusions = Patients who decline investigations.

Target 75%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	82	137	315	617	1152
Numerator	3	9	20	73	105
Not recorded for numerator	0	0	0	0	0
Denominator	3	9	46	109	167
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0
% Performance	**100.0%**	**100.0%**	**43.5%**	**67.0%**	**62.9%**

Comments
NHS Borders and D&G achieved 100% performance though also have very small numbers. This could relate by chance to their small numbers but is more likely a consequence of being diagnosed in more rural peripheral health boards where patients need pathology confirmed to justify travel for radical radiotherapy.

NHS Fife: The target was not met with a shortfall of 31.5% (26 cases). Tumours were too small to biopsy for 5 patients, inaccessible to biopsy for another 2 and both too small and inaccessible for a further 2 patients. The MDT recommended that biopsy was too high risk for 12 of the 26 patients. Biopsy was attempted for a further 4 patients but abandoned. It was agreed that all of these patients should proceed to radical radiotherapy without tissue diagnoses. Finally, 1 patient who received radiotherapy with 'radical' dose, therefore meeting the criteria, was included in the denominator despite actual treatment given with palliative intent.

NHS Lothian: The target was not met with a shortfall of 8% (36 cases). Tumours were too small to biopsy for 2 patients and inaccessible for another 6 patients. The MDT recommended that biopsy was too high risk to 23 of the 36 patients. An additional 4 patients were not fit for biopsy due to poor lung function. It was agreed by the MDT that these 35 patients should proceed to radical radiotherapy without tissue diagnoses. The final outlier in NHS Lothian who did not proceed to biopsy, did not have a documented reason.



	Borders	D&G	Fife	Lothian	SCAN
2017	54.5%	60.0%	58.1%	56.9%	57.0%
2018	40.0%	72.7%	40.9%	64.0%	57.0%
2019	100.0%	100.0%	43.5%	67.0%	62.9%
Target	75%	75%	75%	75%	75%

This QPI was new to our reporting programme from 1st January 2017.

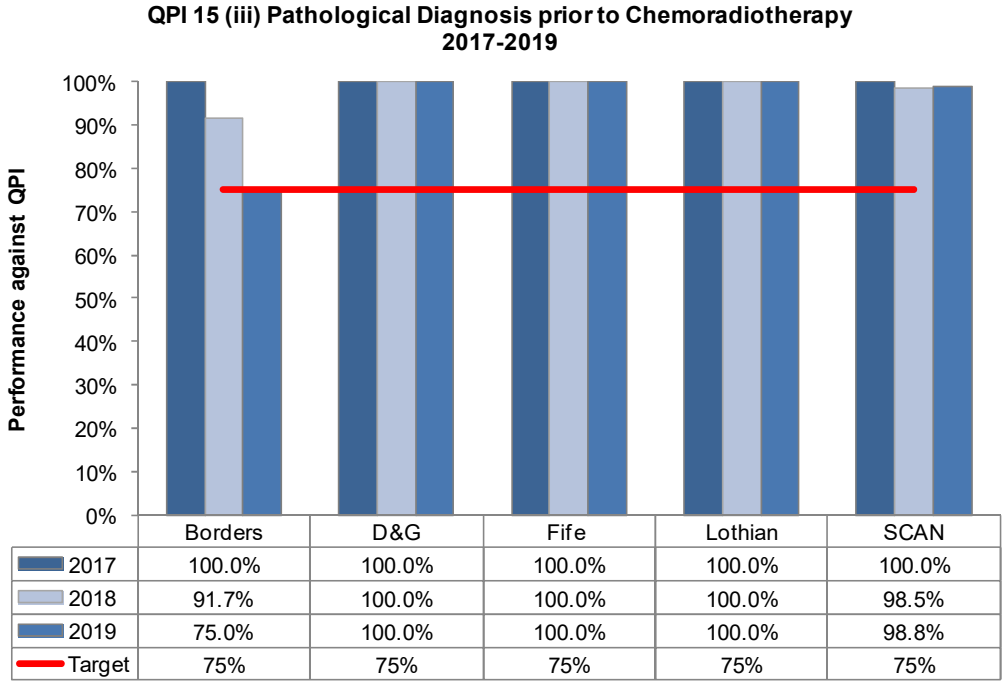
15 (iii) Cytology or Histology prior to Chemoradiotherapy **Target = 75%**

Numerator = Number of patients with lung cancer receiving chemoradiotherapy who have a cytological/histological diagnosis prior to treatment.
Denominator = All patients with lung cancer who receive chemoradiotherapy.
Exclusions = Patients who decline investigations.

Target 75%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	81	145	340	668	1234
Numerator	3	3	21	58	85
Not recorded for numerator	0	0	0	0	0
Denominator	4	3	21	58	86
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	0	0	0	0
% Performance	**75.0%**	**100.0%**	**100.0%**	**100.0%**	**98.8%**

Comments

Historically, and as illustrated in the chart below, the target is generally surpassed by all 4 HBs. It was acknowledged at Sign Off that these results are as expected given that it is good medical practice to not give chemotherapy without pathology in place; pathology which additionally indicates the appropriate chemotherapy agent(s) to be administered.



	Borders	D&G	Fife	Lothian	SCAN
2017	100.0%	100.0%	100.0%	100.0%	100.0%
2018	91.7%	100.0%	100.0%	100.0%	98.5%
2019	75.0%	100.0%	100.0%	100.0%	98.8%
Target	75%	75%	75%	75%	75%

This QPI was new to our reporting programme and was implemented from 1st January 2017.

QPI 16 Brain Imaging for Lung Cancer Patients with N2 Disease Target = 95%

Numerator = Number of patients with lung cancer N2 disease who receive curative treatment that undergo contrast enhanced CT/MRI scanning prior to the start of treatment.
Denominator = All patients with lung cancer N2 disease who receive curative treatment[33].
Exclusions = Patients who decline brain imaging.

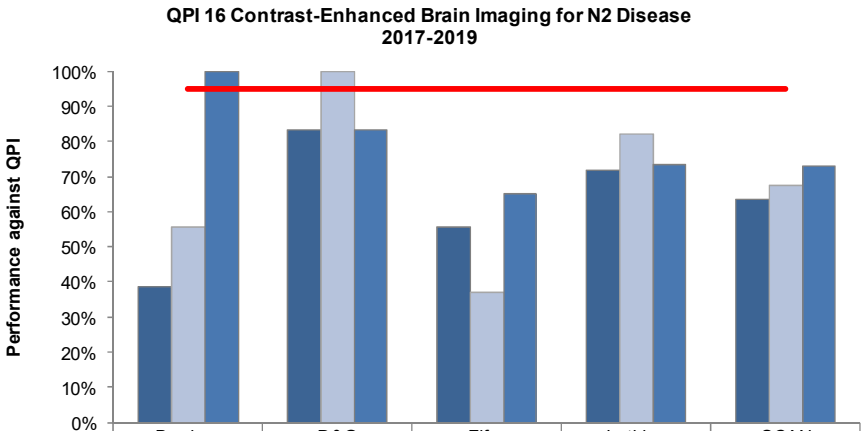
Target 95%	Borders	D&G	Fife	Lothian	SCAN
2019 cohort	85	147	361	726	1319
Ineligible for this QPI	82	141	338	670	1231
Numerator	3	5	15	39	62
Not recorded for numerator	0	0	0	0	0
Denominator	3	6	23	53	85
Not recorded for exclusions	0	0	0	0	0
Not recorded for denominator	0	4	0	3	7
% Performance	**100.0%**	**83.3%**	**65.2%**	**73.6%**	**72.9%**

Comments
Applying the denominator criteria generates very small cohorts. As such, results should be viewed with a degree of caution. They may simply be generated as a consequence of small numbers and, where variation might be due to chance. Valid clinical reasons have been provided for most outliers, although for 7 patients no documented reason was found.

NHS D&G: The target was not met with a shortfall of 11.7% (1 case).
NHS Fife: The target was not met with a shortfall of 29.8% (8 cases).
NHS Lothian: The target was not met with a shortfall of 21.4% (14 cases).

Reasons for not meeting the QPI	**D&G**	**Fife**	**Lothian**
CT Head after treatment had started		2	
Assumed metastatic but PET showed Stg IIIB (radical options available)		1	
Haemoptysis risk: urgent radiotherapy expedited, CT Head not done			2
Large volume therefore incurable. Radical radiotherapy for local control			1
SCLC -PCI is given as standard. CT Head not routine procedure			10
No documented reason	1	5	1
Totals	1	8	14

[33] Curative treatment: radical radiotherapy, radical chemoradiotherapy or surgical resection.



	Borders	D&G	Fife	Lothian	SCAN
2017	38.5%	83.3%	55.6%	71.9%	63.3%
2018	55.6%	100.0%	36.8%	82.1%	67.6%
2019	100.0%	83.3%	65.2%	73.6%	72.9%
Target	95%	95%	95%	95%	95%

These results continue to be somewhat disappointing. QPI 16 has been listed in Action Plans since 2017. A 'reminder' was implemented at MDM to ensure all appropriate patients were referred for CT Head. It was hoped that improvements might have been more apparent in 2019 but a mixed picture persists.

It was suggested at FR2 that there were two anomalies that had arisen in the development of this relatively new QPI. The issues were discussed and subsequent outcomes are summarised below:

- A standard treatment for 'fit' patients with Limited SCLC is chemoradiotherapy followed by PCI. PCI is the standard protocol and is given to patients: *who do not have evidence of progressive disease following chemotherapy*[34]. A CT Head prior to treatment is not a prerequisite for SCLC patients. It was therefore agreed at FR2 to exclude SCLC from the denominator.

  In NHS Lothian 10 of the 14 outliers were diagnosed with Limited SCLC and did not have CT head prior to treatment. Performance in Lothian when SCLC is excluded rises from 73.6% to 90.7%.

- The second anomaly relates to a numerator criterion: *prior to start of treatment*. There are two treatment types recorded in audit: (1) first treatment and (2) definitive treatment. Instances where patients or consultants delay treatment correspond to *first* treatment being reported as *Watch & Wait.* At a later date the plan might change and the patient will undergo any outstanding investigations before proceeding to active treatment; i.e. their *definitive* treatment. QPI 16 was formulated to reference *first* treatment rather than 'any/all'. To encompass *all* treatments, the QPI has been amended to reflect *prior to the start of definitive treatment,* thereby referencing 'all' treatments.

With these changes in mind and the 'reminder' embedded at MDM it is anticipated that improvements will be realized going forward.

[34] Edinburgh Cancer Centre **Clinical Management Guidelines for Lung Cancer (**Last Reviewed: 30/06/20)

QPI 17: Clinical Trials

Consented Trials/Research Study Target = 15%

Numerator = Number of patients with lung cancer consented for a clinical trial/research study.
Denominator = All patients diagnosed with lung cancer.
Exclusions = No exclusions.

2019 Consented Trials/Research Study Target = 15%

Target 15%	Borders	D&G	Fife	Lothian	SCAN
Numerator	1	0	4	15	20
Denominator	106	155	354	762	1377
% Performance	**0.9%**	**0.0%**	**1.1%**	**2.0%**	**1.5%**

Consented Trials in 2019	Numbers
PEARLS Pembrolizumab as adjuvant treatment for early stage NSCLC	2
KEYNOTE-789 Chemo +/- Pembrolizumab (MK-3475) in TKI-resistant	1
MENAC - 5	3
Lung DNA	14
TOTAL	**20**

As of 2019, mesothelioma is now reported separately and mesothelioma trial recruitment (6 patients in 2019) will appear in the national QPI Mesothelioma Report collated by WOSCAN from data submitted by the 3 Scottish networks.

Comment

Total recruitment remains very low. Lung clinical trial eligibility criteria are complex and challenging which prevents many patients from entering trials. Most trials have been geared towards targeted therapies but going forward new trials for palliative patients, and with less exclusions, will become available. It is also anticipated that we will see increased recruitment in 2020 to Covid lung trials.

Discussions in SCAN have considered the inclusion of diagnostic and outcome trials in respiratory medicine and surgery. These are not registered on the SCRN[35] database, the source endorsed by PHS to measure the clinical trials QPI. Using SCRN data allows for comparison with CSO (Chief Scientist Office) published data and ensures capture of all clinical trials activity. The principal benefit of this approach is that this data is already collected utilising a robust mechanism[36].

2019 Consented Trials & Research Study in addition to SCRN database	Numbers Recruited
Visualising c-MET and Activated Neutrophils in Lung Cancer (DUAL)	4
BioResource* consented to Respiratory research groups	109

The studies that consent via BioResource are not ‘true’ clinical trials in that they offer no benefit to the patient. In these trials patients donate samples for laboratory research. To all intents and purposes, the tissue is the research subject and not the patient.

[35] SCRN: Scottish Cancer Research Network
[36] Clinical Trial & Research Access Quality Performance Indicators published by HIS; updated to v.2, October 2017.

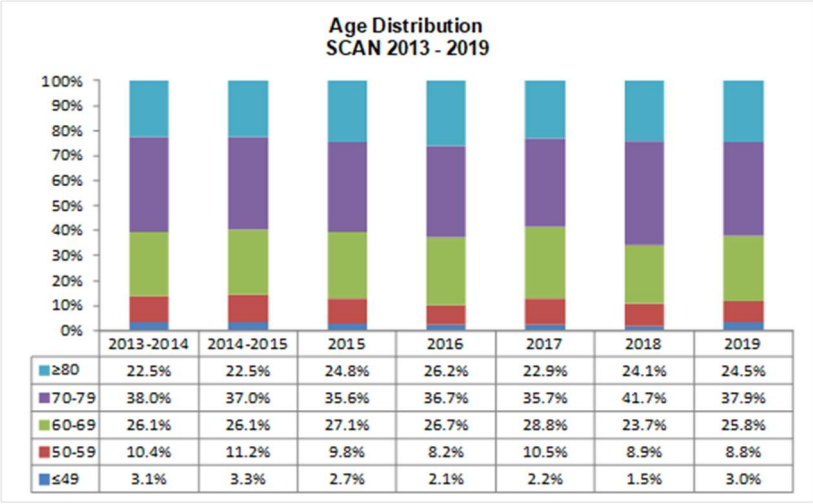
Appendices

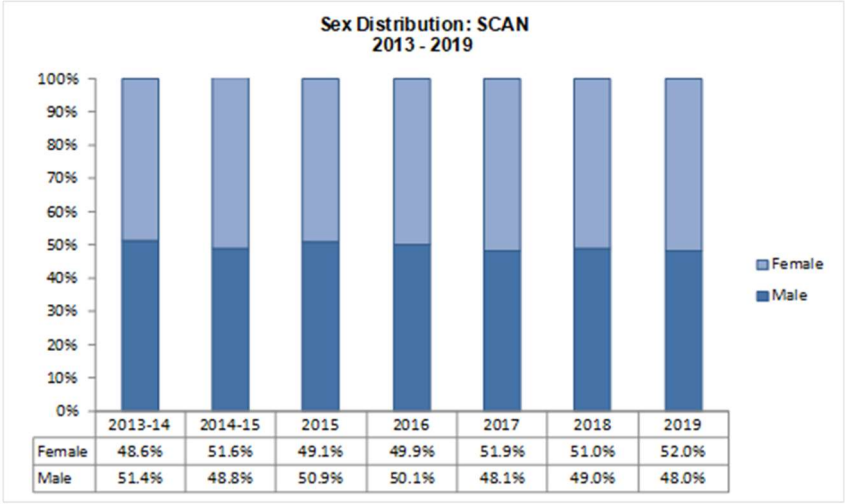
Appendix 1: Key Categories

Tables: patients diagnosed with lung cancer January to December 2019

Charts: Cumulative results for years as indicated.

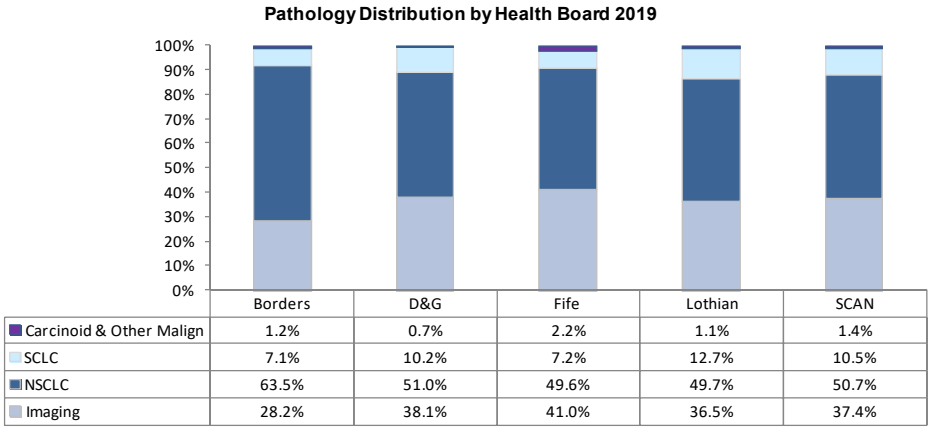
Age & Sex Distribution 2019		Borders		D&G		Fife		Lothian		SCAN	
≤49	M	3	3.5%	1	0.7%	5	1.4%	11	1.5%	20	1.5%
	F	0	0.0%	2	1.4%	6	1.7%	12	1.7%	20	1.5%
50-59	M	6	7.1%	6	4.1%	11	3.0%	32	4.4%	55	4.2%
	F	2	2.4%	6	4.1%	17	4.7%	36	5.0%	61	4.6%
60-69	M	9	10.6%	26	17.7%	51	14.1%	88	12.1%	174	13.2%
	F	16	18.8%	23	15.6%	38	10.5%	89	12.3%	166	12.6%
70-79	M	13	15.3%	21	14.3%	70	19.4%	126	17.4%	230	17.4%
	F	18	21.2%	29	19.7%	69	19.1%	154	21.2%	270	20.5%
≥80	M	6	7.1%	16	10.9%	46	12.7%	86	11.8%	154	11.7%
	F	12	14.1%	17	11.6%	48	13.3%	92	12.7%	169	12.8%
Age Median		72		72		74		73		73	
Age Range		31-89		37-93		27-97		26-97		26-97	



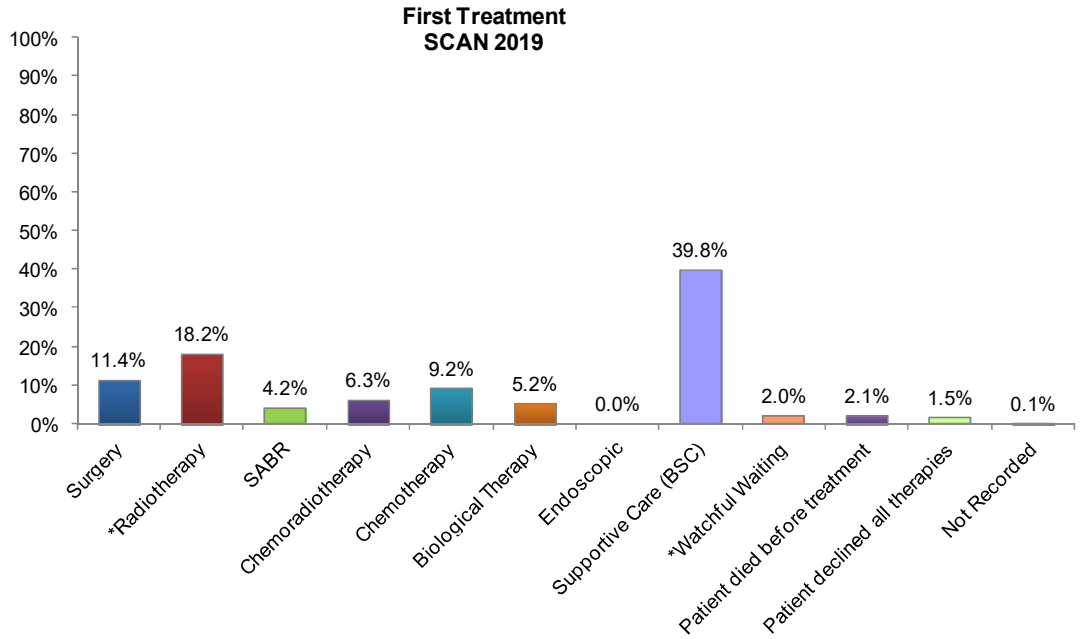


2019	Borders		D&G		Fife		Lothian		SCAN	
Performance Status										
0	29	34.1%	13	8.8%	19	5.3%	84	11.6%	145	11.0%
1	22	25.9%	46	31.3%	117	32.4%	255	35.1%	440	33.4%
2	12	14.1%	25	17.0%	98	27.1%	144	19.8%	279	21.2%
3	15	17.6%	27	18.4%	91	25.2%	138	19.0%	271	20.5%
4	2	2.4%	4	2.7%	34	9.4%	49	6.7%	89	6.7%
Not recorded	5	5.9%	32	21.8%	2	0.6%	56	7.7%	95	7.2%
Total	**85**		**147**		**361**		**726**		**1319**	
Data Completeness		**94.1%**		**78.2%**		**99.4%**		**92.3%**		**92.8%**
Stage NSCLC										
I	10	18.5%	9	12.0%	26	14.5%	61	16.9%	106	15.8%
II	1	1.9%	8	10.7%	18	10.1%	38	10.5%	65	9.7%
III	11	20.4%	16	21.3%	41	22.9%	97	26.9%	165	24.7%
IV	30	55.6%	32	42.7%	92	51.4%	150	41.6%	304	45.4%
Tx and/or Nx M0	0	0.0%	0	0.0%	0	0.0%	2	0.6%	2	0.3%
Not recorded	2	3.7%	10	13.3%	2	1.1%	13	3.6%	27	4.0%
Total	**54**		**75**		**179**		**361**		**669**	
Data Completeness		**96.3%**		**86.7%**		**98.9%**		**96.4%**		**96.0%**
Stage SCLC										
I	1	16.7%	0	0.0%	2	7.7%	2	2.2%	5	3.6%
II	1	16.7%	0	0.0%	1	3.8%	3	3.3%	5	3.6%
III	1	16.7%	1	6.7%	5	19.2%	31	33.7%	38	27.4%
IV	3	50.0%	14	93.3%	18	69.2%	55	59.8%	90	64.7%
Not recorded	0	0.0%	0	0.0%	0	0.0%	1	1.1%	1	0.7%
Total	**6**		**15**		**26**		**92**		**139**	
Data Completeness		**100%**		**100%**		**100%**		**98.9%**		**99.3%**
Clinical Nurse Specialist										
Seen by CNS	82	96.5%	126	85.7%	349	96.7%	608	83.7	1165	88.3%

2019	Borders		D&G		Fife		Lothian		SCAN	
Pathology Type										
Squamous	17	20.0%	26	17.7%	53	14.7%	89	12.3%	185	14.0%
Adenocarcinoma	33	38.8%	43	29.3%	100	27.7%	233	32.1%	409	31.0%
NSCLC (NOS)	3	3.5%	2	1.4%	14	3.9%	28	3.9%	47	3.6%
Other specific NSCLC	1	1.2%	4	2.7%	10	2.8%	8	1.1%	23	1.7%
NSCLC combination	0	0.0%	0	0.0%	2	0.6%	3	0.4%	5	0.4%
SCLC	6	7.1%	15	10.2%	26	7.2%	88	12.1%	135	10.2%
NSCLC/SCLC mixed	0	0.0%	0	0.0%	0	0.0%	4	0.6%	4	0.3%
Carcinoid	0	0.0%	0	0.0%	2	0.6%	5	0.7%	7	0.5%
Other malignancy	1	1.2%	1	0.7%	6	1.7%	3	0.4%	11	0.8%
Negative Pathology	2	2.4%	3	2.0%	15	4.2%	35	4.8%	55	4.2%
Declined Investigation	5	5.9%	5	3.4%	4	1.1%	9	1.2%	23	1.7%
No Pathology	17	20.0%	48	32.7%	129	35.7%	220	30.3%	414	31.4%
Not recorded	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Missing data	0	0.0%	0	0.0%	0	0.0%	1	0.1%	1	0.1%
Total	**85**		**147**		**361**		**726**		**1319**	
NSCLC	54	63.5%	75	51.0%	179	49.6%	361	49.7%	669	50.7%
SCLC	6	7.1%	15	10.2%	26	7.2%	92	12.7%	139	10.5%
Carcinoid & other	1	1.2%	1	0.7%	8	2.2%	8	1.1%	18	1.4%
Radiological diagnosis	24	28.2%	56	38.1%	148	41.0%	265	36.5%	493	37.4%



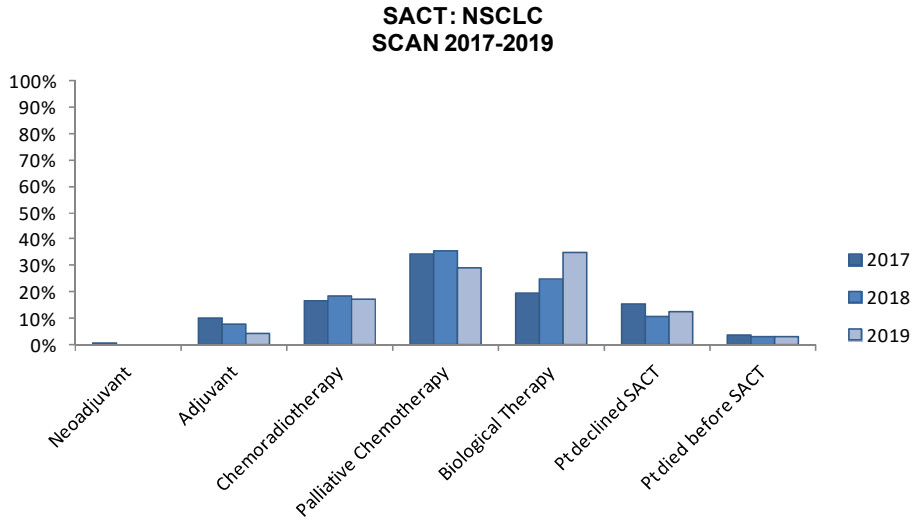
2019	Borders		D&G		Fife		Lothian		SCAN	
First Treatment										
Surgery	17	20.0%	18	12.2%	34	9.4%	81	11.2%	150	11.4%
Radiotherapy	20	23.5%	20	13.6%	66	18.3%	134	18.5%	240	18.2%
SABR	0	0.0%	1	0.7%	15	4.2%	39	5.4%	55	4.2%
Chemoradiotherapy	2	2.4%	3	2.0%	21	5.8%	57	7.9%	83	6.3%
Chemotherapy	8	9.4%	18	12.2%	35	9.7%	60	8.3%	121	9.2%
Biological Therapy	6	7.1%	7	4.8%	19	5.3%	37	5.1%	69	5.2%
Best Supportive Care (BSC)	27	31.8%	73	49.7%	143	39.6%	282	38.8%	525	39.8%
Watchful Waiting	0	0.0%	3	2.0%	10	2.8%	14	1.9%	27	2.0%
Declined all therapies	2	2.4%	2	1.4%	8	2.2%	8	1.1%	20	1.5%
Died before treatment	3	3.5%	2	1.4%	10	2.8%	13	1.8%	28	2.1%
Not recorded	0	0.0%	0	0.0%	0	0.0%	1	0.1%	1	0.1%
Total	**85**		**147**		**361**		**726**		**1319**	

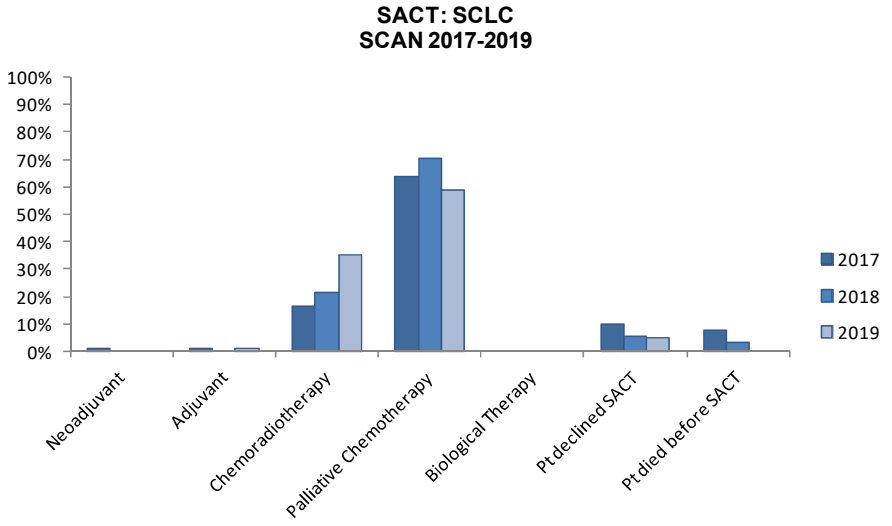


2019	Borders		D&G		Fife		Lothian		SCAN	
Surgery: all lung cancer										
Pneumonectomy	1	5.9%	1	5.6%	1	2.9%	2	2.4%	5	3.3%
Lobectomy	12	70.6%	16	88.9%	30	88.2%	68	81.9%	126	82.9%
Wedge	1	5.9%	1	5.6%	1	2.9%	2	2.4%	5	3.3%
Segmental	1	5.9%	0	0.0%	2	5.9%	8	9.6%	11	7.2%
Other surgery	2	11.8%	0	0.0%	0	0.0%	1	1.2%	3	2.0%
Inoperable	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Not recorded	0	0.0%	0	0.0%	0	0.0%	2	2.4%	2	1.3%
Total	**17**		**18**		**34**		**83**		**152**	
Total lung cancer	**85**		**147**		**361**		**726**		**1319**	
Surgery: NSCLC										
Pneumonectomy	1	7.1%	1	5.6%	1	3.1%	2	2.7%	5	3.6%
Lobectomy	10	71.4%	16	88.9%	29	90.6%	63	84.0%	118	84.9%
Wedge	0	0.0%	1	5.6%	0	0.0%	2	2.7%	3	2.2%
Segmental	1	7.1%	0	0.0%	2	6.3%	8	10.7%	11	7.9%
Other surgery	2	14.3%	0	0.0%	0	0.0%	0	0.0%	2	1.4%
Inoperable	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Not recorded	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	**14**		**18**		**32**		**75**		**139**	
Total NSCLC	**54**		**75**		**179**		**361**		**669**	
Surgery: NSCLC, Stages I-II										
Pneumonectomy	0	0.0%	1	8.3%	1	3.3%	1	1.6%	3	2.6%
Lobectomy	9	90.0%	10	83.3%	27	90.0%	54	84.4%	100	86.2%
Wedge	0	0.0%	1	8.3%	0	0.0%	2	3.1%	3	2.6%
Segmental	1	10.0%	0	0.0%	2	6.7%	7	10.9%	10	8.6%
Other surgery	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Inoperable	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Not recorded	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	**10**		**12**		**30**		**64**		**116**	
Total NSCLC Stage I-II	**11**		**17**		**44**		**99**		**171**	

2019		Borders		D&G		Fife		Lothian		SCAN	
SACT: NSCLC											
Neoadjuvant chemotherapy		0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Adjuvant chemotherapy		1	4.3%	2	5.0%	1	1.1%	7	5.3%	11	3.9%
Chemoradiotherapy		3	13.0%	3	7.5%	14	15.9%	29	21.8%	49	17.3%
Biological Therapy		9	39.1%	14	35.0%	29	33.0%	47	35.3%	99	34.9%
Palliative chemotherapy		8	34.8%	18	45.0%	28	31.8%	28	21.1%	82	28.9%
Declined SACT		1	4.3%	3	7.5%	11	12.5%	20[37]	15.0%	35	12.3%
Patient died before SACT		1	4.3%	0	0.0%	5	5.7%	2	1.5%	8	2.8%
Not recorded		0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
TOTAL		**23**		**40**		**88**		**133**		**284**	
	NSCLC	**54**		**75**		**179**		**361**		**669**	
SACT: SCLC											
Neoadjuvant chemotherapy		0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Adjuvant chemotherapy		0	0.0%	0	0.0%	1	5.0%	0	0.0%	1	1.0%
Chemoradiotherapy		1	20.0%	0	0.0%	6	30.0%	30	41.7%	37	35.2%
Biological Therapy		0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Palliative chemotherapy		4	80.0%	5	62.5%	13	65.0%	40	55.6%	62	59.0%
Declined SACT		0	0.0%	3	37.5%	0	0.0%	2	2.8%	5	4.8%
Patient died before SACT		0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Not recorded		0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
TOTAL		**5**		**8**		**20**		**72**		**105**	
	SCLC	**6**		**15**		**26**		**92**		**139**	

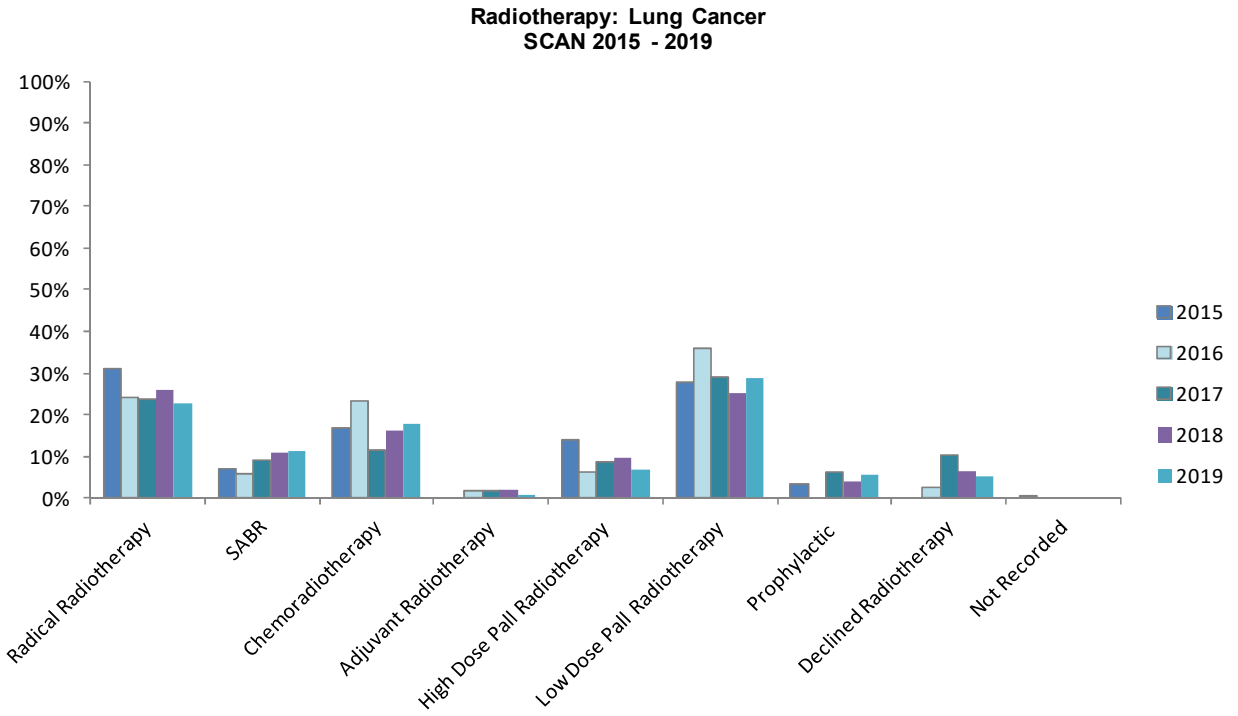
[37] NHS Lothian NSCLC *Declined SACT* x 20 patients includes 8 x declined adjuvant chemotherapy.





2019	Borders		D&G		Fife		Lothian		SCAN	
Radiotherapy										
Radical radiotherapy: conventional	3	9.4%	8	19.0%	31	26.7%	70	23.1%	112	22.7%
Radical radiotherapy: SABR	0	0.0%	1	2.4%	15	12.9%	40	13.2%	56	11.4%
Chemoradiotherapy	4	12.5%	3	7.1%	21	18.1%	59	19.5%	87	17.6%
Adjuvant radiotherapy	1	3.1%	1	2.4%	0	0.0%	2	0.7%	4	0.8%
Low dose palliative radiotherapy	17	53.1%	17	40.5%	29	25.0%	79	26.1%	142	28.8%
High dose palliative radiotherapy	4	12.5%	3	7.1%	9	7.8%	18	5.9%	34	6.9%
Prophylactic	1	3.1%	0	0.0%	2	1.7%	25	8.3%	28	5.7%
Declined radiotherapy	2	6.3%	8	19.0%	9	7.8%	7	2.3%	26	5.3%
Patient died before radiotherapy	0	0.0%	1	2.4%	0	0.0%	3	1.0%	4	0.8%
Not recorded	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	**32**		**42**		**116**		**303**		**493**	

2019	Borders		D&G		Fife		Lothian		SCAN	
Type of Radiotherapy										
Radical	9	28.1%	13	31.0%	69	59.5%	196	64.7%	287	58.2%
Palliative	21	65.6%	20	47.6%	38	32.8%	97	32.0%	176	35.7%
No radiotherapy	2	6.3%	9	21.4%	9	7.8%	10	3.3%	30	6.1%



Appendix 2: Historical QPI Attainment Summaries

Lung Cancer QPI Attainment Summary 2018		Target %	Borders		D&G		Fife		Lothian		SCAN	
QPI 1 MDT discussion before definitive treatment		95	N 106 D 108	98.1%	N 141 D 143	98.6%	N 315 D 331	95.2%	N 614 D 692	88.7%	N 1076 D 1274	92.3%
QPI 2 Pathological Diagnosis	All patients with lung cancer	80	N 74 D 106	69.8%	N 83 D 137	60.6%	N 205 D 326	62.9%	N 443 D 686	64.6%	N 805 D 1255	64.1%
	NSCLC with sub-type identified	90	N 56 D 58	96.6%	N 69 D 70	98.6%	N 152 D 167	91.0%	N 331 D 357	92.7%	N 608 D 652	93.3%
	Non squamous IIIB-IV: molecular profiling	75	N 15 D 22	68.2%	N 26 D 32	81.3%	N 66 D 82	80.5%	N 121 D 143	84.6%	N 228 D 279	81.7%
QPI 4 Patients being treated with curative intent who have a PET/CT before treatment		95	N 24 D 25	96.0%	N 27 D 28	96.4%	N 61 D 66	92.4%	N 163 D 167	97.6%	N 275 D 286	96.2%
*QPI 6 Surgical resection in NSCLC patients	All NSCLC	20	N 14 D 58	24.1%	N 16 D 68	23.5%	N 33 D 155	21.3%	N 88 D 355	24.8%	N 151 D 636	23.7%
	NSCLC Stage I-II	60	N 10 D 12	83.3%	N 14 D 19	73.7%	N 32 D 36	88.9%	N 75 D 108	69.4%	N 131 D 175	74.9%
*QPI 7 Lymph node assessment for NSCLC patients having pneumonectomy or lobectomy		80	Analysis is by Hospital of Surgery: RIE						N 121 D 151	80.1%	N D	n/a
QPI 8 Radiotherapy (including SABR) for inoperable lung cancer		35	N 15 D 33	45.5%	N 14 D 48	29.2%	N 56 D 113	49.6%	N 117 D 268	43.7%	N 202 D 462	43.7%
QPI 9 Chemoradiotherapy for locally advanced NSCLC		50	N 2 D 4	50.0%	N 2 D 2	100%	N 4 D 6	66.7%	N 4 D 15	26.7%	N 12 D 27	44.4%
QPI 10 Chemoradiotherapy for Limited stage SCLC		70	N 4 D 6	66.7%	N 0 D 1	0.0%	N 3 D 4	75.0%	N 4 D 10	40.0%	N 11 D 21	52.4%
QPI 11 SACT for patients with inoperable NSCLC	All types of SACT for NSCLC	35	N 18 D 42	42.9%	N 24 D 47	51.1%	N 64 D 124	51.6%	N 92 D 255	36.1%	N 198 D 468	42.3%
	Biological therapy for NSCLC stage IIIB-IV, PS 0-1	60	N 0 D 0	N/A	N 3 D 3	100%	N 3 D 3	100%	N 11 D 15	73.3%	N 17 D 21	81.0%
QPI 12 SACT for patients with SCLC	All types of chemotherapy for SCLC	70	N 13 D 15	86.7%	N 7 D 10	70.0%	N 25 D 34	73.5%	N 38 D 65	58.5%	N 83 D 124	66.9%
	Palliative chemotherapy for SCLC patients having treatment with non-curative intent	50	N 8 D 11	72.7%	N 6 D 10	60.0%	N 19 D 28	67.9%	N 32 D 58	55.2%	N 65 D 107	60.7%

Lung Cancer QPI Attainment Summary 2018		Target %	Borders	D&G	Fife	Lothian	SCAN
QPI 13.1 30 Day Mortality After Treatment	Surgery	<5	Analysis is by Hospital of Surgery: RIE			N 5 D 188 2.7%	N D n/a
	Radical Radiotherapy	<5	N 0 D 10 0.0%	N 0 D 11 0.0%	N 1 D 44 2.3%	N 2 D 101 2.0%	N 3 D 166 1.8%
	Adjuvant Chemotherapy	<5	N 0 D 4 0.0%	N 0 D 3 0.0%	N 0 D 2 0.0%	N 0 D 14 0.0%	N 0 D 23 0.0%
	Chemoradiotherapy	<5	N 0 D 12 0.0%	N 0 D 4 0.0%	N 1 D 21 4.8%	N 0 D 29 0.0%	N 1 D 66 1.5%
	Palliative Chemotherapy (NSCLC)	<10	N 1 D 10 10.0%	N 1 D 13 7.7%	N 2 D 32 6.3%	N 4 D 39 10.3%	N 8 D 94 8.5%
	Palliative Chemotherapy (SCLC)	<15	N 2 D 8 25%%	N 0 D 6 0.0%	N 4 D 19 21.1%	N 4 D 33 12.1%	N 10 D 66 15.2%
	Biological Therapy (NSCLC)	<10	N 0 D 0 N/A	N 1 D 10 10.0%	N 6 D 16 37.5%	N 0 D 39 0.0%	N 7 D 65 10.8%
QPI 13.2 90 Day Mortality After Treatment	Surgery	<5	Analysis is by Hospital of Surgery: RIE			N 9 D 201 4.5%	N D n/a
	Radical Radiotherapy	<5	N 0 D 10 0.0%	N 1 D 11 9.1%	N 2 D 44 4.5%	N 6 D 101 5.9%	N 9 D 166 5.4%
	Chemoradiotherapy	<5	N 4 D 12 33.3%	N 0 D 1 0.0%	N 2 D 20 10.0%	N 0 D 29 0.0%	N 6 D 62 9.7%
QPI 14 SABR for Inoperable Lung Cancer with Stage I Disease		35	N 3 D 7 42.9%	N 0 D 4 0.0%	N 15 D 39 38.5%	N 27 D 90 30.0%	N 45 D 137 32.8%
QPI 15 Cytological/Pathological Diagnosis Prior to Treatment	Surgery	75	N 8 D 14 57.1%	N 10 D 17 58.8%	N 19 D 36 52.8%	N 75 D 100 75.0%	N 112 D 167 67.1%
	Radical Radiotherapy	75	N 4 D 10 40.0%	N 8 D 11 72.7%	N 18 D 44 40.9%	N 64 D 100 64.0%	N 94 D 165 57.0%
	Chemoradiotherapy	75	N 11 D 12 91.7%	N 4 D 4 100%	N 22 D 22 100%	N 29 D 29 100%	N 66 D 67 98.5%
QPI 16 Contrast CT/MRI for N2 Pts Prior to Curative Treatment		95	N 5 D 9 55.6%	N 4 D 4 100%	N 7 D 19 36.8%	N 32 D 39 82.1%	N 48 D 71 67.6%
Clinical Trials N=patients consented to trials/research and held on SCRN database. D= 5year average from Cancer Registry		15	N 0 D 97 0.0%	N 0 D 147 0.0%	N 0 D 345 0.0%	N 9 D 769 1.2%	N 9 D 1358 0.7%

Lung QPI Attainment Summary Table 2016 – 2018 (Years 4-6)		Borders			D&G			Fife			Lothian			SCAN		
	Target %	Yr4	Yr5	Yr6	Yr4	Yr5	Yr6	Yr4	Yr5	Yr6	Yr4	Yr5	Yr6	Yr4	Yr5	Yr6
QPI 1. Patients to be discussed at MDM before definitive treatment.	95	97.4	97.0	98.1	85.1	95.8	98.6	92.2	96.6	95.2	95.4	95.6	88.7	93.5	96.0	92.3
QPI 2 (i). Patients with lung cancer should have a pathological diagnosis.	80	66.7	61.5	69.8	70.4	72.6	60.6	64.8	59.8	62.9	68.4	62.7	64.6	67.4	62.7	64.1
QPI 2 (ii). Patients with a pathological diagnosis of NSCLC should have tumour subtype identified.	90	92.1	89.6	96.6	93.7	91.9	98.6	90.1	90.7	91.0	91.6	91.5	92.7	91.4	91.2	93.3
QPI 2 (iii). Patients with a pathological diagnosis of non-squamous NSCLC, stage IIIB-IV should have molecular profiling undertaken.	75	n/a	76.2	68.2	n/a	84.6	81.3	n/a	85.9	80.5	n/a	82.9	84.6	n/a	83.5	81.7
QPI 4. Patients with NSCLC who receive curative treatment should undergo PET CT prior to start of treatment.	95	93.3	91.7	96.0	100	100	96.4	95.2	98.3	92.4	98.8	95.2	97.6	97.8	96.0	96.2
QPI 6 (i). Number of patients diagnosed with NSCLC who undergo surgical resection.	20	n/a	29.2	24.1	n/a	26.2	23.5	n/a	19.2	21.3	n/a	30.5	24.8	n/a	27.2	23.7
QPI 6 (ii). Number of patients diagnosed with NSCLC, stage I-II who undergo surgical resection.	60	n/a	90.9	83.3	n/a	69.2	73.7	n/a	69.4	88.9	n/a	73.7	69.4	n/a	73.4	74.9
QPI 7. Patients with NSCLC having pneumonectomy or lobectomy should have at least 1 node sampled from at least 3 x N2 stations.	80	Analysis is by Hospital of Surgery: RIE									83.2	83.0	80.1	N/A		
QPI 8. Patients with lung cancer, not undergoing surgery, should receive radical radiotherapy ± chemotherapy; or have SABR.	35	n/a	46.4	45.5	n/a	32.3	29.2	n/a	40.5	49.6	n/a	46.0	43.7	n/a	43.5	43.7
QPI 9. Patients with NSCLC, Stage IIIA, PS 0-1 and not undergoing surgery should receive chemoradiotherapy.	50	50.0	33.3	50.0	83.3	100	100	81.8	71.4	66.7	61.9	47.1	26.7	70.0	56.7	44.4
QPI 10. Patients with Ltd SCLC and PS0-1 should receive chemoradiotherapy.	70	100	25.0	66.7	0/0	100	0.0	66.7	75.0	75.0	69.2	25.0	40.0	75.0	50.0	52.4
QPI 11 (i). Patients with NSCLC not undergoing surgery who receive SACT.	35	39.1	56.7	42.9	37.8	45.0	51.1	37.4	40.8	51.6	37.9	38.3	36.1	37.8	41.0	42.3
QPI 11 (ii). Patients with NSCLC, Stage IIIB-IV, PS0-1 and not undergoing surgery that are EGFR or ALK positive who receive biological therapy.	60	n/a	0/0	0/0	n/a	100	100	n/a	100	100	n/a	93.8	73.3	n/a	95.2	81.0
QPI 12 (i). Patients with SCLC who receive chemotherapy ± radiotherapy.	70	81.3	90.0	86.7	45.5	90.9	70.0	66.7	69.2	73.5	72.3	64.4	58.5	68.7	70.8	66.9
QPI 12 (ii). Patients with SCLC, not undergoing treatment with curative intent, who receive palliative chemotherapy.	50	60.0	85.7	72.7	40.0	83.3	60.0	62.5	61.9	67.9	58.5	63.5	55.2	57.5	66.3	60.7
QPI 13.1 (i). 30 day mortality after surgery.	<5	Analysis is by Hospital of Surgery: RIE									0.8	1.6	2.7	N/A		
QPI 13.2 (i). 90 day mortality after surgery.	<5	Analysis is by Hospital of Surgery: RIE									2.4	2.8	4.3	N/A		
QPI 13.1 (ii). 30 day mortality after radical radiotherapy.	<5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.3	0.0	2.0	0.8	0.0	1.8

Lung QPI Attainment Summary Table 2016 – 2018 (Years 4-6)		Borders			D&G			Fife			Lothian			SCAN		
	Target %	Yr4	Yr5	Yr6	Yr4	Yr5	Yr6	Yr4	Yr5	Yr6	Yr4	Yr5	Yr6	Yr4	Yr5	Yr6
QPI 13.2 (ii). 90 day mortality after radical radiotherapy.	<5	7.7	0.0	0.0	0.0	0.0	9.1	0.0	6.7	4.5	6.6	4.0	5.9	5.1	4.1	5.4
QPI 13.1 (iii). 30 day mortality after adjuvant chemotherapy.	<5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
QPI 13.1 (iv). 30 day mortality after chemoradiotherapy.	<5	0.0	0.0	0.0	0.0	11.1	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	1.9	1.5
QPI 13.2 (iv). 90 day mortality after chemoradiotherapy.	<5	25.0	37.5	33.3	9.1	12.5	0.0	10.5	0.0	10.0	0.0	6.7	0.0	5.6	11.4	9.7
QPI 13.1 (v). 30 day mortality (NSCLC) after palliative chemotherapy.	<10	0.0	0.0	10.0	0.0	0.0	7.7	7.7	11.1	6.3	5.7	8.6	10.3	5.7	7.1	8.5
QPI 13.1 (vi). 30 day mortality (SCLC) after palliative chemotherapy.	<15	0.0	33.3	25.0	25.0	20.0	0.0	0.0	7.1	21.1	0.0	9.7	12.1	8.9	12.5	15.2
QPI 13.1 (v). 30 day mortality (NSCLC) after biological therapy	<10	0.0	0.0	0/0	100	0.0	10.0	0.0	0.0	37.5	0.0	0.0	0.0	6.7	0.0	10.8
QPI 14. Patients with Stage I lung cancer not undergoing surgery who receive SABR.	35	n/a	50.0	42.9	Na/	50.0	0.0	n/a	32.0	38.5	n/a	39.4	31.0	n/a	38.4	32.8
QPI 15 (i). Patients with lung cancer who receive surgery that have cytological/histological diagnosis before surgery.	75	n/a	28.6	57.1	n/a	40.0	58.8	n/a	65.5	52.8	n/a	68.2	75.0	n/a	61.8	67.1
QPI 15 (ii). Patients with lung cancer who receive surgery that have cytological/histological diagnosis before radical radiotherapy.	75	n/a	54.5	40.0	n/a	60.0	72.7	n/a	58.1	40.9	n/a	56.9	64.0	n/a	57.0	57.0
QPI 15 (iii). Patients with lung cancer who receive surgery that have cytological/histological diagnosis before chemoradiotherapy.	75	n/a	100	91.7	n/a	100	100	n/a	100	100	n/a	100	100	n/a	100	98.5
QPI 16. Patients with N2 disease who have curative treatment and have contrast enhanced brain imaging: CT/MRI, prior to treatment.	95	n/a	38.5	55.6	n/a	83.3	100	n/a	55.6	36.8	n/a	71.9	82.1	n/a	63.3	67.6
QPI 17. Patients with lung cancer who are consented for interventional clinical trial or translational research.	15	n/a	0.0	0.0	n/a	0.0	0.0	n/a	0.3	0.0	n/a	3.5	1.2	n/a	2.0	0.7

Target Met	Target Not Met	Not applicable

* D&G patients have surgery at Golden Jubilee Hospital, Clydebank and are therefore included in WOSCAN's report for QPIs 7, 13.1(i) and 13.2(i).
All patients in NHS Borders, Fife and Lothian have thoracic surgery at the Royal Infirmary of Edinburgh (RIE). Some patients from outwith the SCAN area have surgery at RIE, e.g. patients referred from Tayside. These are identified throughout the report as required.
SCAN totals are therefore not appropriate for these QPIs and are marked as being not applicable.

Note: Allowance should be made where small numbers and variation may be due to chance and manifest as disproportionate percentages; which can distort results both positively and negatively. These should be viewed with a degree of caution.

Appendix 3: Historical Action Plans

Action Plan 2018

QPI	2018: Action required	Progress
QPI 1	• To ensure that all inpatients who are seen by Medicine of the Elderly (MoE), General Medicine (GenMed) and/or Respiratory and have been diagnosed with lung cancer (radiology or pathology) are discussed at Multidisciplinary Team Meeting (MDM). • To ensure that all junior doctors are aware that all patients with lung cancer must be discussed at MDM.	Ongoing continued education to ensure new staff follow the procedures identified.
	For QPI review: to include in numerator 'patients requiring emergency oncology treatment but later discussed at MDM'	Discussed at FR2: COMPLETED.
QPI 2 (i)	Pathological diagnoses: to audit a random blinded selection of patients to ascertain why no pathology has been obtained: requirement for respiratory & radiology input. To delineate between where biopsy would have no impact on outcome e.g. Performance Status (PS) 3-4 versus technically difficult vs. biopsy attempted but failed.	COMPLETED.
QPIs 10 & 12(i)	Small Cell Lung Cancer (SCLC): to look at timelines from referral to pathological diagnosis and oncological opinion.	COMPLETED.
QPI 14	SABR: Clinical oncology peer review to ensure consistency of SABR versus conventional radiotherapy (this is now in place).	COMPLETED.
QPI 13	30- & 90-Day Mortality: To discuss and find ways to improve communication links between primary and secondary care surrounding accessing information about cause of death, in particular for patients who die at home/in the community.	SCAN Lung Group: Ongoing.
	For QPI review: to separate biological therapy into Tyrosine Kinase Inhibitor (TKI) (tablets) and Immuno-Oncology (IO) (immunotherapy vaccine) therapy	Discussed at FR2: COMPLETED.
QPI 15 (i), (ii) & (iii)	Pathological diagnosis before curative treatment: Peer review required to ascertain whether all or some of these cases might have had different outcomes depending on who is undertaking/not undertaking biopsy: to explore the notion of 'bravery' versus a more conservative approach to biopsy.	COMPLETED.
QPI 16	Patients with N2 disease (ipsilateral mediastinal lymph node involvement) who are having curative treatment should have a CT Head prior to treatment: continuation from 2017 Actions and use 'reminder' at MDM to ensure all appropriate patients are referred for CT Head.	COMPLETED.

QPI	2018: Action required	Progress
QPI 17	Clinical Trials: continuation from 2017 Actions - SCAN clinicians should ensure that they register trials with SCRN. SCRN should share their lists of current open trials between the Networks to allow the possibility of cross network trial access. NRCN funding of oncology clinicians undertaken 2018 to improve access to clinician driven realistic trials.	Ongoing.

Action Plan 2017

QPI	2017: Action required	Progress
QPI 2 (i)	Since the removal of Best Supportive Care (BSC) as exclusion (at Formal Review commencing for patients diagnosed from 1st Jan 2016) SCAN (and Scotland-wide) Health Boards consistently miss the target. Discussions, at the Scottish Lung Cancer Forum (SLCF) meeting in Glasgow in 2017 and at SCAN Sign Off, 6th Sept 2018 support reinstating BSC as an appropriate exclusion and perhaps adopting PS 4 as a further exclusion. It is viewed as inappropriate/not best practice to biopsy patients who are not fit (poor PS) or, for those with significant comorbidities whose treatment management is likely supportive care only.	Discussed at QPI Review: COMPLETED.
QPI 2 (ii)	Numerator: Number of patients with a pathological diagnosis of Non-Small Cell Lung Cancer (NSCLC) who have a tumour subtype identified. Code 31 *Combination of non-small cell components* is not included in the measurability document. This category includes adenosquamous and other mixed NSCLC-type cases and should be included as a sub-type within this QPI. This omission is to be raised at the next lung cancer QPI Review and an amendment will be requested.	Discussed at QPI Review: COMPLETED.
QPI 11 (i) & (ii)	Systemic Anti-Cancer Therapy (SACT) data guidelines were discussed at length at the SCAN QPI Report Sign Off meeting, 6th September 2018 and the requirement for more detailed information to be made available to audit staff. TKIs, immunotherapy and several other upcoming treatments are set to become routine for NSCLC. It was suggested that detailed treatment information be taken to the next Review for inclusion in the Lung Cancer QPI Data Set Definitions so that audit have the tools and knowledge to ensure SACT data is reported as complete and accurate. It was agreed at the SCAN Lung Group Meeting, 15 February 2019 to introduce a new agenda item “Oncology” which will inform the group of any new oncology treatments and chemotherapy agents which will additionally inform audit data entry.	Discussed at QPI Review: COMPLETED.
QPI 13.1	30 DAY MORTALITY: Point to raise at Review: reporting appropriate end of treatment dates for biological therapy treatment: Query 412 (from 2014 and still in use) NHS Grampian asked: *What would the treatment completed date be for patients on biological treatment e.g. Erlotinib as it is not strictly given in cycles but re-prescribed on a regular basis.*	COMPLETED.

QPI	2017: Action required	Progress
	ISD advised: *The advice that has been agreed is that for Erlotinib the date ended should be recorded as inapplicable*. Recently ChemoCare has changed and we can only prescribe 30 days at a time of the -ib tablets so we know the patient CANNOT be on treatment 30 days after the last prescription. Suggest take to Review.	
QPI 15 (i), (ii) & (iii)	QPI 15 (cytology/histology before radical treatment) is new to our reporting programme. The target has been set at 75% for all 3 modalities: surgery, radical radiotherapy & chemoradiotherapy. At the SCAN Sign Off meeting it was noted that the results appeared somewhat disappointing for surgery and radical radiotherapy. Concern was voiced as to why the target was not lower for radical radiotherapy given that these patients are not fit for surgery and; should therefore be subject to different criteria and scrutiny. Quite a large number of patients are also referred to surgery without pathology when lesions are too small or inaccessible to biopsy; the patient aware that the lesion may be malignant or benign prior to resection. Additionally, 100% histology would be expected prior to chemoradiotherapy: chemotherapy treatment choices are determined by histological diagnoses. It was agreed that a request for amendment should be submitted at Review. Targets should not be the same for all three modalities.	Discussed at QPI Review: COMPLETED.
QPI 16	Disappointing results. Procedures to be tightened up: these CT or MRI scans should be requested by respiratory medicine as part of the patient's pathway (prior to treatment) when N2 disease has been identified for NSCLC patients who are going on to have curative treatment. An MDM 'reminder' was suggested, similar to that for TNM (Tumour, Node, Metastasis staging) & PS, so that these requests become common place.	Discussed at QPI Review: COMPLETED.
Clinical Trials	SCAN clinicians should ensure that they register trials with the Scottish Cancer Research Network (SCRN). SCRN should share their lists of current open trials between the Networks to allow the possibility of cross network trial access. Note: Clinical trial targets remain challenging due to stringent entry criteria for many trials.	Although clinical trials for patients diagnosed with lung cancer remain challenging due to stringent entry criteria; ongoing efforts by clinical staff will ensure that all appropriate patients are included in trials.

Appendix 4: Audit of Lung Cancer Patients without Tissue Diagnosis

Lung Cancer Patients without Tissue Diagnosis in NHS Lothian 2016 – 2018

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Background
Quality Performance Indicator (QPI) 2 indicates that where possible a tissue diagnosis should be made in lung cancer with an optimal national target of 80%. Currently this target includes all those that are deemed for 'best supportive care' at lung oncology MDT and fails to include pathology if from frozen section at operation. SCAN data falls short of this target from 2016-2018 (70.3%, 68.9% and 68.9% respectively) as it does in NHS Lothian. (68.4%, 62.7% and 64.6%).

Aim
Review the cases in NHS Lothian where tissue diagnosis is not achieved and examine the reasons behind this.

Method
All patients in NHSL with a radiological diagnosis of lung cancer without pathological confirmation were identified from the prospective SCAN audit database, between 01/01/2016 and 31/12/2018. Electronic patient records were reviewed by 4 respiratory clinicians and data recorded on a standardised excel spreadsheet.

Results
873 patient's records were reviewed across the 3 years. 29 patients had tissue confirmation of carcinoma and were excluded. Of the 844 patients 472 were female and 372 male with a mean age of 76.5 years. (2016: 252, 217; 293, 2018; 299). 17% of patients were never discussed at lung oncology MDT. 38% of patents had stage 1 disease and 33% had stage 4 disease. 48% of patients were PS 3 or 4. 63% of patients were for best supportive care (BSC); whilst potentially curative treatments were undertaken in 29% (surgery 15%; radiotherapy/SABR 14%). Across the 3 years the main reason for no pathology (49%) was poor PS and in these cases pathology would not have changed management. Other reasons were patient declined (11%), poor lung function (9%) and tumour not accessible (12%). There was failure to document the reason in 6% of cases and an unsuccessful attempt at tissue diagnosis made in 10%.

Conclusion
The reviewers found appropriate clinical decisions were made for patients in NHS Lothian during this period. The median survival from diagnostic CT in the BSC group was 20 days. The reviewers have presented this information to the lung cancer SCAN group on 18.11.20. We will explore in more detail the group who receive radiotherapy or SABR with radical intent as this group receive treatment for lung cancer without ever receiving pathological confirmation. The use of Herder Score (based on PET, size, characteristics of the tumour and smoking status) probability of cancer is an alternative option in this group.

The 2nd QPI national review 2019 -2020 have now updated QPI2 to exclude those with PS3/4 from the analysis and those with confirmation on frozen section are included as having pre treatment pathology. Subsequent review of 2018 data from NHSL showed that of the 299 no pathology patients, 160 were PS3/4 and 5 were confirmed on frozen section prior to resection. Recalculation of QPI 2 on the new QPI allowances show NHS Lothian achieved a tissue diagnosis in 81% of appropriate patients. This compares favourably to NHS England rate of 72% pathological confirmation rate for PS 0-2 patients.

Appendix 5: Glossary

ACaDMe
(Acute, Cancer, Deaths and Mental Health).
This PHS datamart contains linked inpatient and day case (SMR01), mental health (SMR04), cancer registration (SMR06) and death (NRS) records.

AKI (Acute Kidney Injury)
A sudden loss of kidney function that develops over a few days or weeks.

Adenocarcinoma
This type of cancer develops from glandular cells which produce mucus in the lining of the airways. This is classified as a type of non-small cell lung cancer.

Adjuvant Therapy
A treatment given in addition to the main or primary treatment (for example, chemotherapy given after surgery) to try to prevent a cancer recurring.

AF (Atrial Fibrillation)
AF is caused by abnormal electrical discharges (signals) that generate chaotically throughout the upper chambers of the heart. It reduces the ability of the atria to pump blood into the ventricles, and usually causes the heart to beat too rapidly

ALK-positive lung cancer
This is a type of NSCLC in which the cancer cells have a mutation in the anaplastic lymphoma kinase (**ALK**) gene. The mutation is a gene rearrangement which can lead to uncontrolled cell growth and tumour formation.

ARDS
(Acute Respiratory Distress Syndrome)
In ARDS there is respiratory failure of sudden (acute) onset due to the rapid accumulation of fluid in the lungs (pulmonary oedema) following an abrupt increase in the permeability of the normal barrier between the capillaries and the air sacs in the lungs. ARDS is the most serious response to acute lung injury.

Biological (Targeted) Therapy
Biological, or targeted, therapy drugs interfere with or interrupt the way cancer cells signal or interact with each other and aim to prevent cancer cells from growing.

Biopsy
A biopsy is a small tissue sample taken for microscopic examination and diagnosis.

Bronchoscopy
An examination used for inspection of the interior of the tracheo-bronchial tree, performance of endobronchial diagnostic tests, taking of specimens for biopsy and culture, and removal of foreign bodies.

Broncho-pulmonary fistula
This is an abnormal passageway (a sinus tract) that develops between the large airways in the lungs (the bronchi) and the space between the membranes that line the lungs (the pleural cavity).

BSC
Best Supportive Care or palliative care with medicines given to control any symptoms. See also **palliative care**.

CABG (Coronary Artery Bypass Graft) Surgery
Surgery for significant narrowings or blockages of the heart arteries.

Carcinoid
A carcinoid tumour is a rare, mostly slow growing, type of neuroendocrine tumour.

Chemotherapy
The use of anti-cancer (cytotoxic) drugs to destroy cancer cells.

Chemoradiation
A term used to describe chemotherapy and radiotherapy used in combination. This can be given concurrently (treatment that is given at the same time as another treatment) or sequentially.

CKD (Chronic Kidney Disease)
A general terms to indicate that kidneys are damaged, diseased or not functioning correctly and have been that way for a while.

Co-morbidity
The condition of having two or more diseases at the same time.

Consolidation Radiotherapy
Treatment to stop the cancer coming back once it is in remission. The aim is to kill any remaining cancerous cells.

COPD (Chronic Obstructive Pulmonary Disease)
Chronic Obstructive Pulmonary Disease is the name for a collection of lung diseases including chronic bronchitis, emphysema and chronic obstructive airways disease.

CT Guided Lung FNA / Biopsy
A Computed Tomography scan is used to accurately locate the abnormality and mark a spot on the chest through which the biopsy needle will be passed to obtain FNA (fine needle aspirate/fluid) or biopsy for pathological diagnosis.

CT (Computed Tomography) Scan
An X-ray imaging technique used in diagnosis that can reveal many soft tissue structures not shown by conventional radiography. A computer is used to assimilate multiple X-ray images into a two-dimensional cross-sectional image.

CTPA
A CTPA is a scan which will produce images of the pulmonary arteries, which are the blood vessels from the heart to the lungs. This is the preferred method to specifically identify any blockages.

CVA (Cerebrovascular Accident)
The medical term for a stroke.

Cytology/Cytological
The study of the structure and function of cells under the microscope, and of their abnormalities.

DCE (Detect Cancer Early)
DCE was formally launched by the Scottish Government in February 2012. The main purpose of the programme is to raise the public's awareness of the national cancer screening programmes and also of the early signs and symptoms of cancer to encourage them to seek help earlier.

Diagnosis
Confirmation of the presence of the disease.

Dyspnoea
Sudden shortness of breath, or breathing difficulty.

EBUS (Endobronchial Ultrasound)
A form of bronchoscopy where the bronchoscope is fitted with an ultrasound probe which allows visualisation and sampling of mediastinal and hilar lymph nodes.

EGFR
(Epidermal Growth Factor Receptors)
EGFR is a protein found on the surface of some normal cells and is involved in cell growth. EGFR mutations can lead to uncontrolled cell growth and tumour formation. Blocking EGFR may keep cancer cells from growing. EGFR was the first biomarker identified as a potential "target" for personalised treatments in lung cancer.

Emphysema
If you have emphysema, the walls of the air sacs in your lungs are damaged. With emphysema, the sacs break apart and merge into each other, producing holes in the lung.

EXT SCLC (Extensive Small Cell Lung Cancer)
The cancer has spread outside the lung, within the chest area or to other parts of the body. TNM Stage IV is equivalent to extensive disease.

EOL care
End of life care.

First Treatment
This is the first treatment and not specifically the definitive treatment. It includes *active treatment*: surgery, radiotherapy (radical and palliative), chemoradiotherapy and SACT (palliative chemotherapy, biological therapy and Immunotherapy), and *non-active treatment* (watchful waiting and supportive care (BSC)).

FNA Biopsy
Fine needle aspiration biopsy involves the extraction of cells in fluid through a fine needle for microscopic examination and diagnosis.

Frozen Section Biopsy
Frozen-Section Biopsy (FSB) allows intraoperative distinction between benign and malignant lung lesions. Pulmonary nodules of unknown histology undergo FSB prior to anatomical lung resection to minimise surgery for benign disease. FSB is classified as a pre-treatment biopsy.

GRO Records
General Register Office Records provide official government information on births, marriages and deaths.

Haemoptysis
The coughing of blood originating from the respiratory tract below the level of the larynx.

Herder Score
Looks at the probability of cancer based on PET, size and characteristics of the tumour plus smoking status and calculates the percentage likelihood of being cancer rather than of benign aetiology.

Histology/Histological
The study of cells and tissue on the microscopic level.

IHD (Ischaemic Heart Disease)
The term given to heart problems caused by narrowed heart arteries.

ILD (Interstitial Lung Disease)
A group of diseases characterised by thickening of the supportive tissues between the air sacs of the lungs.

Immunotherapy
Immunotherapy drugs are usually used to treat advanced stage NSCLC. Immunotherapy drugs help to stimulate your immune system to recognise and destroy cancer cells.

IPF (Idiopathic Pulmonary Fibrosis)
A specific form of aggressive fibrosing interstitial lung disease that can cause pneumonia.

Large Cell Carcinoma
Consists of large, rounds cells which are seen under the microscope. It is sometimes known as undifferentiated carcinoma. This is classified as a type of non-small cell lung cancer.

LCNS (Lung Cancer Nurse Specialist)
A Lung Cancer Nurse Specialist is a first level nurse, locally recognised as part of the specialist lung cancer multidisciplinary team and designated as a specialist in lung cancer. The nurse should spend at least 50% of his or her time caring for lung cancer patients. It is recognised that the Lung Cancer Nurse Specialist may be practising within a sub speciality of oncology, respiratory nursing, thoracic nursing or specialist palliative care. [*National Lung Cancer Forum*].

LTD SCLC (Limited Small Cell Lung Cancer)
Limited disease is cancer that can only be seen in one lung, in nearby lymph nodes or in fluid around the lung (pleural effusion). TNM Stages I, II and III aggregated are equivalent to limited disease.

Lobe/Lobes
A section of an organ. The right lung has three lobes and the left has two.

Lobectomy
The surgical removal of a lobe of the lung.

LRTI (Lower Respiratory Tract Infection)
Lower respiratory tract infections are any infections in the lungs or below the voice box. These include pneumonia, bronchitis, and tuberculosis.

Managed Clinical Network (MCN)
A formally organised network of clinicians. The main function is to audit performance on the basis of standards and guidelines, with the aim of improving healthcare across a wide geographic area, or for specific conditions.

MDM
The Multi-Disciplinary Meeting of the MDT.

MDT: Multi-Disciplinary Team
A multi-professional group of people from different disciplines (both healthcare and non-healthcare) who work together to agree best treatment options and provide optimal care for patients.

MI (Myocardial Infarction)
MI refers to tissue death (infarction) of the heart muscle (myocardium). This occurs when one of the heart's coronary arteries is blocked suddenly or has extremely slow blood flow.

Mixed NSCLC
Includes lung cancer with mixed NSCLC components e.g. adenosquamous.

Molecular Profiling
or **Oncogenic Mutation Profiling**
A form of testing that classifies tumours based on genetic make-up to help diagnose and treat cancer. Using a blood test or biopsy, the testing examines the DNA of cancer cells, looking for genetic mutations (ALK, EGFR, ROS-1, etc. & PDL1) that have been acquired by these cells to personalise and target treatment.

N2 Disease
The presence of mediastinal nodal metastases.

Neoadjuvant Therapy
Treatment given as the first step to shrink the tumour prior to the main treatment.

Neuroendocrine Tumours
Neuroendocrine tumours (NETs) are rare cancers. The commonest type is carcinoid tumour, which grows most often in the appendix and small bowel, but may occur in other parts of the digestive system, lung, pancreas, kidney, ovaries and testicles.

NLCA
National Lung Cancer Audit which reports on patients diagnosed in England, Wales, Northern Ireland, Jersey and Guernsey. (https://www.rcplondon.ac.uk/projects/national-lung-cancer-audit).

NSCLC (Non-Small Cell Lung Cancer)
A group of lung cancers that are named for the kinds of cells and how the cells look under a microscope. The three main types are squamous cell carcinoma; large cell carcinoma; and adenocarcinoma. Other types include mixed components and NSCLC (not otherwise specified (NOS)). NSCLC is the most common lung cancer.

NSCLC (NOS)
Non-small cell lung cancer (not otherwise specified) includes undifferentiated carcinoma and large cell undifferentiated which cannot be further specified.

Oligometastatic Disease in Lung Cancer
This is a lung tumour with a simultaneous solitary metastasis.

Other Malignancy
To describe lung cancers reported as “malignant cells’ or ‘carcinoma (not otherwise specified)’.

Other Specific NSCLC
This accounts for other specific NSCLC including salivary-type carcinomas.

Outcome
The end result of care and treatment and/or rehabilitation: the change in health, functional ability, symptoms or situation of a person, which can be used to measure the effectiveness of care and treatment, and/or rehabilitation.

Outliers
Outside or different to the normal range which can be used to prompt a review of services and an action plan to recover performance.

Palliative Care
Palliative care is the active total care of patients and their families by a multi-professional team when the patient's disease is no longer responsive to curative treatment.

Palliative Radiotherapy
When it is not possible to cure a cancer, radiotherapy can be given to alleviate symptoms and improve quality of life. Lower doses are given than for curative or radical radiotherapy and generally over a shorter period of time.

Pathology
The study of disease processes with the aim of understanding their nature and causes. Observation of samples of fluid and tissues obtained from the living patient by various methods, or at a post mortem.

Pathological Diagnosis
The microscopic examination (histological or cytological) of specimens by a pathologist to determine the presence of malignancy and the classification of the malignant tumour.

PCI (Prophylactic Cranial Irradiation)
Radiation therapy to the brain to prevent cancer seeding.

PD-L1 (Programmed Death Ligand 1)
T-cells are part of the immune system and play a role in attacking cancer cells within the body. The PD-L1 expression attaches to a receptor on a T-cell which then prevents this process. Testing for PD-L1 allows clinicians to predict whether targeted immunotherapy treatments are likely to be effective.

PE (Pulmonary Embolism)
A sudden blockage of a lung artery which usually happens when a when a blood clot breaks loose and travels through the bloodstream to the lungs.

Pneumonectomy
An operation to remove an entire lung.

Pneumonitis
Pneumonitis is a general term for inflammation of lung tissue. Chronic inflammation of lung tissue can lead to irreversible scarring (**pulmonary fibrosis**).

Pneumothorax
An abnormal collection of air in the pleural space between the lung and the chest wall. This air pushes on the outside of your lung and makes it collapse.

Primary Tumour
Original site of the cancer. The mass of tumour cells at the original site of abnormal tissue growth.

PS: (WHO [World Health Organisation] Performance Status)
Performance Status is an overall assessment of the functional/physical performance of the patient (see appendix 6 for further details).

Pulmonary Fibrosis
A type of interstitial lung disease (ILD) which manifests as a build up of scar tissue in the air sacs of the lung and reduces the efficiency of your breathing.

Radiation Pneumonitis
This is the acute manifestation of radiation-induced lung disease which causes inflammation of the lung. It is relatively common following radiotherapy for chest wall or intra-thoracic malignancies; and is a dose limiting toxicity of radiotherapy affecting its therapeutic ratio.

Radical Radiotherapy
Radiotherapy is given with the aim of destroying cancer cells to attain cure.

Resection
Surgical removal of a portion of any part of the body.

SABR
(Stereotactic Ablative Radiotherapy)
Radiotherapy is given from many different directions to target the tumour more accurately. It is less invasive treatment with curative intent for patients with NSCLC who are not fit for surgery.

SACT (Systemic Anti-Cancer Therapy)
SACT is a collective term to describe the growing number of differing therapies and comprises chemotherapy agents alongside targeted therapies and immunotherapy.

SCLC (Small Cell Lung Cancer)
A type of lung cancer in which the cells are small and round.

SCRN (Scottish Cancer Research Network) and Clinical Trials
The aim of the cancer research networks are ultimately to increase, support and sustain clinical trial activity in cancer care in partnership with the UK Clinical Research Collaboration.

Segmentectomy
Removal of part of the lung less than a lobe. See **lobe**.

Squamous Cell Carcinoma
This is the commonest type of lung cancer. It develops in the cells which line the airways.

Staging
The process of determining whether cancer has spread. Staging involves clinical, surgical, radiological and pathological assessment (see Appendices 7 and 8 for further details).

STEMI (ST-Elevation Myocardial Infarction) is a very serious type of heart attack during which one of the heart's major arteries is blocked.

SVCO (Superior Vena Cava Obstruction) The superior vena cava is a large vein in the chest which carries blood from the upper half of the body into the heart. SVCO happens when this blood flow is blocked and is usually caused by lung cancer near to this vein.

Targeted Therapies
Targeted therapy drugs interfere with the way cancer cells signal or interact with each other. This stops them growing and dividing.

Thoracic
Relating to the chest.

TIA (Transient Ischaemic Attack)
A transient ischaemic attack or "mini stroke" is caused by a temporary disruption in the blood supply to part of the brain.

TKIs (Tyrosine Kinase Inhibitors)
A type of targeted therapy that targets the cancer's specific genes, proteins, or the tissue environment that contributes to cancer growth and survival. This type of treatment blocks the growth and spread of cancer cells and limits damage to healthy cells. Therapeutic decisions are guided by an understanding of the molecular features of patient's tumour.

TNM Classification
TNM classification provides a system for staging the extent of cancer. T refers to the size and position of the primary tumour. N refers to the involvement of the lymph nodes. M refers to the presence or absence of distant metastases (see Appendices 7 and 8).

Tumour
An abnormal mass of tissue. A tumour may be either benign (not cancerous) or malignant. A tumour is also known as a neoplasm.

Undifferentiated
Undifferentiated is a term used to describe very immature cells that are not specialised. If a cancer cell is completely undifferentiated, it may not be possible to tell its origin.

Wedge
A surgically removed triangle-shaped portion of lung containing a tumour and a small amount of normal tissue around it. A tissue wedge may also be removed for biopsy.

Appendix 6: Performance Status

WHO/ECOG PERFORMANCE STATUS (PS) CATEGORIES

0	Fully active. Able to carry on all pre-disease performance without restriction.
1	Restricted in physically strenuous activities but ambulatory and able to carry out work of a light and sedentary nature.
2	Ambulatory and capable of all self-care but unable to carry out many work activities; up and about more than 50% waking hours.
3	Capable of only limited self-care; confined to bed or a chair for more than 50% of waking hours.
4	Completely disabled; unable to carry out any self-care; totally confined to bed or a chair.

Appendix 7: TNM Classification

TNM Classification of Malignant Tumours, 8th Edition, International Association for the Study of Lung Cancer (IASLC), 2016

T – Primary Tumour		
Tx	Primary tumour cannot be assessed, or tumour proven by the presence of malignant cells in sputum or bronchial washings but not visualized by imaging or bronchoscopy.	
T0	No evidence of primary tumour.	
Tis	Carcinoma in situ	
T1	Tumour 3cm or less in greatest dimension, surrounded by lung or visceral pleura, without bronchoscopic evidence of invasion more proximal than the lobar bronchus (i.e. not in main bronchus).	
	T1(mi)	Minimally invasive adenocarcinoma.
	T1a	Tumour 1cm or less in greatest dimension.
	T1b	Tumour more than 1cm but not more than 2cm in greatest dimension.
	T1c	Tumour more than 2cm but not more than 3cm in greatest dimension.
T2	Tumour more than 3cm but not more than 5cm; or tumour with any of the following features: ○ Involves main bronchus regardless of distance from the carina, but without involvement of the carina. ○ Invades visceral pleura. ○ Associated with atelectasis or obstructive pneumonitis that extends to the hilar region, involving part or all of the lung.	
	T2a	Tumour more than 3cm but not more than 4cm in greatest dimension.
	T2b	Tumour more than 4cm but not more than 5cm in greatest dimension.
T3	Tumour more than 5cm but not more than 7cm in greatest dimension or directly invades any of the following structures: ○ chest wall (including parietal pleura and superior sulcus tumours) ○ phrenic nerve ○ parietal pericardium ○ or associated with separate tumour nodule(s) in the same lobe as the primary.	
T4	Tumour more than 7cm in greatest dimension or invades any of the following structures: ○ diaphragm, mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, oesophagus, vertebral body, carina, or ○ associated with separate tumour nodule(s) in different ipsilateral lobe to that of the primary tumour.	
N – Regional Lymph Nodes		
Nx	Regional Lymph nodes cannot be assessed.	
N0	No regional lymph node metastasis.	
N1	Metastasis in ipsilateral peribronchial and/or ipsilateral hilar and intrapulmonary lymph nodes, including by direct extension.	
N2	Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s).	
N3	Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s).	
M – Distant Metastasis		
M0	No distant metastasis.	
M1	Distant metastasis present.	
	M1a	Separate tumour nodule(s) in a contralateral lobe; tumour with pleural or pericardial nodule(s) or malignant pleural or pericardial effusion.
	M1b	Single extrathoracic metastasis.
	M1c	Multiple extrathoracic metastases in one or several organs.

Appendix 8: TNM Stage Groups
(TNM Classification of Malignant Tumours, 8th Edition, IASLC, 2016)

Stage Group	Tumour	Nodal	Metastases
Occult carcinoma	Tx	N0	M0
Stage 0	Tis	N0	M0
Stage IA1	T1(mi)	N0	M0
	T1a	N0	M0
StageIA2	T1b	N0	M0
Stage IA3	T1c	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T2b	N0	M0
Stage IIB	T1a-c	N1	M0
	T2a-b	N1	M0
	T3	N0	M0
Stage IIIA	T1a-c	N2	M0
	T2a-b	N2	M0
	T3	N1	M0
	T4	N0-N1	M0
Stage IIIB	T1a-c	N3	M0
	T2a-b	N3	M0
	T3	N2	M0
	T4	N2	M0
Stage IIIC	T3-T4	N3	M0
Stage IVA	Any T	Any N	M1a-b
Stage IVB	Any T	Any N	M1c

TNM Stage Comparison
TNM 8th Edition implemented 01/01/2018 (black font) 7th Edition, pre 2018 (blue font).

8TH EDITION	7TH EDITION	N0	N1	N2	N3
T1a 0-1cm	T1a	IA1 (IA)	IIB (IIA)	IIIA	IIIB
T1b >1-2cm		IA2 (IA)	IIB (IIA)	IIIA	IIIB
T1c >2-3cm	T1b	IA3 (IA)	IIB (IIA)	IIIA	IIIB
T2a>3-4cm	T2a	IB	IIB (IIA)	IIIA	IIIB
T2b >4-5cm		IIA (IB)	IIB (IIA)	IIIA	IIIB
T3 >5-7cm	T2b	IIB (IIA)	IIIA (IIB)	IIIB (IIIA)	IIIC (IIIB)
T4 >7cm	T3	IIIA (IIB)	IIIA	IIIB (IIIA)	IIIC (IIIB)
M1a	M1a	IVA (IV)	IVA (IV)	IVA (IV)	IVA (IV)
M1b	M1b	IVA (IV)	IVA (IV)	IVA (IV)	IVA (IV)
M1c	M1b	IVB(IV)	IVB(IV)	IVB(IV)	IVB(IV)

Appendix 9: Acknowledgements

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