
LCA Lung Cancer Clinical Guidelines

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Contents

Introduction.....	5
1 Prevention.....	7
1.1 Background information	7
1.2 Smoking cessation services	7
1.3 Implementation of smoking cessation guidance	8
2 Early Diagnosis	9
2.1 Standards to improve early diagnosis for lung cancer	9
3 Referral and Diagnosis	10
3.1 Referral for suspected lung cancer	10
3.2 Assessment of patients with possible lung cancer for investigation	12
3.3 Diagnostic investigations.....	13
3.4 Staging investigations.....	15
3.5 Staging of lung cancer	17
4 Radiology.....	19
4.1 Routine indications for imaging	19
5 Pathology Guidelines for the Reporting of Lung Cancer.....	23
5.1 Biopsies for lung cancer	23
5.2 Lung resection for tumours.....	23
5.3 Cytology specimens for lung cancer.....	23
5.4 Referral of difficult cases.....	24
5.5 Molecular analysis.....	24
6 MDT Membership and Function	25
7 Data Requirements of Lung Cancer Services	26
7.1 The Cancer Outcomes and Services Dataset (COSD)	26
7.2 National Audits – National Clinical Lung Cancer Audit (formerly LUCADA)	26
7.3 Systemic Anti-Cancer Therapy (SACT) chemotherapy dataset	26
7.4 National Radiotherapy Dataset (RTDS)	26
7.5 National Cancer Waiting Times Monitoring Data Set	27
7.6 Local data requirements.....	27
8 Breaking Bad News.....	28
8.1 Advance preparation.....	28
8.2 Build a therapeutic environment	28
8.3 Communication	28
8.4 Dealing with reactions.....	29

9	Inter-professional Communication between Secondary and Primary Care	30
9.1	General principles.....	30
9.2	At diagnosis	30
9.3	MDT discussions and decisions	31
9.4	Letters from clinics	31
9.5	Treatment Record Summary	31
10	Surgical Guidelines.....	32
10.1	Introduction.....	32
10.2	Non-small cell lung cancer	32
10.3	Risk assessment for surgery	32
10.4	Lymph node management	34
10.5	Adjuvant therapy.....	34
10.6	Bronchopulmonary carcinoids	35
10.7	Small cell lung cancer	35
10.8	Post-operative follow-up.....	35
10.9	LCA high-quality lung cancer surgical service – measures and metrics	36
11	Non-surgical Management of Early Stage Non-small Cell Lung Cancer.....	38
11.1	Stereotactic ablative radiotherapy.....	38
11.2	Patient selection.....	38
11.3	Patient information and consent	39
11.4	Radiotherapy localisation imaging and contouring.....	40
11.5	Selection of optimal plan.....	42
11.6	Dose schedules	45
11.7	Treatment verification and delivery.....	46
11.8	Patient management during and following treatment	46
11.9	Oligometastatic lung disease	47
11.10	Percutaneous thermal tumour ablation (PTTA)	48
12	Management of Locally Advanced Non-small Cell Lung Cancer.....	49
12.1	Radical concomitant chemo-radiotherapy/sequential chemo-radiotherapy/radiotherapy alone.....	49
12.2	Patient selection.....	49
12.3	Chemotherapy schedule	49
12.4	Radical radiotherapy	50
12.5	Patient management during and following treatment	50
13	Management of Metastatic Non-small Cell Lung Cancer	51
13.1	First-line chemotherapy	51
13.2	Second- and third-line chemotherapy	52
13.3	Palliative radiotherapy	52

13.4	Follow-up of patients after treatment with palliative intent.....	53
14	Management of Small Cell Lung Cancer.....	54
14.1	Introduction.....	54
14.2	Limited stage disease (T1–4, N0–3, M0).....	54
14.3	Extensive stage disease (T0–4, N0–3, M1; or M0 medically unsuitable for radical therapy).....	55
15	Skin Management for Patients on Targeted Therapies.....	57
15.1	Prophylaxis.....	57
15.2	Treatment.....	57
16	Specialist Palliative and End of Life Care.....	59
16.1	Definitions.....	59
16.2	Key stages for consideration of palliative care needs.....	59
16.3	Referral to specialist palliative care.....	60
16.4	Specialist palliative care management.....	61
17	Palliative Treatments.....	62
17.1	Specific therapies.....	64
18	Survivorship.....	66
18.1	Background.....	66
18.2	Recommendations and rationale.....	67
	Appendix 1: Pan-London Suspected Lung and Pleural Cancer Urgent Referral Form Example.....	73
	Appendix 2: Systemic Anti-cancer Therapy in Lung Cancer.....	76
	Appendix 3: SCLC Chemotherapy Regime – Oral Etoposide.....	77
	Appendix 4: Radiotherapy: Radiotherapy Normal Tissue Delineation and Tolerances for Radical Treatment.....	78
	Appendix 5: Competencies for Key Worker Role.....	79
	Appendix 6: LCA Key Worker Policy.....	81
	Appendix 7: LCA Holistic Needs Assessment Tool.....	83
	Appendix 8: NCSI Treatment Summary.....	84
	Appendix 9: Lung Pathway Metrics.....	87
	Appendix 10: Treatment of Teenagers and Young Adults.....	88
	Appendix 11: Referral Form for SABR Early Stage Lung Cancer 3 to 5.....	90
	Appendix 12: Palliative Endobronchial Therapies available for London Cancer Alliance Sites.....	94
	Abbreviations.....	96
	References.....	98
	Acknowledgements.....	101

Introduction

Lung cancer is the most common cause of death from cancer for males and the second most common cause of death for females (after breast cancer). The annual incidence of lung cancer in South East England is 54.5 per 100,000 among men and 27.8 per 100,000 among women (average standardised incidence rates, 1999–2003, Thames Cancer Registry). Mortality rates are almost as high, at 47.9 per 100,000 for men and 23.4 per 100,000 for women (average standardised mortality rates, 1999–2003, Thames Cancer Registry).

Survival from lung cancer in the UK is improving although, in comparison with other cancers, remains poor. The best chance of cure is with early diagnosis and radical therapy, and as such these guidelines reflect some new additions which focus on early diagnosis such as 'straight to CT' and also on combining the best quality diagnostic and staging procedures to limit the time taken to treatment as well as lessening the diagnostic burden for the patient.

There are also revised sections on several areas of treatment. The section on surgery has been updated to reflect the importance of patient selection and procedure selection to look at surgery for borderline cases both in terms of fitness for surgery and stage of cancer. The radiotherapy section now contains much more on stereotactic treatments including a guide for referral which should improve the time taken to start this treatment. The chemotherapy section has been updated to include the growing importance of targeted therapies, although this is of course a rapidly changing area.

Pulmonary nodules is increasingly being set up as a service outside the lung cancer MDM. New British Thoracic Guidelines for the investigation and surveillance of solitary pulmonary nodules were published by the British Thoracic Society in 2015. We regard those as being sufficiently thorough and recommend you to review the guidelines which are available at: <https://www.brit-thoracic.org.uk/document-library/clinical-information/pulmonary-nodules/bts-guidelines-for-pulmonary-nodules/>.

The National Lung Cancer Audit (NLCA) has undergone significant change in 2015 and is now in a position, thanks to integration of several national datasets, to be the most comprehensive dataset for any cancer in the UK. Evidence has now been published that the NLCA has been key to significant improvements in the structure of lung cancer services in the UK as well as a rise in survival rates. The LCA continues to rely on collaboration with the NLCA and the National Cancer Registration Service to support its work.

The LCA guidelines are designed to be used by all healthcare professionals in Trusts within the LCA who are involved in the care of the lung cancer patient. They have been developed to take into account the wide range of clinical experience of the user and the different clinical settings in which they work. The guidelines are intended to assist in the initial assessment, investigation and management of patients. Adoption of the LCA guidelines will allow widespread implementation of up-to-date and evidence-based management of lung cancer patients, and will assist in the provision of a consistently high standard of care across the LCA.

All Trusts are expected to be able to provide the standard of care detailed in these guidelines.

These guidelines will be reviewed on an annual basis in line with guidance from the National Institute for Health and Care Excellence, the British Thoracic Society, and other national and international guidance, as well as significant new research publications, to ensure that they continue to reflect best practice.

Please note that this set of guidelines is limited to small cell, non-small cell lung cancer, and carcinoid.

Please also note that treatment for patients from the age of 16 to their 25th birthday should be in line with national guidance regarding the management of teenagers and young adults with cancer. Patients from the age of 16 to the end of their 18th year should be treated in a principal treatment centre (see [Appendix 10](#) for contact details of principal treatment centres). Teenagers and young adults from the age of 19 to their 25th birthday will follow the adult pathway but should be offered choice of treatment in a teenage and young adult (TYA) designated hospital or at the principal treatment centre. Teenagers and young adults in this age group should be treated either in the principal treatment centre or a designated hospital.

I hope that this revision of the original guidelines, which were led by Dr Liz Sawicka, is useful. As before many specialists both within the LCA Lung Pathway Group and the stakeholder group have contributed. All members of the stakeholder group have had the opportunity to review the guidelines, and their comments have been taken into consideration. I would like to thank them for their contributions.

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1 Prevention

More than 80% of deaths from lung cancer are attributable to smoking. Measures to prevent people from taking up smoking, or helping them to quit, will reduce the number of deaths from lung cancer. In addition, patients with lung cancer undergoing curative treatment who stop smoking pre-treatment reduce the risk of complications from surgery.

1.1 Background information

Adult smoking prevalence is 21% and varies significantly by gender and socio-economic group. Rates are higher in males than females and in more socio-economic deprived groups. People in routine and manual occupations are about twice as likely to smoke as those in managerial or professional occupations (29% compared with 14%) (NHS Information Centre 2010).

Incidence rates of lung cancer closely reflect past smoking prevalence with a time lag of approximately 20 to 30 years. Smoking prevalence has decreased over the past 50 years and this accounts for the decrease in the rates of lung cancer.

Individuals who use NHS Stop Smoking Services have higher quit rates at one year than those receiving no intervention (Bauld et al. 2009; Ferguson et al. 2005). In addition, evidence suggests that brief interventions by healthcare professionals can increase the uptake of smoking cessation (NICE 2006).

The provision of effective smoking cessation services in an acute Trust setting remains highly variable despite evidence that delivering smoking cessation interventions to inpatients in hospital is effective (Rigotti et al. 2008). This is clearly a missed opportunity to deliver stop smoking interventions at a point at which an individual may be more susceptible to health advice and hence more motivated to quit.

The Department of Health (DH) has published a number of guidance documents on the development of smoking cessation services in an acute setting. The key document for acute Trusts is *Stop Smoking Interventions in Secondary Care*. In addition, DH has commissioned NCSCT (National Centre for Smoking Cessation and Training) to support and develop Stop Smoking Services across all healthcare settings.

Work undertaken by NCSCT demonstrates that the majority of inpatients who smoke are not receiving interventions to support them to stop smoking during their hospital stay. The main barriers to successful implementation tend to be administrative elements such as data collection. Lack of support from the Trust was also commonly cited as a barrier to implementing interventions.

1.2 Smoking cessation services

Provision of effective smoking cessation programmes is necessary to reduce the prevalence of smoking.

Smoking cessation interventions must be targeted to reach different population groups and provided across a range of settings. In particular, there has been an increased focus on the need to establish effective smoking cessation services in secondary care (Fiore et al. 2012).

In 2009, DH published *Stop Smoking Interventions in Secondary Care* in an attempt to address the gap in service provision of smoking cessation in the acute setting.

Published evidence suggests that the necessary components for effective smoking cessation in secondary care are:

- a systematic process to identify and record patients who smoke
- staff trained to deliver 'very brief advice'
- prescription of nicotine replacement products – a range of these products must be available in the hospital formulary
- a referral system to local smoking cessation services – best practice is an electronic referral system.

The supporting processes identified to implement a successful smoking cessation programme for inpatients are:

- engaging with key stakeholders in the Trust
- training of staff in brief interventions – the NCSCT provides a free online training module
- developing patient information leaflets
- standardising the process for the identification of smokers
- setting up a referral process
- ensuring that a range of nicotine replacement therapies are available in the hospital formulary
- developing appropriate documentation to support the process
- developing a letter for the patient's GP.

1.3 Implementation of smoking cessation guidance

The implementation of this guidance for clinicians treating patients with lung cancer at the earliest opportunity should improve outcomes (Moller et al. 2002). It is advisable for patients undergoing surgery to have ceased smoking for a month before the operation rather than immediately beforehand, though it is not recommended that surgery is delayed because patients continue to smoke. There are suggestions that other treatments for lung cancer are more effective if patients are no longer smoking, and for patients who have undergone radical treatment it may reduce the risk of a second tumour.

2 Early Diagnosis

2.1 Standards to improve early diagnosis for lung cancer

- GPs should have access to chest X-rays (CXRs) for their patients and receive a report within 5 working days. When sending symptomatic patients for CXR, GPs should stress the importance of attending without delay so that the time to diagnosis for positive cases is kept to the minimum.
- Reports of abnormal CXRs suggestive of lung cancer should also be forwarded to the multidisciplinary team (MDT) to ensure that these patients receive appointments within 2 weeks.
- **All CXRs suspicious of malignancy should be reported by a radiologist, with clear recommendations to the requester for cross-sectional imaging where it is clinically indicated.** Abnormal results suggestive of lung cancer should be forwarded to the GP and an agreed member of the MDT ideally within 24 hours to ensure that the patient receives an appointment.
- High-risk patients having surgery will often have a pre-operative film as part of the assessment. Ideally, such films should also be reported by a radiologist and, if abnormal and suggestive of cancer, forwarded to the GP within 24 hours.
- Radiologists reporting CXRs which are suggestive of lung cancer and which should be followed up by computerised tomography (CT) should be reported as such.
- Patients referred to the 2 week wait (2ww) clinic for lung cancer should have blood tests – full blood count (FBC), urea, electrolytes and creatinine (UEC), liver function tests (LFTs) including gamma-GT and calcium requested by the GP at the same time as the referral.
- CT should be requested by the MDT and carried out so that the result is available for the first appointment.
- Decision on the best route for diagnosis should be made at the clinic and confirmed by MDT members at the ‘diagnostic’ multidisciplinary meeting (MDM), usually the radiology meeting.
- The ‘decision to treat’ cancer MDM should be confined to discussion of cases that have undergone investigation and have the diagnosis and staging confirmed at the meeting.
- Clinicians meeting patients at any stage in this pathway should use the opportunity to discuss smoking cessation.
- GPs should include adequate clinical information, especially smoking history, to enable radiologists to make a satisfactory report on cancer risk.
- Patients with symptoms such as persistent chest infections, coughs, breathlessness and chest or shoulder pain are likely to attempt to self-medicate in the first instance, often via the pharmacy. Pharmacists are also therefore in an ideal position to identify symptoms in at-risk individuals and advise them to visit their GP, contributing to the early detection of lung cancer.

3 Referral and Diagnosis

Treatment for patients from the age of 16 to their 25th birthday should be in line with national guidance regarding the management of teenagers and young adults with cancer. Patients from the age of 16 to the end of their 18th year should be treated in a principal treatment centre (see [Appendix 10](#) for contact details of principal treatment centres). Teenagers and young adults from the age of 19 to their 25th birthday will follow the adult pathway but should be offered choice of treatment in a teenage and young adult (TYA) designated hospital or at the principal treatment centre. Teenagers and young adults in this age group should be treated either in the principal treatment centre or a designated hospital.

3.1 Referral for suspected lung cancer

Indications for an urgent referral for a chest X-ray include guidance from NICE which has been updated (NICE, 2015).

There is no longer mention of symptoms or signs being persistent (that is, lasting more than 3 weeks) as in previous guidance. Also the guidance relates to patients aged over 40 when there was no age discrimination in previous guidance (NICE, 2005). Unexplained haemoptysis in patients over 40 years of age is considered criteria for 2 week referral (NICE, 2015).

An urgent chest X-ray should be offered (to be performed within 2 weeks) to assess for lung cancer in people aged 40 and over if they have two or more of the following unexplained symptoms, or if they have ever smoked and have one or more of the following unexplained symptoms:

- cough
- fatigue
- shortness of breath
- chest pain
- weight loss
- appetite loss

An urgent chest X-ray should be considered (to be performed within 2 weeks) to assess for lung cancer in people aged 40 and over with any of the following:

- persistent or recurrent chest infection
- finger clubbing
- supraclavicular lymphadenopathy or persistent cervical lymphadenopathy
- chest signs consistent with lung cancer
- **thrombocytosis**

An urgent chest X-ray should be offered (to be performed within 2 weeks) to assess for mesothelioma in people aged 40 and over, if:

- they have two or more of the following unexplained symptoms, or
- they have one or more of the following unexplained symptoms and have ever smoked, or

- they have one or more of the following unexplained symptoms and have been exposed to asbestos:
 - cough
 - fatigue
 - shortness of breath
 - chest pain
 - weight loss
 - appetite loss

Consider an urgent chest X-ray (to be performed within 2 weeks) to assess for mesothelioma in people aged 40 and over with either:

- finger clubbing or
- chest signs compatible with pleural disease

3.1.1 Pan-London urgent suspected cancer referral form

A new pan-London lung cancer urgent referral form has been produced by Transforming Cancer Services London, in consultation with lung clinicians across London, which reflects the NICE guidance from 2015. The form has been developed to improve the quality of referral from primary care and has the appropriate information to enable clinical triage and support earlier diagnosis. It can be found at:

<https://www.myhealth.london.nhs.uk/healthy-london/cancer/pan-london-suspected-cancer-referrals>

An example of the form can be found in [Appendix 1](#).

3.1.2 Guidelines for urgent referral

Any of the following should lead to urgent referral:

- CXR suggestive/suspicious of lung cancer (including pleural effusion and slowly resolving consolidation)
- persistent haemoptysis of recent onset in smokers/ex-smokers over 40 years of age
- signs of superior vena cava obstruction (swelling of face/neck with fixed elevation of jugular venous pressure)
- stridor (consider emergency referral).

Best practice suggests that patients should be seen on first visit with their CT result. For this reason, knowledge of patients' estimated glomerular filtration rate (eGFR) and diabetes history is required to enable consultants to order these tests in advance.

3.1.3 Organisation of the 2 week wait service

The 2ww office or MDT coordinator should be informed of all abnormal X-rays that have been reported so that the follow-up is established.

Ideally, patients should be seen with CT chest and abdomen at their first clinic attendance, if their CXR shows an abnormality suggestive of cancer. All CXRs of patients with suspected lung cancer will need to be reviewed for this pathway to work within limited resources. Where locally agreed pathways exist to provide direct access CT for GPs, this should continue. The advice for proceeding to CT should then be given by a member of the MDT (radiologist or chest physician).

Wherever possible, a contrast enhanced staging CT should be performed at this stage, and the request should be made for CT neck, chest and abdomen. (Note that a request for CT chest will omit much of the abdominal organs where lung cancer commonly spreads, i.e. liver and adrenal glands.) Adding a routine CT pelvis does not add additional information in the vast majority of cases unless there is a pre-existing clinical suspicion of pelvic pathology.

3.2 Assessment of patients with possible lung cancer for investigation

3.2.1 Presentation

The following factors are assessed and recorded at the first outpatient appointment in patients presenting with possible lung cancer.

History including:

- age
- previous/current occupation
- smoking history (number of pack years) and attempts to stop
- presenting symptoms of lung cancer
- weight loss
- co-morbidity
- social and family history
- past medical history
- industrial exposure
- drug and allergy history
- performance status (see ECOG/WHO Performance Status table below).

0 – Asymptomatic
1 – Symptomatic but completely ambulant
2 – Symptomatic, <50% in bed during the day
3 – Symptomatic, >50% in bed, but not bed bound
4 – Bed bound

Full examination, including:

- weight and height
- presenting signs of lung cancer
- cardiac assessment
- spirometry (FEV1/FVC with predicted values). Full lung function including transfer factor and lung volumes should be performed in any patient likely to be offered radical treatment.

Blood tests:

- urea, electrolytes and creatinine
- liver function with gamma-GT
- bone profile
- FBC and clotting screen.

The patient should also have an electrocardiogram (ECG) if there is a cardiac history.

3.2.2 Triage of 2 week wait referrals to ‘straight to CT’ in secondary care

All 2 week wait referrals should be triaged by a clinician who is part of the lung cancer multidisciplinary team. In the majority of cases this should be a chest physician. This triage should have cross cover for annual and study leave. The 2 week wait referral should be of sufficient quality to allow the clinician to be able to choose the correct CT scan protocol. Information should include:

- clinical history
- access to the chest radiograph and/or report
- access to a recent eGFR
- access to drug history especially metformin and anticoagulants

Once the patient has been triaged for ‘straight to CT’, the scan should be performed and reported by the patient’s first appointment. National target is 7 days.

3.3 Diagnostic investigations

Histological or in some instances cytological diagnosis should be established in all patients, unless specific circumstances suggest that this might not be possible. Investigations should be selected to offer the most diagnostic information with the least risk of harm. Where there is evidence of distant metastases, then biopsies should be taken from the metastatic site if this can be achieved more easily than from the primary site.

If patients have a previous diagnosis of cancer, this should influence where the biopsy is taken from to distinguish between primary and metastatic lung cancer.

Patients who are on oral anti-coagulants and new anti-platelet agents should be offered a risk assessment of the safety of discontinuing these drugs, and if necessary a second opinion should be obtained, prior to any biopsy. In general, the INR should be within a range that the biopsy can be performed safely, depending on the size and site of the biopsy. In some cases where anti-coagulants need to be continued, low molecular weight heparins can be substituted. Please see [section 4.1.2](#) on biopsy and safe use of anticoagulants.

Dabigatran and procedures

Creatinine clearance (ml/min)	Estimated t _{1/2} (h)	Stop dabigatran before elective surgery	
		High risk bleed	Standard risk bleed
> 50	13	2 days	24 hrs before
50–80	15	2–3 days	1–2 days
30–50	18	4 days	2–3 days before (> 48 hrs)
< 30	27	6 days	4 days

Rivaroxaban and procedures (similar with apixaban)

Creatinine clearance (ml/min)	Estimated t _{1/2} (h)	Stop rivaroxaban before elective surgery	
		High risk bleed	Standard risk bleed
> 30	12	2 days	24 hrs before
< 30	Unknown	4 days	2 days

All patients should be given written information regarding diagnostic tests to enable them to give informed consent.

3.3.1 Diagnostic tests

Diagnostic tests may include the following:

- Bronchoscopy with pathology assessment of appropriate specimens (tissue, bronchial washings, and brushings).
- Transbronchial needle aspiration (TBNA) or endobronchial ultrasound (EBUS) guided needle aspiration (EBUS/TBNA) of enlarged mediastinal lymph nodes for diagnostic/staging purposes. Staging CT scan of chest and abdomen should be performed before bronchoscopy to maximise output from the investigation and to allow TBNA to be performed for staging as well as diagnostic purposes. EBUS/TBNA is indicated for biopsy of paratracheal and peribronchial intraparenchymal lung lesions and should be accessible to all MDTs for diagnosis.
- Endoscopic ultrasound (EUS) with or without node sampling may be indicated for diagnostic purposes and as a staging investigation.
- Percutaneous needle biopsy/fine needle aspiration (FNA)/core biopsy (CT, ultrasound or fluoroscopy guided) – a decision regarding the approach to obtain diagnostic material should be made by a diagnostic MDT with a radiologist and chest physician as a minimum membership. Lung function should be considered. Areas of emphysema should be noted, as needle passes through these areas will increase the risk of pneumothorax and this should be discussed with the patient, as well as the management of this potential complication (pleural aspiration and drainage). Consider for referral to specialist centres performing CT guided lung biopsy with ambulatory pneumothorax management in patients who have been turned down by local interventional radiologists as high risk due to severe COPD.
- Mediastinoscopy/mediastinotomy should be performed early if staging investigations suggest that this is the best method to obtain tissue diagnosis (e.g. mediastinal lymphadenopathy without a primary lesion accessible bronchoscopically or percutaneously).

- FNA of palpable lymph nodes or skin deposits.
- Ultrasound guided FNA of supraclavicular lymph nodes or lymph nodes.
- Pleural fluid aspiration and/or biopsy.
- Biopsy of distant metastases.

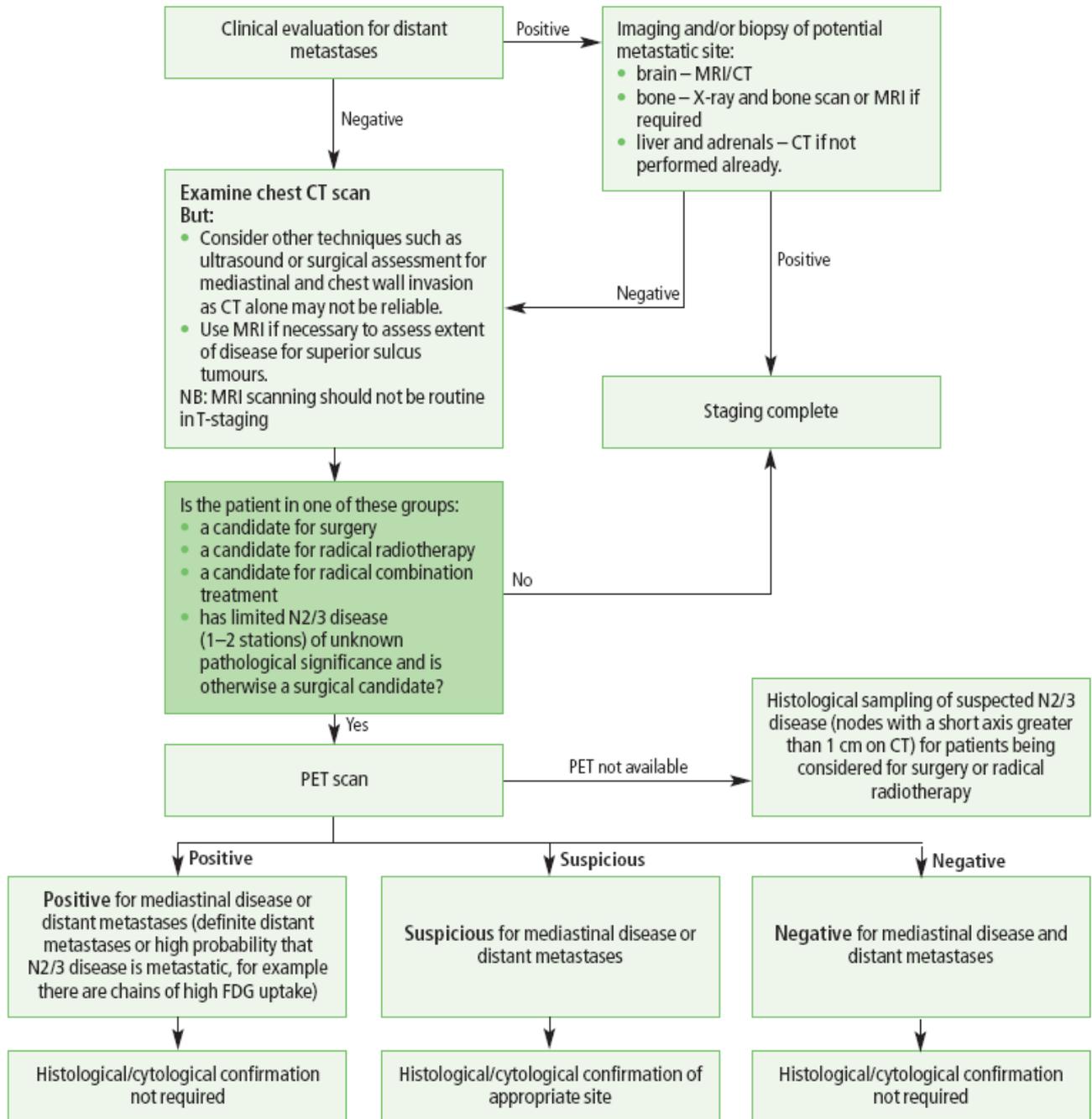
3.4 Staging investigations

Choose investigations that give the most information about diagnosis and staging with least risk to the patient. Think carefully before performing a test that gives only diagnostic pathology when information on staging is also needed to guide treatment.

Staging investigations should include the following:

- Blood tests: FBC, U&E, creatinine, liver function including gamma-GT, bone profile. Further tests will depend on the result (e.g. plasma and urine osmolality in hyponatraemia).
- CT scan of the neck, chest and abdomen (to include the liver and adrenals) with contrast enhancement.
- Pulmonary function tests – spirometry with reversibility, gas transfer and lung volumes (in patients who are candidates for surgery or other curative therapy, radical radiotherapy or radical chemo-radiotherapy).
- Positron emission tomography (PET)/CT scan should be performed in all patients who may be candidates for curative treatment with either surgery, radical radiotherapy or other curative therapy, including patients with limited (1–2 stations) N2/N3 disease on CT of uncertain pathological significance. PET/CT scan should also be considered in the evaluation of isolated pulmonary nodules, particularly when these are larger than 10mm.
- EBUS/EUS-FNA in PET/CT-positive mediastinal nodes by mediastinal sampling (except when there is definite distant metastatic disease or a high probability that N2/N3 disease is metastatic, for example, if there is a chain of lymph nodes with high ¹⁸F-deoxyglucose uptake). Consider histological sampling of mediastinum (mediastinoscopy/mediastinotomy) if EBUS/EUS results are negative and there is high clinical suspicion, when ultrasound guided FNA is not indicated and when a large tissue sample is indicated for diagnosis (e.g. for lymphoma).
- Pleural cytology and supraclavicular biopsy (ultrasound guided if nodes are not palpable).
- Magnetic resonance imaging (MRI) may play a role in the assessment of chest wall, vertebral, brachial plexus or great vessel involvement. Axial T1W, axial T2W should be used, while the use of contrast enhancement is optional. Coronal +/- sagittal T1W views should be taken for suspected brachial plexus involvement. STIR sequences may be helpful. MR angiography should be performed for vessel assessment if required.
- Investigation for metastatic disease should be dictated by clinical suspicion. A bone scan should be requested when symptoms or hypercalcaemia suggest the presence of bone metastases, or when alkaline phosphatase is raised, or for staging of small cell lung cancer. Do not perform a bone scan when PET/CT has excluded bone metastases.
- Imaging of the brain (MRI or CT pre- and post-contrast; routine technique) should be requested for staging of small cell carcinoma, radically treatable adenocarcinoma, or where there are symptoms or signs suggestive of brain metastases (see Figure 3.1).

Figure 3.1: Investigations to stage lung cancer



3.5 Staging of lung cancer

The TNM Classification of Malignant Tumours, 7th edition, is used to stage lung cancer. Radiological staging should be included in the report on a staging CT scan. Final staging (prior to mediastinal sampling) should be a combined decision made at the MDM. The IASLC eighth edition is in consultation in early 2016 and will be in use from January 2017 (<https://www.iaslc.org/>).

Table 3.1: TNM classification

TNM classification	
T	<p>T = Extent of primary tumour</p> <p>Tis – Carcinoma in situ</p> <p>TX – Positive cytology</p> <p>T1a – The tumour is contained within the lung and is smaller than 2cm across</p> <p>T1b – The tumour is contained within the lung and is between 2cm and 3cm across</p> <p>T2a – >3cm but ≤5cm (or tumour with any other T2 descriptors – main bronchus, >2cm from carina, invades visceral pleura, partial atelectasis – but ≤5cm)</p> <p>T2b – >5cm but ≤7cm</p> <p>T3 – >7cm or growth into chest wall, diaphragm, pericardium, mediastinal pleura, main bronchus <2cm from carina, total atelectasis, phrenic nerve, more than 1 nodule in same lobe</p> <p>T4 – Growth into mediastinum, heart, great vessels, carina, oesophagus, vertebrae, trachea; nodules in more than 1 lobe of the same lung</p>
N	<p>N = Condition of regional nodes</p> <p>N0 – No regional lymph node metastasis</p> <p>N1 – Ipsilateral peribronchial, ipsilateral hilar</p> <p>N2 – Ipsilateral mediastinal, subcarinal</p> <p>N3 – Contralateral mediastinal or hilar, scalene or suprascapular</p>
M	<p>M = Metastases</p> <p>MX – Distant metastases cannot be assessed</p> <p>M0 – No distant metastases</p> <p>M1a – Separated tumour nodule/s in the contralateral lung: tumour with pleural nodules or malignant pleural effusion/pericardial effusion</p> <p>M1b – Distant metastases</p>

Table 3.2: Stage grouping

Stage grouping			
Occult ca	Tx	N0	M0
Stage 0	Tis	N0	M0
Stage IA	T1a, T1b	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T1a, T1b	N1	M0
	T2a	N1	M0
	T2b	N0	M0
Stage IIB	T2b	N1	M0
	T3	N0	M0
Stage IIIA	T1, T2	N2	M0
	T3	N1, N2	M0
	T4	N0, N1	M0
Stage IIIB	T4	N2	M0
	Any T	N3	M0
Stage IV	Any T	Any N	M1a, M1b

Patients with small cell lung cancer may also be staged as limited (LS, confined to the thorax) or extensive stage (ES).

CT or MRI of the brain, and bone scan should be performed in cases of limited disease fit for radical treatment.

Additional tests should not delay the start of treatment.

4 Radiology

4.1 Routine indications for imaging

Table 4.1: Routine indications for imaging

	Imaging modality	Indications and notes
Diagnosis	CXR	Haemoptysis, persistent cough for >3 weeks: chest/shoulder pain, dyspnoea, weight loss, chest signs, hoarseness, finger clubbing, features of metastases, cervical/supraclavicular lymphadenopathy Direct referral policy to the lung cancer MDT should be agreed locally
	CT chest and abdomen	Suspected or newly diagnosed lung cancer to evaluate treatment options
	Cerebral CT/MRI	Should be performed in patients with neurological signs or symptoms, or prior to curative/radical therapy as agreed by the MDT. Also patients with adenocarcinoma who are being considered for surgery or radical treatment
	CT or US guided biopsy EBUS/TBNA	As referred by members of the MDT. Ultrasound preferred for peripheral or pleural lesions CT should be performed prior to biopsy and discussed with radiology department
	Adrenal MRI	Referred by the MDT for assessment of equivocal adrenal masses or if indicated by prior CT report
	Chest MRI	Selected cases including superior sulcus tumours and to help differentiate tumour from adjacent normal tissue
	PET/CT	1. Solitary pulmonary nodule/pre-lung biopsy, if cancer is considered likely 2. Pre-thoracotomy assessment/curative treatment 3. Candidates for radical (non-surgical) therapy 4. Unknown primary, probably lung – CUP
	Bone scan/MRI	Symptoms of bone metastases, or neurological signs and symptoms suggestive of spinal cord or nerve root compression
Surveillance	Post-surgery	Please see Surgery (section 14.2.1)
	Post-radiotherapy +/- chemotherapy	Please Radiotherapy (section 14.3.2)
	Post-ablation	3-monthly CT/MRI

4.1.1 Imaging techniques

Chest radiography is the usual initial point for imaging in an undiagnosed patient.

Staging CT scans should always be contrast-enhanced unless there is a contraindication to intravenous contrast, and should ideally be performed before bronchoscopy. A lung cancer staging CT should include the whole chest (ideally starting at the root of the neck to also assess for supraclavicular lymphadenopathy), liver, adrenals and kidneys.

In all candidates for curative or radical therapy, PET/CT should be performed prior to instigating therapy and if possible prior to tissue sampling to help guide biopsy. The minimum coverage should include from base of skull to mid-thigh.

In cases of diagnostic dilemma, MRI may also be used to refine diagnosis (e.g. in and out of phase imaging for adrenals and chest MRI to help differentiate tumour from normal tissue).

Brain imaging is advocated in patients with adenocarcinoma considered for radical therapy owing to the high incidence of metastases. This should ideally be with MRI, but where this is not achievable in a timely fashion pre- and post-contrast-enhanced CT may be used as a substitute.

4.1.2 CT or ultrasound guided percutaneous biopsy

This requires extra planning. The patient should be assessed by a clinician within the MDT and the procedure then needs to be discussed with a consultant radiologist to make sure it is technically feasible.

Percutaneous needle biopsy is indicated in the following groups of patients:

- Patients with undiagnosed pulmonary lesions not diagnosed by other approaches.
- In patients with a diagnosis of a mediastinal mass or lymph nodes, as an alternative to EBUS or transoesophageal guidance.

Guidance is usually by ultrasound for peripheral lesions abutting the pleura or CT.

It is usual to perform core biopsy of at least 20G. A co-axial technique may be used (especially if multiple samples are required). Larger gauge biopsy sampling should be weighed against the risk of complication. At least two passes should be performed in order to obtain tissue for molecular tests. The cores can be placed in a single pot; however, ideally they should be placed in different pots, as they will be processed in the lab more adequately. In the lab, one core-biopsy should be used for diagnosis (routine HE and special stains, always avoiding over-trimming), while the second would mainly be aimed for molecular studies. After the biopsy procedure, tissue should be fixed immediately in formalin (10%). Formalin dilution with saline should be avoided.

Fine needle aspiration cytology can replace the biopsy when it is possible to perform the procedure with pathology staff. In these cases, the amount and quality of the material is assessed ad hoc, and therefore the risk of a non-diagnostic result is reduced. On the contrary, if it is not possible to perform the procedure with a pathologist, a cytology aspiration after the biopsy, to avoid damage the tissue, also increases the amount of tissue obtained. Fixation will vary depending on the selected pot (for example, liquid based cytology or cytorich red).

In some centres, experience staff can spread the material on two slides: one air-dried for May Grünwald-Giemsa and another fixed in alcohol for Papanicolau. Though this cytology material can still be used for molecular studies, this procedure is mainly aimed to get the diagnosis, and therefore currently should be avoided if it is performed in isolation.

Preparation for a percutaneous needle biopsy includes:

- clinical assessment by a member of the clinical team; the patient should be given an information leaflet about the procedure
- spirometry
- coagulation profile including platelet count
- informed consent
- intravenous (IV) access.

Arrangements should be made for a safe place to recover and monitor the patient post-biopsy. This may be within the department or using day case or ward facilities. Procedures should only be performed if adequate access to on-site emergency medical assistance is available (in case of need).

The radiologist performing the biopsy should explain the procedure to the patient again at the time of the biopsy.

Relative contraindications for a percutaneous needle biopsy:

- poor lung function
- previous occurrence of pneumothorax not well tolerated
- unable to give informed consent for biopsy
- uncooperative/unable to control respiration
- bleeding disorders that cannot be corrected are absolute contraindications
- pulmonary artery hypertension.

The biopsy findings should be discussed at the next MDM, although decisions and referrals may already have been planned, thus pre-empting the results.

Guidance for achieving safe and high quality lung biopsies

The LCA Lung Pathway Group reviewed the local literature and evidence relating to pre-biopsy checklists and achieving the best quality biopsy sample. This was done with the aim of combining the expertise of the interventional radiologist and the pathologist. The check list and technical guide below are the result of a LCA consultation to provide a simple and universally applicable pathway to follow. The LCA recommends that trusts adopt this checklist and technical guide into their CT biopsy practice.

PRE LUNG BIOPSY CHECK LIST

Platelet count must be $> 80 \times 10^9/L$

INR must be < 1.4

1) Parenteral anticoagulants

- **Warfarin:** stop 4 days before biopsy and substitute short acting anticoagulation as appropriate (to be decided by clinical team depending on indication for anticoagulation)
- **Low molecular weight heparin:** stop 24 hours prior to biopsy
- Check INR on day of biopsy – must be < 1.4

2) Novel oral anticoagulants

- **Factor Xa inhibitors (Apixaban, Rivaroxaban)**
- **Direct thrombin inhibitor (Dabigatran)**
- Have short half lives (5-17 hours)
- Stop 24 hours before procedure (48-72 hours beforehand in patients with renal impairment)

3) Antiplatelet drugs

- **Aspirin:**
- No need for aspirin to be stopped. (In high risk patients for liver biopsy aspirin may be stopped 7 days prior to biopsy)
- **Dipyridamole:** same as aspirin
- **Clopidogrel:**
- Must be stopped 7 days prior to biopsy

LUNG BIOPSY TECHNICAL GUIDELINES

- 1) Take core biopsies if possible (19 or 18G)
- 2) Co-axial technique is preferred for CT-guided biopsies to reduce number of pleural punctures
- 3) Co-axial technique is not needed for US-guided biopsies (where no aerated lung is crossed)
- 4) Take as many cores as possible (minimum 3) to allow additional molecular testing
- 5) Additional fine needle aspirations may be taken but these should be in addition to, and not instead of, the core biopsies.

5 Pathology Guidelines for the Reporting of Lung Cancer

The LCA follows the minimum dataset recommendations of the Royal College of Pathologists (RCPATH).

Pathologists reporting lung cancer should participate in the lung external quality assessment (EQA) scheme.

5.1 Biopsies for lung cancer

According to local policy, biopsies may or may not be fast tracked. Specimen request forms should therefore be indicated as urgent/fast track for priority processing based on local policy.

Full clinical details should be provided (in particular, history of previous malignancy), and if necessary further data should be obtained from the requesting clinician.

Specimens are processed as indicated in the RCPATH guidelines (Dataset for Lung Cancer Histology Reports, <https://www.rcpath.org/resourceLibrary/dataset-for-lung-cancer-histopathology-reports--4th-edition-.html>).

5.2 Lung resection for tumours

These are handled and reported (macro and micro) according to the lung cancer Dataset for Lung Cancer Histology Reports published by RCPATH. (In particular, the macro description should include tumour site, distance from pleura/bronchial/peribronchial resection margin, relationship to lobar bronchi, appearance of overlying pleura and background lung.)

At the time of resection in theatres, samples should be placed in ample sized specimen pots with copious (at least 2 times the size of the specimen) amounts of formalin to ensure adequate fixation. Facility for inflation fix via the airways is optimal.

Once fixed, specimens should be photographed, if possible.

A minimum of three blocks of tumour should be taken, including at least one that incorporates the nearest pleural margin. Elastic-Van Gieson (EVG) staining of blocks including visceral pleura should be undertaken to assess invasion. Any nodes attached to hilum and intraparenchymal lymph nodes should be sampled. Other blocks must include the bronchial and vascular resection margins, as well as the mediastinal margin where appropriate.

At least one, and ideally three, blocks from background lung should be taken, inclusive of sampling any suspected background pathology.

In cases that may be related to asbestos exposure, tissue from the non-tumorous lung is to be retained according to college guidelines.

5.3 Cytology specimens for lung cancer

Increasingly, patients may only have a positive cytological specimen. These should be processed and reported according to local standard operating procedures. Even in those with additional histological specimens, consideration should be given to cyto-spinning positive specimens and fixing cell pellets to retain malignant cells for further analysis, as future treatments may require additional investigations such as mutation status.

We support the recommendations of RCPATH and suggest that there should be no more than three pathologists reviewing cases at MDT meetings.

5.4 Referral of difficult cases

Where a second opinion is required, the relevant slides/blocks should be reviewed locally in the first instance and then sent to the local centre. If diagnosis remains uncertain, the case should be sent to the supra-regional centre.

5.5 Molecular analysis

Clinical teams should have access to molecular testing by an accredited laboratory for gene mutations relevant to patient management (e.g. EGFR, ALK, KRAS etc.), with results being entered into the pathology record for the tested specimen. Pathologists should therefore handle samples sent for suspected lung cancer judiciously and endeavour to retain enough tissue for testing while making a diagnosis (e.g. multiple blocking of biopsies, avoiding repeated cutting from the block, selective immunochemistry rather than large panels).

6 MDT Membership and Function

The lung cancer MDT should include medical and nursing staff with specialised knowledge of lung cancer diagnosis and treatment, both curative and palliative.

A lead clinician, normally a respiratory physician, should take managerial responsibility for the service. The team should meet weekly to discuss all patients with a working diagnosis of lung cancer.

The team should include the following as a minimum:

- a respiratory physician with a special interest in lung cancer
- a radiologist with thoracic expertise
- a pathologist +/- a cytologist
- a lung cancer specialist nurse
- an oncologist, preferably a clinical oncologist
- a palliative care specialist +/- a palliative care nurse specialist
- a thoracic surgeon.

The diagnosis is usually made with a histological and cytological diagnosis, and staged using CT of the chest and abdomen as a minimum. In cases where the patient is not considered fit to receive any form of radical treatment or palliative chemotherapy for advanced disease, the team may not consider it appropriate to seek more than a clinical diagnosis. This should only apply to a minority of cases.

During the meeting, the staging of each case and treatment plan should be agreed. In some cases additional investigations (e.g. PET scan or molecular testing for genetic mutation) will be requested.

Performance status and stage are recorded along with data required for the National Lung Cancer Audit following discussion with the team, usually by the MDT coordinator. Clinicians will consider the potential entry of each patient into a trial.

A member of the team will have responsibility for ensuring that the GP is informed of the MDT decision within 24 hours of the meeting, preferably after the decision has been communicated to the patient.

It is good practice for patients to be seen by the diagnosing doctor and the specialist nurse after the multidisciplinary team meeting to discuss results and have an opportunity to consider treatment options. All members of the team who have contact with patients at this point in the pathway should have training in advanced communication skills.

7 Data Requirements of Lung Cancer Services

Lung cancer services within the LCA are required to submit data to nationally mandated datasets for patients diagnosed with lung cancer.

These are as follows:

7.1 The Cancer Outcomes and Services Dataset (COSD)

The core dataset for all tumour types including lung cancer is mandated from January 2013, and the site-specific dataset is mandated from July 2013. Details of the dataset can be found on the National Cancer Intelligence Network (NCIN) website:

www.ncin.org.uk/collecting_and_using_data/data_collection/cosd.aspx.

The local cancer registry will be collating this dataset using Trust data feeds which should include all these items. The feeds are:

- Trust PAS feed
- Trust pathology feed
- Trust radiology feed
- Trust MDT feed.

In line with the requirements set out in provider Trust contracts this data should be submitted within 25 working days of the end of the month in which the activity took place.

7.2 National Audits – National Clinical Lung Cancer Audit (formerly LUCADA)

The National Clinical Lung Cancer Audit has been up and running since 2004, and requires Trusts to submit data for patients diagnosed with lung cancer. The details of the dataset can be found on the Health & Social Care Information Centre website at <http://www.hscic.gov.uk/lung>.

7.3 Systemic Anti-Cancer Therapy (SACT) chemotherapy dataset

Trusts that provide chemotherapy to patients are required to submit data to the SACT dataset. Details of the audit and the dataset requirements are available at the dataset homepage:

www.chemodataset.nhs.uk/home.aspx.

7.4 National Radiotherapy Dataset (RTDS)

Trusts that provide radiotherapy to patients are required to submit data to the RTDS. Details of the audit and the dataset requirements are available at the dataset homepage: www.canceruk.net/rtservices/rtds/.

7.5 National Cancer Waiting Times Monitoring Data Set

Trusts are required to submit data to the Cancer Waiting Times Monitoring Data Set, which includes details of all patients with a 2ww referral, and of all patients' treatments for cancer. Trusts are required to submit this data within 25 working days of the month in which patients were first seen for the 2ww target, or the month in which the patient was treated.

The Cancer Waiting Times Monitoring Data Set can be found at:

www.datadictionary.nhs.uk/data_dictionary/messages/clinical_data_sets/data_sets/national_cancer_waiting_times_monitoring_data_set_fr.asp.

7.6 Local data requirements

The LCA Lung Pathway Group is developing a suite of metrics (see [Appendix 9](#)) to inform the group and services within the LCA about areas of priority and potential service improvements. The LCA is currently collating information from the various sources of data available, though the Lung Pathway Group or LCA Clinical Board may require Trusts to submit additional MDT data to the LCA if additional priority areas are identified.

8 Breaking Bad News

Staff dealing with patients and giving diagnoses of cancer should have received training in advanced communication skills. Bad news should only be given by consultants and experienced trainees. This chapter provides a summary of the key points.

8.1 Advance preparation

- Consider the time available, put pager on silent mode and find a private setting.
- If the patient is an inpatient, consider the setting and ensure that you cannot be overheard by other people on the ward.
- Would it be helpful to have another member of staff present? It is recommended that a clinical nurse specialist (CNS) be present when delivering bad news and should always be available to provide support during that day.
- Before seeing the patient, review relevant clinical information, consider psychological/social issues and mentally rehearse words or phrases to use or avoid.

8.2 Build a therapeutic environment

- Introduce yourself.
- Ask the patient if they would like someone else with them.
- Be aware of your body language.

8.3 Communication

- Ask what the patient already knows.
- Warn the patient that you do not have good news.
- Proceed at the patient's pace.
- Be frank but compassionate.
- Avoid jargon.
- Allow for silence and tears.
- Check the patient's understanding.
- Repeat information if needed.
- Allow time for discussion.
- Outline the next steps in the treatment plan and provide written information. This should include details of any treatments, where appropriate.
- Offer a follow-up meeting.
- Ensure that the patient has details of their key worker and how to contact them should the need arise.

8.4 Dealing with reactions

- Be aware of family/patient reactions and acknowledge their emotional needs.
- Be empathic.
- Offer support from other members of the MDT if needed.
- Do not show any signs of rushing away from the meeting.
- Avoid confrontational scenarios.
- Be aware of your own safety.
- Do not criticise or argue with colleagues.
- Deal with your own emotional needs and the needs of other colleagues.
- Allow time for reflection.

9 Inter-professional Communication between Secondary and Primary Care

9.1 General principles

- Communication needs to be timely and concise.
- Use fax-back route/electronic means for urgent communications (meaning those that need to be with the GP within 24 hours).
- Communications must include:
 - what the patient has been told
 - who told the patient
 - who was there with the patient (e.g. named partner/friend)
 - what written/other information was offered
 - next steps – when the patient is being seen or their treatment started
 - actions for the GP – for information only or suggesting specific GP actions (including information for Macmillan or district nursing colleagues)
 - named care worker in secondary care
 - intent of treatment (curative/palliative)
 - any additional information required from the GP (e.g. co-morbidities status)
 - summary of medication and alterations to medication
 - contact details for further information/discussion.
- Key points of change along the patient journey:
 - referral
 - investigations
 - diagnosis
 - treatment planning at MDT meetings
 - start of treatment(s)
 - end of treatment(s)
 - completion of active management of cancer (Treatment Record Summary (TRS))
 - follow-up(s).

9.2 At diagnosis

The GP is informed, by telephone or fax, within 24 hours of the patient being told the diagnosis, along with the general management plan (further investigations and treatment). The letter must include:

- what the patient has been told (e.g. prognosis)
- who told the patient
- who was there with the patient (e.g. named partner/friend)
- what written/other information was offered
- next steps – when patient is being seen, further investigations or treatment started

- actions for the GP – for information only or suggesting specific GP action
- named care worker in secondary care
- intent of treatment (curative/palliative)
- any additional information required from the GP.

If the patient is told their diagnosis in the joint clinic, information confirming diagnosis should be sent to the GP within 24 hours.

All inpatients who are given a new diagnosis of lung cancer will be given a discharge letter to be taken to their GP. In addition, for some patients, the GP surgery will be contacted by phone or fax.

9.3 MDT discussions and decisions

The decisions made at the MDM are conveyed to the patient verbally by their key worker as appropriate. The patient is also offered a written copy of this information, and a detailed letter summarising the MDT's management plan is dictated for the GP. This letter will be sent to the GP by post or electronically within 24 hours. It will be made clear when the patient is being seen, and by whom, to discuss MDT decisions. Feedback by the GP will be invited as appropriate.

9.4 Letters from clinics

These will be organised to an agreed format with diagnosis and staging information, intent of treatment and medication highlighted as above. The format can be an agreed template with core fields and areas to add free text.

9.5 Treatment Record Summary

A letter detailing the planned meeting between clinician (CNS or doctor) and patient at the end of active treatment, to discuss diagnosis, response to treatment and next steps, will be sent to the GP. The TRS should cover psycho-social aspects, signposting to services, anticipated side effects of treatment and signs of disease progression, with management plans clearly highlighted. Holistic needs assessment (HNA) will be undertaken with an approved instrument and summarised. The letter will be sent within 48 hours of the interview, with the patient's permission.

The LCA Survivorship Group has recommended the adoption of the National Cancer Survivorship Initiative (NCSI) Treatment Summary. A copy of this document can be found at [Appendix 8](#).

10 Surgical Guidelines

10.1 Introduction

The LCA adopts the British Thoracic Society (BTS) guidelines (Lim et al. 2010) on the surgical management of patients with lung cancer.

10.2 Non-small cell lung cancer

10.2.1 Patient selection

The 7th edition of the TNM Classification of Malignant Tumours is used. The IASLC is publishing the eighth edition in 2016 and it will come into use from January 2017 (<https://www.iaslc.org/>). Surgery should be offered to patients who are medically fit and suitable for treatment with curative intent. This includes:

- Stage Ia (T1aN0M0 and T1bN0M0)
- Stage Ib (T2aN0M0)
- Stage IIa (T2bN0M0 and T1–2aN1M0)
- Stage IIb (T3N0M0 and T2bN1M0)
- Stage IIIa (T3N1M0).

Consider surgery in selected patients with:

- Stage IIIa (T4N0-N1M0).

Consider surgery as part of radical multimodality management in selected patients with:

- Stage IIIa (T1–3N2M0 where N2 is single zone, non-fixed and non-bulky)
- adenocarcinoma in-situ (formerly bronchioloalveolar carcinoma).

Anatomical lung resection should be offered to suitable patients with single-site bronchioloalveolar carcinoma.

Multiple wedge resections may be considered in patients with a limited number of sites of bronchioloalveolar carcinoma.

10.3 Risk assessment for surgery

In assessing the fitness of patients for surgery, consideration should be given specifically to operative mortality, the risk of perioperative myocardial events and the risk of post-operative dyspnoea, indicating whether these risks are low, moderate or high to the patients. Patients should also be given counselling about commonly occurring complications associated with lung resection.

10.3.1 Operative mortality

Thoracscore, which takes into account nine variables (age, sex, ASA (American Society of Anesthesiologists) score, performance status, dyspnoea score, priority of surgery, extent of surgery, malignant diagnosis and a composite morbidity score), may help to estimate mortality risk when considering patients with lung cancer for surgery.

10.3.2 Cardiovascular morbidity

Baseline cardiac risk assessment should include history and assessment of functional status, physical examination and resting ECG as defined by the American College of Cardiology (ACC) guidelines (Fleisher et al. 2007). Surgery should be avoided within 30 days of myocardial infarction. Patients with a murmur or unexplained dyspnoea should also have an ECG.

A cardiologist should evaluate patients with an active cardiac condition, three or more risk factors or poor cardiac functional capacity, though the pressing need for urgent cancer treatment may sometime preclude a full risk assessment, and a pragmatic approach must be taken. Surgery may be offered without further investigations in patients with two or fewer risk factors and good cardiac functional capacity.

Patients with coronary artery disease should have their medical therapy and secondary prophylaxis optimised as early as possible in the pathway. Anti-ischaemic treatment including aspirin, statins and beta blockers should be continued in the perioperative period. In patients with coronary stents, discuss with a cardiologist perioperative anti-platelet management. Patients with chronic stable angina and conventional ACC/American Heart Association indications for treatment (coronary angioplasty and stent or coronary artery surgery) should be considered for revascularisation prior to thoracic surgery.

10.3.3 Respiratory morbidity

Lung function is used in the pre-operative assessment to estimate the risk of operative mortality and impact of lung resection on quality of life, especially in relation to unacceptable post-resection dyspnoea. FEV₁ has not been shown to be an independent predictive factor for perioperative death, but may be useful as a surrogate for performance status, and may be used as a predictor of post-operative dyspnoea. TLCO is an important predictor of post-operative morbidity despite normal spirometry. Spirometry alone cannot be considered sufficient unless within normal limits in patients who also have good exercise tolerance. BTS guidelines recommend measurement of TLCO in all patients regardless of spirometric values. Surgical resection should be offered to patients with low risk of post-operative dyspnoea. Surgical resection may be offered to patients at moderate to high risk of post-operative dyspnoea and associated complications if it is felt that this is the better treatment option, and the patient is willing to accept the higher risk.

If ventilation or perfusion mismatch is suspected, ventilation scintigraphy or perfusion scintigraphy may be considered to predict post-operative lung function. Quantitative CT or MRI may also be considered, if available.

In patients with moderate to high risk for post-operative dyspnoea, the shuttle walk test may be considered as a functional assessment, using a distance walked of >400m as a cut-off for good function. Cardio-pulmonary exercise testing to measure peak oxygen consumption may also be considered in this group of patients, using >15ml/kg/min as a cut-off for good function.

When pneumonectomy can be avoided but there is the potential for an increased risk of recurrence, this should be explained to patients so that they can make a choice. Where possible, broncho-angioplastic resection is advised to be performed to avoid pneumonectomy.

Risk assessment for post-operative dyspnoea should include segment counting to estimate post-operative lung function. Patients with moderate to high risk of post-operative dyspnoea should be considered for lung parenchyma-sparing surgery.

Broncho-angioplastic procedures in suitable patients should be considered to preserve pulmonary function. Sublobar resection may be an acceptable alternative to lobectomy in patients with limited pulmonary reserve. Patients with concomitant lung cancer within severe heterogeneous emphysema should be considered for lung resection based on lung volume reduction surgery criteria (especially if lung cancer is positioned in upper lobes).

10.3.4 Enhanced recovery after surgery (ERAS)

Consideration should be given to implementing the principles of enhanced recovery for surgical patients where all steps of the patient journey from pre-assessment through to follow-up after discharge are being optimised. ERAS has been shown to improve patient outcomes and reduce post-operative complications. It enables patients to recover from surgery and leave hospital sooner by minimising the stress responses on the body during surgery.

10.4 Lymph node management

Systematic nodal dissection should be performed in all patients undergoing lung cancer resection with a minimum of six lymph node stations removed or sampled where possible/present (IASLC 2009). Three of these lymph nodes should be mediastinal (including subcarinal) and three from N1 stations.

10.5 Adjuvant therapy

10.5.1 Pre-operative chemotherapy

Patients with resectable lung cancer should not routinely be offered pre-operative chemotherapy.

10.5.2 Post-operative chemotherapy

Post-operative chemotherapy should be offered to patients with TNM Classification of Malign Tumours (7th edition) pT1–3N1–2M0 non-small cell lung cancer (NSCLC). It should be considered in patients with pT2–3N0M0 NSCLC with tumours >4cm diameter.

10.5.3 Post-operative radiotherapy

Post-operative radiotherapy is not indicated after R0 complete resection. It should be considered in patients with residual microscopic disease at the resection margin, and timed to be after completion of adjuvant chemotherapy. Post-operative radiotherapy should be considered in patients with pathological N2 lymph nodes.

10.5.4 Percutaneous thermal tumour ablation (PTTA)

For primary lung cancer, PTTA may be considered in any patient as monotherapy (in N0 and M0 disease) or as part of combined curative or palliative therapy (including in higher stage disease). For metastatic lung tumours, PTTA is a useful option for local tumour control. As expertise within the LCA is limited at the present time, referrals should be discussed only with specialist centres with the appropriate expertise.

10.6 Bronchopulmonary carcinoids

All bronchopulmonary carcinoids are classified as malignant because, despite being indolent, they can invade and metastasise. They are classified by pathologic features as typical carcinoid (<2 mitoses/2mm² of viable tumour) or atypical carcinoid (2 to 10 mitoses, necrosis or architectural disruption). The same TNM stage classification is used for carcinoids as for other primary lung cancers.

Apart from clinical evaluation, chest CT with intravenous contrast +/- bronchoscopy for central tumours, routine additional imaging or hormonal assays are unnecessary in the majority of cases. Endobronchial biopsy may be performed, but diagnosis is fraught – biopsy specimens have a high misdiagnosis rate, especially when classifying typical versus atypical carcinoid tumours.

The mainstay of treatment is surgical resection.

- A limited resection (parenchyma-sparing) is appropriate for typical carcinoid tumours, provided the resection is complete.
- With atypical carcinoid tumours, further imaging with PET or octreotide scan +/- mediastinoscopy may be appropriate. Patient selection for surgical resection is as for NSCLC (see [section 10.2.1](#)). Anatomical resection and lymph node dissection should be performed, and patients should be considered for adjuvant chemotherapy.

Multimodality treatment should be considered for atypical carcinoid with N2 involvement.

10.6.1 Endobronchial resection for typical carcinoids

Patient selection for endobronchial removal is important – only about 5% to 10% are polyp-like without extension through the cartilaginous wall and might benefit from endobronchial therapies alone. The risk of recurrence is, however, much higher (50% to 87%) when compared with complete surgical resection.

10.7 Small cell lung cancer

Patients with T1–3N0M0 small cell lung cancer may be considered for surgery as part of multimodality management. Surgical management of patients with T1–3N1–2M0 small cell lung cancer should only be considered in the context of a clinical trial.

10.8 Post-operative follow-up

Although there is no conclusive evidence that follow-up of patients after resection to detect early, asymptomatic recurrence alters outcome, we suggest that patients should be reviewed at regular intervals, with initial follow-up by the surgical team. Subsequently, depending on local practice, this may continue at the referring unit unless special circumstances dictate otherwise. Patients should be evaluated clinically and radiologically with CXR as the first line, and CT scan considered annually, or if there are symptoms or signs of recurrence.

The suggested follow-up is:

- 1 month following discharge
- 3-monthly for 12 months
- 6-monthly for the next 2 years, the period when most recurrences occur.

Extending this follow-up to 5 years could be via the GP and influenced by patient choice. Consideration should be given to nurse-led follow-up at this stage, though a CXR is required. Some units have regular 6-monthly CXR with telephone follow-up by the lung CNS.

It is not known whether imaging during follow-up improves outcomes by detecting recurrence or a further primary earlier, and trials should be conducted to look into this.

10.9 LCA high-quality lung cancer surgical service – measures and metrics

The LCA Lung Pathway Group, in conjunction with surgeons from all LCA surgical centres, has developed the following set of measures and metrics. These criteria are considered to be important in delivering a high-quality service and should be the aspiration of all LCA surgical providers. It is acknowledged that financial implications and pathway modelling will need to be considered in implementing these criteria at all surgical sites.

Table 10.1: Quality measures – high-quality lung cancer surgical service

Features of surgery	
1	Future surgical provision by thoracic surgeons
2	Timely access to EBUS for pre-op staging
3	Lung sparing surgery
4	Video-assisted thoracoscopic surgery when appropriate
5	Lymphadenectomy for correct staging data
6	Extended resections should be offered and all MDTs should have access to this
Other features of a high-quality service	
7	Access to cardio-pulmonary exercise testing and lung function testing
8	Timely links with pathology
9	Access to allied health professionals, including pulmonary rehabilitation
10	Access to thoracic/lung cancer CNS support as per guidelines. Feedback should also be given to the referring CNS
11	Good data collection and management
12	Access to alternative technologies, e.g. interventional radiology and ablation
13	Future availability of molecular biology
14	Communication pathways between primary, secondary and tertiary care should be seamless
15	HNA should be delivered to all surgical patients

Table 10.2: Quality metrics – high-quality lung cancer surgical service

	Metric	Data source
1	Weekly attendance by a consultant surgeon at all LCA lung MDTs	Trust submissions /Commissioning for Quality and Innovation (CQUINS)
2	Resection volume per surgeon and centre per annum	Society for Cardiothoracic Surgery (SCTS)/Trusts
3	30-day mortality and in-hospital mortality (to include risk and staging adjustments)	National Cancer Intelligence Network (NCIN)
4	Readmission rate (per centre)	LCA providers
5	Length of stay following surgery	Trust submissions
6	Survival outcomes 1 and 5 years – needs to be stage adjusted	NCIS
7	Trial participation	Trust submissions
8	Research output	Trust submissions
9	Patient experience	National Cancer Patient Experience Survey/LCA-developed tool
10	Communications with other professionals – referring professional and primary care	TBC
11	Thoracoscore	Trust submissions
12	Peer review performance	CQUINS

11 Non-surgical Management of Early Stage Non-small Cell Lung Cancer

11.1 Stereotactic ablative radiotherapy

The LCA is served by four radiotherapy centres that treat patients with lung cancer with radiotherapy and systemic therapy. Three of these centres – Guy’s and St Thomas’ NHS Foundation Trust, The Royal Marsden NHS Foundation Trust, and Mount Vernon Cancer Centre – deliver stereotactic ablative radiotherapy (SABR). The centres have different radiation planning and treatment delivery facilities but the principles of treatment are the same across the LCA. As lung cancer is a common cancer with a large number of patients undergoing radiotherapy, treatment should be available at all sites.

Early stage NSCLC patients (T1–3N0) will normally be offered surgery as the preferred treatment option. However, a substantial proportion of these patients have significant co-morbidities, poor lung function, poor performance status and so on, making surgery hazardous and rendering the patient inoperable. These patients may, however, still be suitable for non-surgical radical treatment in the form of radical radiotherapy.

Patients in this group should be referred to a clinical oncologist for assessment. The preferred non-surgical radiotherapy option is SABR. SABR is a modification of conventional fractionated radiotherapy based on principles used in intracranial stereotactic radiosurgery (SRS). It utilises newly developed imaging and planning techniques to more precisely target treatment with highly ablative doses of radiation while minimising normal tissue toxicity.

The majority of work with SABR has been with lung tumours, both primary and oligo-metastatic disease. There is now considerable non-randomised evidence supporting SABR as superior to conventional radiotherapy with respect to local control and survival in early NSCLC.

11.2 Patient selection

Patients must be identified as suitable for SABR. This decision must be made in an MDM setting but ultimately by a clinical oncologist with experience in SABR. A clinical oncologist and thoracic surgeon should be present at the MDT when the decision for SABR is made. If no thoracic surgeon is present and a decision for SBRT is made, then the MDT should ensure patient has been deemed inoperable based on local or regional surgical guidelines.

[Appendix 11](#) gives a guide to MDTs for appropriate early identification and optimum referral for SBRT.

11.2.1 Inclusion criteria

- MDT-confirmed diagnosis of NSCLC based on findings of positive histology, positive PET scan or growth on serial CT scans.
- NSCLC, clinical stages of T1, T2 (≤ 5 cm), T3 due to chest wall invasion (≤ 5 cm), N0 M0.
- Peripheral lesions gross tumour volume (GTV) or internal target volume (ITV) outside a 2cm radius of the proximal airways. This is defined as 2cm from the bifurcation of the second order bronchus (i.e. where the right upper lobe bronchus splits). Central lesions, less than 2cm from the proximal airways, should be treated with caution and only considered for a conservative dose-fractionation schedule. Some centres are now treating these patients in the LungTECH trial. Please refer to Dr Merina Ahmed at The Royal Marsden NHS Foundation Trust or Dr Shareen Ahmad at Guy’s and St Thomas’ NHS Foundation Trust for consideration within the LungTECH trial.

- Patient not suitable for surgery because of medical co-morbidity, technical inoperability or patient declines surgery after surgical assessment.
- World Health Organization (WHO) performance status 0–2.
- Age ≥ 18 years and life expectancy >3 months.

11.2.2 Exclusion criteria

- Previous radiotherapy within the planned treatment volume.
- Sepsis, pericardial or pulmonary infections.
- Interstitial lung disease.
- Patients being considered for fiducial marker insertion: allergy to gold, unsuitable for procedure due to medical co-morbidities, coagulation that cannot be safely corrected.

11.2.3 Delays in referral pathway

Once a patient is considered suitable for lung SBRT, the referring chest physician, surgeon or clinical oncologist should fax through a referral to a clinical SBRT oncologist within 2 days of the MDT discussion. The MDT coordinator from the referral centre should liaise with the MDT coordinator at the treating centre to ensure that all required information has transferred across.

Delays in the pathway can occur by waiting for the stereotactic meeting outcome. The MDT coordinator should ensure images are available at first MDT meeting. There can be further delays if the patient is to undergo fiducial implantation.

All the delays in the pathway can result in disease progression which could require further staging, and therefore the patient may no longer fulfil the selection criteria for SBRT.

11.2.4 Pre-radiotherapy assessment

- MDT review of histology or, in absence of histology, review of PET and/or serial growth on CT.
- Full staging with CT scan of chest and abdomen and PET scan.
- Consider imaging of the brain.
- Pulmonary function tests including transfer factor.
- FBC, electrolytes and creatinine, LFTs.
- Other investigations that may be required as directed by a clinician.

11.3 Patient information and consent

Information booklets about lung cancer and radiotherapy, patient information sheets specifically about SABR, treatment planning and contact details for the relevant members of the team should be made available to patients prior to obtaining consent.

Signed informed consent should be completed following each department's guidelines.

11.4 Radiotherapy localisation imaging and contouring

11.4.1 Position and immobilisation

- Each fraction of SABR takes more time to deliver than a fraction of conventional radiotherapy. It is therefore essential that the patient is in a position that is comfortable and reproducible between treatments.
- Patients should be scanned and treated using a robust immobilisation system following each department's guidelines.
- If a patient is unable to comply with acceptable immobilisation criteria, they will be deemed unsuitable for SABR.

11.4.2 Planning scan

A tumour motion management technique should be used:

- four-dimensional (4-D) CT individualised tumour motion encompassing technique
- free-breathing CT with abdominal compression for motion reduction
- breath-hold CT using an active breathing control (ABC) device for gating treatment to breath-hold deep inspiration
- free-breathing CT with CyberKnife tumour tracking.

The extent of the scan must be sufficient to include all potential organs at risk. As a guide, contiguous axial slices of $\leq 3\text{mm}$ will be obtained from the upper cervical spine to the lower edge of the liver, taking care to include all lung parenchyma on the planning scan.

11.4.3 Delineation of target volumes

- All tumour contours must be reviewed robustly according to local protocol.
- **Gross tumour volume (GTV)** is defined as the radiologically visible tumour in the lung, contoured using lung windows. Mediastinal windows may be suitable for defining tumours adjacent to the chest wall. Where available, information from other imaging modalities should be used to aid delineation of the GTV.
- **Clinical target volume (CTV)** is defined as the GTV with no margin for microscopic disease extension.
- **Internal target volume (ITV)** is the tumour volume obtained using a 4-D CT scan. This is defined as tumour contoured, using information from all phases of a 4-D CT scan. If using breath-hold technique with ABC, no ITV is required.
- **Planning target volume (PTV)** – the margins from GTV/ITV to PTV should be determined according to local protocols, depending on an individual centre's set-up accuracy, as margin parameters may vary according to the planning systems and treatment machines available at different hospitals across the LCA.

11.4.4 Delineation of organs at risk (OAR)

- All OAR contours must be reviewed robustly according to local protocol. The OAR must be inspected to ensure that wherever a treatment beam traverses the OAR, it has been contoured.
- **Spinal cord:** The spinal canal must be contoured on all slices and grown by 3mm to create a planning organ at risk volume (PRV).

- **Oesophagus:** The oesophagus must be contoured using mediastinal windows on CT to correspond to the mucosa, submucosa and all muscular layers out to the fatty adventitia.
- **Heart:** The heart must be contoured along with the pericardial sac. The superior aspect (or base) for purposes of contouring is defined as the inferior aspect of the pulmonary artery (as seen in a coronal reconstruction of the CT scan) and extends inferiorly to the apex of the heart.
- **Trachea and proximal bronchial tree:** The trachea and bronchial tree must be contoured as two separate structures using lung windows. For this purpose, the trachea will be divided into two sections: the proximal trachea and the distal 2cm of trachea. The proximal trachea must be contoured as one structure, and the distal 2cm of trachea will be included in the structure identified as the proximal bronchial tree. Differentiating these structures in this fashion will facilitate identifying if the eligibility requirements listed in [section 11.2](#) have been met.
 - **Proximal trachea:** Contours must begin 10cm superior to superior extent of PTV or 5cm superior to the carina (whichever is the more superior) and continue inferiorly to the superior aspect of the proximal bronchial tree.
 - **Proximal bronchial tree:** This includes the most inferior distal 2cm of trachea and the proximal airways on both sides. The following airways will be included: distal 2cm trachea, carina, right and left main stem bronchi, right and left upper lobe bronchi, the bronchus intermedius, right middle lobe bronchus, lingular bronchus, and the right and left lower lobe bronchi. Contouring of the lobar bronchi must end immediately at the site of a segmental bifurcation.
 - **Proximal airways plus 2cm:** As part of adhering to the eligibility requirements for enrolling patients with tumours in the zone of the proximal bronchial tree listed above, it is convenient to define an artificial structure 2cm larger in all directions from the proximal bronchial tree. If the ITV falls within this artificial structure, caution must be taken and the patient's suitability for standard SABR dose schedules reconsidered.
- **Whole lung:** Left and right lungs should be contoured together as a single structure using a pulmonary window level. All inflated and collapsed lung must be included. However, the GTV/ITV and trachea/proximal bronchus as defined above must not be included. The lungs minus GTV/ITV must be kept within normal tissue dose constraints listed below.
- **Brachial plexus:** The defined ipsilateral brachial plexus originates from the spinal nerves exiting the neuroforamina on the involved side from around C5 to T2. However, for the purposes of this protocol, only the major trunks of the brachial plexus must be contoured using the subclavian and axillary vessels as a surrogate for identifying the location of the brachial plexus. This neurovascular complex will be contoured starting proximally at the bifurcation of the brachiocephalic trunk into the jugular/subclavian veins (or carotid/subclavian arteries), and following along the route of the subclavian vein to the axillary vein, ending after the neurovascular structures cross the 2nd rib.
- **Skin and chest wall:** The body contour should be outlined wherever the beams traverse it. The skin contour must be inspected to ensure that beams do not overlap, producing excessive skin dose, especially where there is a skin fold. Skin should be separately contoured to a depth of 5mm. The ipsilateral chest wall (defined as a rind of 3cm depth) should be assessed to minimise the amount receiving 30Gy without compromising on PTV coverage.

11.5 Selection of optimal plan

11.5.1 Generation of treatment plan

- To achieve adequate target coverage using SABR while sparing critical OARs, including the skin surface, at least seven beams are typically required or a volumetric modulated arc therapy (VMAT) planned delivery. The beam configuration may be coplanar or non-coplanar, depending on the size and location of the lesion.
- Lower energy beams such as 6MV should be used, due to the wide penumbra of higher energy beams, the small beam apertures used in SABR and the problems associated with secondary build-up.
- Plan optimisation is to use homogeneity correction for lung and ideally a type B algorithm.
- Analysis of the dose-volume histogram (DVH) for the PTV and OAR forms the basis for selecting a particular treatment plan. It is therefore recommended that plans be calculated on a fine dose grid, with a separation no greater than 2.5mm, to ensure the accuracy of the DVH calculations.
- Patients can be treated on a conventional linear accelerator with online image guided radiotherapy (IGRT) capacity or on a CyberKnife machine.

11.5.2 Normal tissue dose constraints

Table 11.1 lists the SABR consortium guidelines for dose constraints based on the European ROSEL study of SABR (Hurkmans et al. 2009). These dose limits are based on the highest dose/fractionation regimes reported in lung SABR and therefore should be safe for the lower biologically effective dose regimes used in lung SABR.

11.5.3 Dose distribution and conformity requirements

Successful treatment planning will require accomplishment of the following criteria:

The dose should be prescribed so as to ensure that the isodose covering the PTV is of the intended value given below; this should be 60–90% of the maximum dose at the normalisation point (typically and ideally 80%).

Adequate dose and conformity to the PTV will be realised by satisfying the constraints given below in Table 11.2 and Table 11.3.

Table 11.1a: Normal tissue dose constraints

OAR	Volume (cm ³)	3#		5#		8–10#	
		Tolerance	Minor deviation	Tolerance	Minor deviation	Tolerance	Minor deviation
Spinal cord*	0.01	18Gy	18–22Gy	25Gy	25–28Gy	25Gy	25–28Gy
Oesophagus*	1.0	24Gy	24–27Gy	27Gy	27–28.5Gy	27Gy	27–28.5Gy
Brachial plexus*	1.0	24Gy	24–26Gy	27Gy	27–29Gy	27Gy	27–29Gy
Heart*	1.0	24Gy	24–26Gy	27Gy	27–29Gy	50Gy	50–60Gy
Trachea, bronchus*	1.0	30Gy	30–32Gy	32Gy	32–35Gy	32Gy	32–35Gy
Lungs – GTV		V20 < 10% V12.5 < 15%	N/A	V20 < 10% V12.5 < 15%	N/A	V20 < 10% V12.5 < 15%	N/A
Liver (constraints only valid if >1000cc of liver imaged)		700cc < 15Gy D33 < 21% D50 < 15Gy	N/A	700cc < 15Gy D60 < 30Gy Mean < 20Gy	N/A	D30 < 27Gy D50 < 24Gy	N/A
Chest wall	30.0 0.01	30Gy 37Gy	N/A	32Gy 39Gy	N/A	32-35Gy 39Gy	N/A

Table 11.1b: Normal tissue dose constraints with volumetric tolerances

OAR N.B.: α D max = 0.035 cc		Tolerance (Gy)	
		3 #	5 #
Lungs – GTV	1,000 cc	11.4	13.5
	1,500 cc	10.5	12.5
Spinal cord PRV	D max ^{α}	18	30
Brachial plexus	D max ^{α}	24	30.5
	3 cc	20.4	27
Proximal airways	D max ^{α}	30	40
	4 cc	15	16.5
Oesophagus	D max ^{α}	25.2	35
	5 cc	17.7	19.5
Heart	D max ^{α}	30	38
	15 cc	24	32
Chest wall	30 cc	30	30
	3 cc	60	
Skin	D max ^{α}	24	32
	10 cc	22.5	30

Table 11.2: PTV planning optimisation constraints

PTV criteria	54Gy in 3 fractions	55Gy in 5 fractions	60Gy in 8 fractions
D95	100% of nominal coverage dose		
D99	90% of nominal coverage dose		
Dmax tolerance	110–140% of nominal coverage dose		
Dmax minor dev	105–110% or 140–145% of nominal coverage dose		

Table 11.3: Dose conformity requirements

3 fractions	Vol (100%)/Vol (PTV)		Vol (50%)/Vol (PTV)		Max dose >2cm	
	Vol PTV (cc)	Tolerance	Minor dev	Tolerance	Minor dev	Tolerance
<20	<1.25	1.25–1.40	<12	12–14	<35.1Gy	35.1–40.5Gy
20–40	<1.15	1.15–1.25	<9	9–11	<37.8Gy	37.8–43.2Gy
>40	<1.10	1.10–1.20	<6	6–8	<37.8Gy	37.8–43.2Gy
60–90	<1.10	1.10–1.20	<5	5–7	<37.8Gy	37.8–43.2Gy
>90	<1.10	1.10–1.20	<4.5	4.5–6.5	<37.8Gy	37.8–43.2Gy

5–10 fractions	Vol (100%)/Vol (PTV)		Vol (50%)/Vol (PTV)		Max dose >2cm	
	Vol (PTV) (cc)	Tolerance	Minor dev	Tolerance	Minor dev	Tolerance
<20	<1.25	1.25–1.40	<12	12–14	<35.8Gy	35.8–41.3Gy
20–40	<1.15	1.15–1.25	<9	9–11	<38.5Gy	38.5–44.0Gy
>40	<1.10	1.10–1.20	<6	6–8	<38.5Gy	38.5–44.0Gy
60–90	<1.10	1.10–1.20	<5	5–7	<38.5Gy	38.5–44.0Gy
>90	<1.10	1.10–1.20	<4.5	4.5–6.5	<38.5Gy	38.5–44.0Gy

Vol (100%)/Vol (PTV): ratio of prescription isodose (e.g. 54Gy, 55Gy or 60Gy) volume to the PTV.

Vol (50%)/Vol (PTV): ratio of 50% prescription isodose (27Gy, 27.5Gy or 30Gy) volume to the PTV.

Max dose >2cm: maximum dose (% of nominal prescription dose) at least 2cm from the PTV in any direction.

11.6 Dose schedules

- The dose-fractionation must be decided according to its appropriateness to the individual patient and this must be checked when the patient is seen by the clinical oncologist during their first clinic consultation.
- Fractionation schedules are dependent on target volume, proximity to central structures and chest wall and dose constraints on OARs. The fractionation schedules that clinicians will choose from for early stage NSCLC are:
 - 18Gy x 3 # (standard dose-fractionation)
 - 11Gy x 5 # (conservative dose-fractionation)
 - 7.5Gy x 8 # (very conservative dose-fractionation).

- The conservative dose-fractionation is recommended when any part of the PTV is in contact with the chest wall. It is recommended that the inter-fraction interval be at least 40 hours, with a maximum interval of 4 days between treatment fractions.
- **All clinical plans should be signed by a consultant prior to the start of treatment.**

11.7 Treatment verification and delivery

- Prior to treatment delivery, the patient should be considered for a plan check appointment.
- Patients treated on a linear accelerator will have cone-beam CT scans performed before each treatment with an online tumour match to the planning CT and remote couch correction performed by an experienced clinician or radiographer. Further cone-beam CTs are considered after couch correction, during and after treatment, on an individual patient basis to ensure adequate verification of treatment delivery. 4-D cone beam CT assessment should be used where available.
- Patients treated on CyberKnife will have regular external monitoring and internal monitoring of tumour position (X-sight lung) or fiducial marker position with continuous updating of the beam position.

11.8 Patient management during and following treatment

11.8.1 On-treatment review

The assessments during treatment are given in Table 11.4. Patients should be reviewed according to clinical need. The Common Terminology Criteria for Adverse Events (CTCAE) v4.0 (Common Toxicity Criteria) should be used for assessing toxicity during and after radiotherapy. For management of treatment-related toxicity, please refer to the [LCA Acute Oncology Clinical Guidelines September 2013 \(updated March 2016\)](#).

11.8.2 Follow-up after treatment

- The first follow-up should be at 4 weeks post-radiotherapy for an acute toxicity assessment or sooner if clinically indicated.
- Subsequent follow-up visits will be of the order of 3-monthly for the first year, and 6-monthly for subsequent years because of greater risk of recurrence after radical radiotherapy than resection. The patient can contact the CNS/key worker if they have any concerns between follow-up appointments, or they can become part of a protocol nurse-led clinic.
- The first post-treatment CT scan should be done at 3 months and then repeated at least every 3–12 months. Due attention must be paid to the difficulty that can arise in differentiating local recurrence from tumour progression in certain scenarios.
- Lung function tests should be performed, guided by patient's symptoms and radiological investigations.
- Radiological response should be documented using Response Evaluation Criteria in Solid Tumours (RECIST). If possible, patients should be followed for a minimum of 5 years.
- Longer-term follow-up should be at the discretion of the clinical team and patient.

Table 11.4: Assessments at baseline and during radiotherapy

Procedure	Baseline	During radiotherapy
Medical history	X	
Physical examination	X	
Weight	X	X
WHO performance status score	X	X
FBC	X	
Biochemistry	X	
Full lung function tests	X	
CT scan thorax and abdomen	X	
Chest X-ray	optional	
CT/MRI head	If clinically indicated	
PET/CT	X	
Informed consent	X	
Adverse event monitoring CTCAE v4.0	X	X

11.9 Oligometastatic lung disease

Oligometastatic disease – lung metastases treatment with SBRT within the commissioning through evaluation (CTE) process.

- SBRT proposed treatment discussed and agreed at site specific MDT.
- Histologically or radiologically confirmed lung metastases. Histological confirmation of malignancy from either initial primary or metastases is mandatory. Consider PET-CT where appropriate to confirm staging.
- Not suitable for surgery due to medical co-morbidities, inadequate lung function or disease status.
- Tumour dimension 5cm or less in maximal size.
- Treatment of multiple lesions up to a maximum of 3 can be considered if dosimetrically achievable whilst respecting normal tissue (lung) tolerance doses using a sum plan.
- Centrally located lesions lying within a 2cm radius of main airways and proximal bronchial tree are eligible for treatment with an 8# regimen (60Gy/8#). NB This dose and fractionation should also be used for mediastinal lymph nodes lying in this region.
- No chemotherapy within 4 weeks prior to SABR.
- Disease free interval from primary disease to development of metastases >6 months.
- Patient willing to attend follow up and have details collected on prospective database.

11.9.1 Exclusion criteria

- Previous RT within the planned treatment volume (e.g. breast RT).
- Tumour that is not clinically definable on the planning CT e.g. surrounded by consolidation or atelectasis, unless visible on fused PET.
- Interstitial lung disease (unless the risk of SABR has been fully considered and the patient has been appropriately consented).

11.10 Percutaneous thermal tumour ablation (PTTA)

For primary lung cancer, PTTA may be considered as monotherapy for localised disease or as part of combined curative or palliative therapy (including in higher stage disease). For lung metastases, PTTA is a useful option for local disease control. As expertise within the LCA is limited at the present time, referrals should be discussed only with specialist centres with the appropriate expertise.

12 Management of Locally Advanced Non-small Cell Lung Cancer

12.1 Radical concomitant chemo-radiotherapy/sequential chemo-radiotherapy/radiotherapy alone

For good performance status patients with locally advanced disease, there is increasing evidence that local disease control improves with increasing treatment intensity. A meta-analysis (Aupérin et al. 2010) revealed an absolute overall survival benefit of 4.5% at 5 years for concomitant versus sequential chemotherapy at the expense of increased acute oesophageal toxicity. Additionally, a recent meta-analysis confirmed modified intensification fractionation schedules (accelerated radiotherapy using hyper/hypo fractionation) was associated with an absolute overall survival benefit of 2.5% at 5 years, again at the expense of increased acute oesophageal toxicity.

The choice between concomitant chemo-radiotherapy, sequential chemo-radiotherapy and radical radiotherapy alone should be discussed at the MDM and be based on the extent of disease, performance status of the patient, and additional co-morbidities. On an individual patient basis, risks and benefits should be discussed in detail with an oncologist.

The treatment of the superior sulcus tumours (Pancoast tumours) may differ from that of other locally advanced NSCLC. Their position and close proximity to vital structures (such as nerves and spine) may make a radical approach difficult with either surgery or chemo-radiotherapy alone. As a result, depending on the disease extent and fitness of the patient, treatment may involve chemotherapy and radiotherapy given prior to surgery. Management of these patients should be carefully considered by the MDT and scheduling of treatment should be planned ahead to avoid delays in the treatment pathway.

12.2 Patient selection

- MDT-confirmed diagnosis of NSCLC based on findings of positive histology, positive PET scan or growth on serial CT scans.
- T1–3, N1–3 or T4 N0–3 M0 disease, which can be encompassed within a radical radiotherapy plan.
- Post-operative radiotherapy should be considered in patients with a positive resection margin.
- WHO performance status 0–1 and a subset of patients with performance status 2 whose general condition is explained by disease rather than a result of co-morbidities can be considered at the discretion of a clinical oncology consultant.
- Satisfactory respiratory function assessed on full lung function tests including lung volumes and transfer factor.

12.3 Chemotherapy schedule

- Vinorelbine/cisplatin for 3–4 cycles (see [Appendix 2](#)).
- Carboplatin can be substituted for cisplatin for patients in whom cisplatin is contra-indicated (see [Appendix 2](#)).

Toxicity with each cycle should be assessed according to WHO grade and recorded in line with local guidelines. Patient response should be assessed, usually with a repeat CT, after 2 or 3 cycles. In the presence of objective response, or symptom improvement with stable disease, a further cycle should be given.

12.4 Radical radiotherapy

12.4.1 Pre-radiotherapy assessment

- MDT review of histology or, in absence of histology, review of PET and/or serial growth on CT.
- Full staging with CT scan of chest and abdomen and PET scan.
- Consider imaging of the brain.
- Pulmonary function tests including transfer factor.
- FBC, electrolytes and creatinine, LFTs.
- Other investigations that may be required as directed by a clinician.

12.4.2 Patient information and consent

Information booklets about lung cancer and radiotherapy, patient information sheets about treatment planning and contact details for the relevant members of the team should be made available to patients prior to obtaining consent.

Signed informed consent should be completed following each department's guidelines.

12.4.3 Technique

Patient set-up and immobilisation, localisation imaging, target definition, normal tissue constraints, treatment delivery and verification should follow local guidelines.

12.4.4 Dose schedules

- CHART 54Gy in 36 # over 12 days
- 55Gy in 20 # over 4 weeks
- 64–66Gy in 32–33 # over 6.5 weeks
- Post-operatively 60Gy in 30 # over 6 weeks
- Lower total doses as part of tri-modality approach for superior sulcus tumours close to sensitive normal tissue structures, such as spinal cord, can be considered and discussed by the MDT.

12.5 Patient management during and following treatment

- Patients should be seen regularly throughout treatment and then initially 4–6, weeks after completing radical treatment or sooner if symptomatic. Subsequent follow-up is 3, 6, 9 and 12 months after treatment completion then at 6-monthly intervals up to 5 years with documentation of acute and late toxicity at each visit. Follow-up may be shared between the clinical oncology, medical oncology and medical team as deemed suitable for each patient.
- A CT scan of the chest is considered at 3, 6 and 12 months after completion of radical radiotherapy with a chest X-ray at other times. Repeat spirometry should be considered if there is concern about respiratory decline post-radiotherapy.

13 Management of Metastatic Non-small Cell Lung Cancer

13.1 First-line chemotherapy

Most patients have advanced stage disease at the time of diagnosis. Even patients without any cancer-related symptoms at diagnosis will manifest symptoms as their disease progresses. The overall goals of systemic treatment are to improve symptoms, preserve or improve quality of life and prolong survival. This is an area in which there is a lot of research and guidelines do not always reflect updated practice. NICE is in the process of updating its recommendations.

All patients should have timely access to current molecular diagnostic tests, enabling them to access any treatment recommended by the results within the timeframe of the Cancer Waiting Times initiative. The network will deliver systemic therapies in accordance with NICE clinical guidelines and therapies available via the Cancer Drugs Fund.

13.1.1 Key points from recent studies

- First-line therapy with an EGFR-TKI improved the response rate, progression-free survival, and quality of life in patients with advanced NSCLC which harboured a sensitising EGFR mutation (15% of non-squamous lung cancer) (NICE 2010/TA192; NICE 2012/TA258).
- In patients with non-squamous histology, a cisplatin/pemetrexed regimen was associated with a median overall survival rate superior to that of cisplatin/gemcitabine (12.6 months vs 10.9 months). In addition, this regimen was also associated with a favourable tolerability profile. These results led to NICE approval of the cisplatin/pemetrexed regimen for patients with adenocarcinoma or large-cell carcinoma (NICE 2009/TA181).
- The use of switch maintenance pemetrexed in patients who have not received this agent in the first line and who are not progressing is associated with a prolonged progression-free survival and overall survival (NICE 2010/TA190).
- The use of continuous maintenance pemetrexed has demonstrated improvements in progression-free survival and overall survival (under NICE review).
- Patients with an EML4-ALK or ROS1 mutation (4–7% of all NSCLC) benefit from the use of crizotinib (under NICE review).

13.1.2 Patient assessment

- Performance status and co-morbidities.
- Histological sub-type.
- Presence of a sensitising mutation in genes with approved therapeutic agents.

13.1.3 Choice of systemic agent

- A few mutations in the EGFR gene are TKI resistant. Those patients should receive chemotherapy as first systemic therapy. Guidance on the sensitivity of the mutation to EGFR-TKI is given in the EGFR molecular analysis report. Patients with wild-type EGFR should receive chemotherapy as first systemic option.
- Platinum-doublet combination chemotherapy should be offered to all patients with stage 4 and performance status 0 or 1, especially those with systemic symptoms.

- Non-squamous histology: third generation drug (pemetrexed, gemcitabine, vinorelbine, paclitaxel or docetaxel) in combination with platinum agent (cisplatin or carboplatin when cisplatin is contraindicated), as per NICE guidelines.
- Squamous histology: third generation drug (gemcitabine, vinorelbine, paclitaxel or docetaxel) in combination with platinum agent (cisplatin or carboplatin when cisplatin is contraindicated).
- Selected patients with performance status 2 may tolerate doublet chemotherapy or may benefit from single agent chemotherapy, and adequate home support and follow-up should be provided. Single agent vinorelbine and gemcitabine both have activity and are well tolerated by patients.
- Duration of treatment with targeted inhibitors is an area of current research. Some patients have ongoing clinical benefit from these agents in the face of asymptomatic progression of a solitary lesion or treated brain metastases.

13.2 Second- and third-line chemotherapy

The benefit of second-line therapies has had a major positive impact on the prognosis of NSCLC.

If performance status allows, recurrent disease following first-line combination chemotherapy should be considered for second-line treatment. Second-line chemotherapy is associated with a survival benefit compared with best supportive care; therefore, it should be offered at the first detection of disease progression, rather than delayed until the development of symptoms.

Options for second-line treatment include pemetrexed (if not given in the first-line setting), docetaxel and erlotinib. Erlotinib has been approved by NICE as second-line treatment as an alternative to docetaxel (NICE 2012/TA162). The decision to use erlotinib or docetaxel should be made after a discussion between the responsible clinician and the individual about the potential benefits and adverse effects of each treatment.

Nintedanib may become approved by NICE in selected patient groups for second-line chemotherapy with docetaxel.

Those patients who have EGFR mutations or belong to the favourable response group – female, adenocarcinoma histology, never smokers and East Asian ethnicity – should be treated with erlotinib. Similarly, chemo-refractory patients tend to do better with erlotinib. Docetaxel would be the preferred option in smokers with squamous histology although some may gain cytostatic benefit from erlotinib. In other patients, current data should be considered in making the decision.

Certain agents are available for third-line treatment. In the absence of contraindications those patients progressing after erlotinib/docetaxel and maintaining a good performance status can be considered for third-line treatment. As before, our favoured option would be a clinical trial.

13.3 Palliative radiotherapy

13.3.1 Symptomatic chest disease

- Patients with symptoms such as haemoptysis, cough, pain, dysphagia and breathlessness should receive palliative thoracic radiotherapy when appropriate according to their performance status.
- NB: Consideration should be given to the spinal cord dose with isodose intervention and cord shielding as appropriate.
- Performance status 0–1: 39Gy in 13 # / 36Gy in 12 # over 2.5 weeks.
- Performance status 2–3: 17Gy in 2 # 7 days apart.

- Performance status 3–4, or any metastatic disease: 10Gy single #

13.3.2 Superior vena cava obstruction/central airway obstruction with stridor

Please refer to Superior Vena Cava Obstruction, Chapter 19 in the [LCA Acute Oncology Clinical Guidelines September 2013 \(updated March 2016\)](#).

- Consider referral for superior vena cava (SVC) stent/airway stent/laser therapy.
- Consider 20Gy in 5 # over 1 week.
- Consider dexamethasone and proton pump inhibitor (PPI) cover until completion of radiotherapy. It is then imperative to reduce the dose with a view to discontinuation as quickly as symptoms allow.

13.3.3 Painful bone metastases

- Consider referral for prophylactic pinning of weight-bearing bones.
- Consider 8Gy in single #
- Consider 20Gy in 5 # over 1 week if there is a significant soft tissue component or associated nerve root symptoms.

13.3.4 Brain metastases

Please refer to the [LCA Acute Oncology Clinical Guidelines September 2013 \(updated March 2016\)](#).

- Performance status 0–1: 20Gy in 5 #
- Performance status 2–3: 12Gy in 2 #
- Consider dexamethasone and PPI cover until completion of radiotherapy. It is then imperative to reduce the dose with a view to discontinuation as quickly as symptoms allow.

NB: 1–3 brain metastases confirmed on MRI scan in patients with disease controlled at other sites should be considered for a neurosurgical opinion. Surgical resection followed by whole brain radiotherapy may be an option or whole brain radiotherapy followed by stereotactic boost.

13.3.5 Spinal cord compression

Please refer to the [LCA Acute Oncology Clinical Guidelines September 2013 \(updated March 2016\)](#).

- Consider referral for neurosurgery.
- Consider 20Gy in 5 # over 1 week.
- Consider dexamethasone and PPI cover until completion of radiotherapy. It is then imperative to reduce the dose with a view to discontinuation as quickly as symptoms allow.

13.4 Follow-up of patients after treatment with palliative intent

Follow-up should be individualised to anticipate treatment-related toxicity and potential changes in symptoms or quality of life. Referrals to community palliative care teams should be made early.

14 Management of Small Cell Lung Cancer

14.1 Introduction

The objective response rate to platinum-etoposide combination chemotherapy in small cell lung cancer (SCLC) is around 65%, with nearly all patients attaining some radiological tumour regression, and this should be offered to most patients with limited and advanced disease. Recommended first-line treatment is 4–6 cycles of cisplatin/carboplatin and etoposide. Unlike NSCLC, poor performance status is not a contraindication to chemotherapy in this context, and dose-attenuated chemotherapy should be considered. Possible regimes include dose-attenuated carboplatin-etoposide, single agent carboplatin, and oral etoposide monotherapy. Details of chemotherapy schedules are given in [Appendix 3](#). For selected patients with concerns about alopecia, platinum-gemcitabine doublets can be used (Lee et al. 2009/PMID: 18786981). For patients with relapsed SCLC, systemic therapy options include platinum-doublet re-challenge (Vincent et al. 1988/PMID: 2830043), CAV, ACE or topotecan. Growth factors and antibiotics can be given in secondary prophylaxis or in high-risk patients in primary prophylaxis.

14.2 Limited stage disease (T1–4, N0–3, M0)

14.2.1 Surgery

Surgery can be considered in patients with histologically proven T1–3, N0 SCLC (the merits of each case should be discussed at the MDM), as per BTS guidelines 2010 (Lim and Woodhead/BTS 2011/PMID: 21502103). Patients with peripheral small cell lung tumours that are not bronchoscopically visible and who have no evidence of lymph node involvement represent the most suitable group for resection. Staging investigations should include mediastinoscopy or EBUS to ensure that mediastinal nodes are not involved. Post-operative chemotherapy and prophylactic cranial irradiation (PCI) should be given. Thoracic radiotherapy should be considered to mediastinum if lymph nodes are involved, or if the patient has not had systematic nodal dissection.

14.2.2 Chemo-radiotherapy

- In general, patients with limited stage SCLC should be treated with a combination of chemotherapy and radiotherapy. The standard chemotherapy regimen is cisplatin and etoposide for 4–6 cycles (see [Appendix 2](#)). Carboplatin can be substituted for cisplatin in patients for whom cisplatin is contraindicated (e.g. performance status 2, renal impairment).
- Clinical trials have reported better survival in patients randomised to concurrent chemo-radiotherapy compared with sequential chemo-radiotherapy. Based on data obtained by meta-analysis, radiotherapy should be given up to and including the third cycle of chemotherapy but it is currently unclear if thoracic radiotherapy should commence with the first, second or third cycle, with one large randomised phase III trial demonstrating no difference in survival between radiotherapy commenced with the third cycle and radiotherapy commenced with the first.
- Options for radical thoracic radiotherapy in the concurrent setting include a twice daily schedule of 45Gy in 30 # over 3 weeks and once daily schedules (e.g. 50Gy in 25 # over 5 weeks). Higher doses of radiation (≥ 66 Gy) delivered once daily concurrently with chemotherapy are currently under evaluation. Limited data supports the use of conformal radiotherapy without elective nodal irradiation to decrease acute toxicity.

- Patients who are not suitable for concurrent chemo-radiotherapy, as outlined above, but who are eligible for platinum-based chemotherapy should be treated with sequential chemo-radiotherapy. Such patients should receive 4–6 cycles of platinum-etoposide chemotherapy, and be assessed for response evaluation every 2–3 cycles, after which they should have radical thoracic radiotherapy. A standard schedule is 40Gy in 15 # over 3 weeks.
- Patients with any response to chemotherapy or stable disease should be given PCI (e.g. 25Gy in 10 # over 2 weeks).

14.3 Extensive stage disease (T0–4, N0–3, M1; or M0 medically unsuitable for radical therapy)

14.3.1 First-line chemotherapy

Recommended first-line treatment is 4–6 cycles of carboplatin or cisplatin combined with etoposide (see Appendices 2 and 3). Radiological response evaluation to chemotherapy should occur every 2–3 cycles of chemotherapy.

14.3.2 Radiotherapy

- Patients who have experienced a complete response at extrathoracic sites can be considered for consolidation thoracic radiotherapy 40Gy in 15 # over 3 weeks (REST data).
- Palliative thoracic radiotherapy should be offered to patients with extensive disease and symptoms from intrathoracic disease that fails to respond to chemotherapy. The schedule is dependent on the patient's performance status:
 - 30Gy in 10 # over 2 weeks for WHO performance status 0–1
 - 20Gy in 5 # over 1 week or 17Gy in 2 # a week apart for WHO performance status 2–3
 - 10Gy single fraction for WHO performance status 3–4.
- PCI is recommended for patients who do not progress on chemotherapy (20Gy in 5 # over 1 week). Patients presenting with brain metastases should be offered palliative whole brain radiotherapy (20Gy in 5 # over 1 week).
- High-dose palliative consolidation thoracic radiotherapy:
 - Consolidation thoracic radiotherapy improves survival in patients with stage IV disease who achieve a complete response to chemotherapy at distant disease sites and at least partial response in the thorax (Jeremic et al. 1999).
 - There is also a survival advantage with consolidation thoracic radiotherapy for patients with stage IV SCLC who on completion of chemotherapy achieve at least a partial response (REST trial). These patients, if they have thoracic disease encompassable in a high dose palliative radiotherapy field and no pleural disease and no brain metastases, should be considered for high dose palliative consolidation thoracic radiotherapy 30 Gy 10 fractions (in addition to PCI – see Jeremic et al. 1999; Slotman et al.).

14.3.3 Second-line chemotherapy

On completion of first-line treatment, patients should be reviewed regularly and consideration given to second-line chemotherapy on relapse. Patients' performance status can deteriorate rapidly at time of relapse and consideration should be given to treatment of asymptomatic or minimally symptomatic

relapse. Approved regimes for relapse include: re-challenge with first-line therapy (if the patient relapses 90 days or more from last dose of chemotherapy), platinum-gemcitabine for patients with concerns about alopecia, CAV, ACE and oral topotecan ([Appendix 2](#)).

Bone-modifying agents (denosumab/zolendronic acid) should be offered to patients as per NICE guidelines/licence. Consideration of palliative radiotherapy to sites of bony metastases should be given as per NSCLC.

SCLC patients with performance status 3 should be considered for palliative chemotherapy. Such patients will likely require attenuated dose chemotherapy (e.g. carboplatin AUC5 monotherapy, carboplatin-etoposide day 1 only, or etoposide monotherapy), and this should be discussed with the consultant oncologist.

15 Skin Management for Patients on Targeted Therapies

Mild to moderate skin changes are to be anticipated in nearly all patients treated with EGFR inhibitors. Skin toxicity is a considerable issue for these patients as it can cause psychological as well as physical discomfort, impacting on quality of life, and can result in poor compliance, treatment interruptions and dose reductions. In order to minimise the occurrence, duration and deterioration of these side effects patients should be counselled on the possibility of skin toxicity developing, as well as advised on how it is managed. Outlined below are the key recommendations for prophylaxis as well as the treatment of acneiform rash, the most frequently occurring EGFR-inhibitor-induced skin toxicity. (See EMSO 2009; Putthoff et al. 2011; Tan and Chan 2009; Thatcher et al. 2009.)

15.1 Prophylaxis

All patients who are initiated EGFR-TKIs should be counselled on the following.

Table 15.1: Prophylactic skincare management

Personal hygiene	Use lukewarm water to bathe/shower and gentle soaps/shampoos or soap substitutes for washing Use clean smooth towels and avoid excess rubbing when drying (pat the skin to dry) Take care when shaving Cut nails straight and avoid removing cuticles
Sun protection	Do not sunbathe or use sunbeds/tanning booths Wear protective clothing, hats and sunglasses and use a broad spectrum sunscreen (UVA/UVB protection) with SPF 30 or higher; apply to exposed skin areas before going outdoors to minimise exposure to sunlight
Moisturising the skin daily	Use an emollient cream e.g. Diprobase®. Apply liberally especially on hands, feet and limbs
Prevention of paronychia	Keep hands dry and out of water as much as possible Avoid picking at or manipulating the nail Topical application of petroleum may be used around the nails due to its lubricant and smoothing effect on the skin

15.2 Treatment

Patients should be advised to report immediately any adverse side effect relating to the skin so that it can be managed appropriately.

Early intervention is important. After treatment is initiated it should be assessed after 2 weeks. If there is no improvement or the reaction worsens in that time, then proceed to the next step of treatment.

Dose interruptions or discontinuation of EGFR inhibitors may be necessary if any Grade 4 skin toxicity occurs or symptoms continue to worsen despite optimal management. These patients should be referred to a dermatologist.

15.2.1 Acneiform rash

Use of topical steroids is not unanimously supported, with some reviews stating that the advantages do not outweigh the risks. However, consensus groups in the UK and Germany have recommended them based on the reports and evidence supporting their benefits. They are for short-term use only and should be used sparingly on the skin.

Table 15.2: Treatment of acneiform rash

Grade/severity	Treatment	EGFR inhibitor
Grade 1 (mild) Usually localised and minimally symptomatic No ulceration, weeping or infection	Clindamycin 1% lotion.* Apply thinly twice daily	Continue at the same dose and monitor for change in severity
Grade 2 (moderate) Localised or generalised with mild symptoms (e.g. pruritus) No ulceration, weeping or infection	Clindamycin 1% lotion.* Apply thinly twice daily + Hydrocortisone 1% cream. Apply BD + Lymecycline 408mg OD	
Grade 3 (severe) Usually generalised with severe symptoms Ulceration, weeping or infection present Significant impact on activities of daily living	Clindamycin 1% lotion.* Apply thinly twice daily + Hydrocortisone 2.5% cream. Apply BD + Lymecycline 408mg BD (double dose)** +/- Consider systemic steroids prednisolone 25mg OM for 7/7 then reduce by 5mg/day for 5/7 If superinfection with <i>Staphylococcus aureus</i> is suspected, take swabs for sensitivities Empiric treatment <ul style="list-style-type: none"> • Flucloxacillin 500mg QDS for 5/7 • <i>Penicillin allergic</i>: cefalexin 500mg TDS for 5/7 	Withhold treatment of EGFR inhibitor until ≤Grade 2 Restart treatment at a reduced dose (see relevant Summary of Product Characteristics)

* Lotion is preferred because of its moisturising properties. For isolated scattered lesions, cream may be used instead.

** Minocycline has high penetration in the pilosebaceous unit. If there is no improvement after 2 weeks, consider switching lymecycline to minocycline MR 100mg OD.

16 Specialist Palliative and End of Life Care

16.1 Definitions

It is important at the outset to distinguish between palliative treatments (i.e. non-curative but possibly life-prolonging) and specialist palliative care and, indeed, end of life care.

Palliative treatments for lung cancer patients include external beam radiotherapy and chemotherapy for the relief of breathlessness, cough, haemoptysis or chest pain, and patients should be discussed with/referred to oncologists for consideration of treatment. Symptom management is as important for patients for whom cure is possible as it is for those who will have continuing disease. **In each case, consider if potentially reversible causes exist** and, if so, whether such intervention is appropriate.

Guidance on these treatments is given in [Chapter 17](#), Palliative Treatments.

Specialist palliative care (SPC) is defined as “the active, total care of patients with progressive, advanced disease and [of] their families. Care is provided by a multi-professional team who have undergone recognised specialist palliative care training” (Leadership Alliance for the Care of dying People 2014). Patients requiring SPC intervention are those who may not only be approaching the end of their life, but who also present with complex physical, psychological, social, emotional or spiritual symptoms.

End of life care is a term that can be used interchangeably (though somewhat confusingly) with (generalist) palliative care.

In the national *End of Life Care Strategy* (DH 2008), the term ‘end of life care’ was defined as the last year of life. However, for some people, including health and care staff, the term ‘end of life’ is understood to mean the last few days of life, in other words, when death appears to be imminent.

The national Leadership Alliance for the Care of Dying People agrees that this terminology is confusing. The Social Care Institute for Excellence, the National Council for Palliative Care and NHS England have undertaken a joint piece of work to generate and facilitate understanding of the terms ‘palliative care’ and ‘end of life care’ with the aim of developing greater clarity in the use of these terms.

Within the LCA, end of life care or generalist palliative care is provided to all patients who require it by the clinical teams already responsible for managing those patients, with the support and/or advice of the specialist palliative care teams, when needed.

If the needs of the patient become too complex for the skills of the team, this meets the LCA specialist palliative care referral criteria. Referral can be made to the relevant multiprofessional specialist palliative care team.

16.2 Key stages for consideration of palliative care needs

There are key points in a patient’s illness when their palliative care needs should be specifically considered and this may stimulate referral to multiprofessional specialist palliative care services, where appropriate; these key points include:

- pre-diagnosis if advanced disease is suspected
- diagnosis
- at commencement of definitive treatment of the disease
- on completion of the primary treatment plan

- on disease recurrence or relapse
- at the point of recognition of incurability
- end of life care
- other times requested by a patient.

The LCA's holistic needs assessment (HNA) form is a helpful tool in this decision-making process, providing key questions relating to the patient's emotional, personal and social support needs.

This resource is available to download through:

www.londoncanceralliance.nhs.uk/information-for-healthcare-professionals/pathway-groups/survivorship/.

Once it has been identified that a patient is likely to be approaching the end of their life (if they meet the criteria suggested by the GMC (2010) guidance), the opportunity to consider an advance care plan should be offered to the patient and referral to specialist palliative care considered.

16.3 Referral to specialist palliative care

Patients who may benefit from SPC services should be identified, the referral discussed with the patient and carers and then referral made as soon as possible. For patients with poor performance status, not suitable for either surgery or palliative chemotherapy, or for other palliative treatments, early involvement of SPC services should be considered.

Advance care planning should be offered to such patients, whether undertaken by the lung team itself or, where necessary, by the specialist palliative team. A robust palliative care package to address any physical, psychological, social, emotional or spiritual symptoms should be implemented.

Guidance from the LCA Palliative Care Group regarding referral to SPC services recommends the following:

1. The patient has active, progressive advanced disease, a limited prognosis and the focus of care is on quality of life, for example:

- potentially fatal conditions where treatment has changed from curative to palliative intent (e.g. cancer, multiple co-morbidities where curative treatment is no longer possible)
- complex symptom control issues during treatment
- treatment available to prolong life but prognosis uncertain (e.g. advanced chronic obstructive pulmonary disease, advanced heart failure)
- palliative treatment from the outset, with no cure available (e.g. motor neurone disease, multiple systems atrophy, advanced dementia).

2. The patient has unresolved complex needs that cannot be met by the team responsible for the patient's care. These needs may be physical, psychological, social and/or spiritual. Examples may include complicated symptoms, difficult family situations, or ethical issues regarding treatment decisions.

If in any doubt, please contact the SPC team available in all LCA Trusts.

Referral can be made by an appropriate healthcare professional, with the consent of the patient, where the patient has capacity for this consent.

The SPC team within each Trust is available for advice about symptom management.

It is also important to consider whether, if it has not been done already, referral should be made to the relevant community SPC service for ongoing support of the patient at home, following diagnosis in the outpatient department or hospital discharge. Again, the hospital SPC team can advise.

16.4 Specialist palliative care management

SPC input should be available at the MDT meetings.

LCA SPC teams have adopted the *Palliative Care Adult Network Guidelines* available at:

<http://book.pallcare.info>.

Clinicians from London contributed significantly to these guidelines, which have been endorsed widely across England and in Wales and Northern Ireland. The current version of the Palliative Care Adult Network Guidelines (PANG) is the third edition, which grew out of collaborative work from across London and Northern Ireland. PANG represents the culmination of nearly two years of work involving clinicians from eight cancer networks from across the UK, who have thoroughly reviewed and updated the very successful second edition, 68,000 of which were distributed across the UK and internationally.

The PANG guidance is being reviewed and revised for publication in 2016.

17 Palliative Treatments

In this section, 'palliation' and 'palliative treatment' refer to interventions designed to relieve specific symptoms, not merely to treatments that are not expected to be curative.

Examples of common symptoms and possible causes which should be considered in patients with lung cancer and their management are listed in Table 17.1 below.

Table 17.1: Common symptoms and possible causes

Symptom/sign	Palliative interventions to be considered
Breathlessness	<p><i>Bronchial narrowing or obstruction by tumour:</i> radiotherapy (external beam or endobronchial procedures (see next section)); corticosteroids</p> <p><i>Pleural effusion:</i> aspiration/drainage +/- talc pleurodesis, indwelling pleural catheters, surgical pleurodesis</p> <p><i>Palliation:</i></p> <ul style="list-style-type: none"> • non-drug interventions: e.g. fan, breathing techniques, anxiety reduction* • drug interventions: opioids, initially morphine 1–2mg (suggest 1mg initially for opiate naïve) PRN PO; benzodiazepines if anxiety prominent, nebulised drugs, oxygen • optimisation of concomitant medical conditions: e.g. COPD, asthma, congestive heart failure
Chest wall pain/bone pain	<p>Consider cause and investigate as necessary</p> <p>Analgesic medication, opioids and neuropathic pain agents, biphosphonates, monoclonal antibodies</p> <p>Via MDT: radiotherapy/radiofrequency ablation, possible nerve blocks, bisphosphonates, rehabilitation</p>
Cough	<p><i>Productive cough:</i> nebulised saline, mucolytic, antibiotic as appropriate</p> <p><i>Non-productive cough:</i> antitussives</p>
Haemoptysis	<p>Check and correct clotting defects</p> <p>Antibiotics if infection is an underlying cause</p> <p>Consider pharmacological management, e.g. tranexamic acid</p> <p>Any degree of haemoptysis, consider radiotherapy</p> <p>Endobronchial/endovascular procedures – see list of providers at Appendix 12.</p>
Hoarseness	<p>Referral to ear, nose and throat specialist for consideration of vocal cord injection</p> <p>Non-pharmacological interventions, e.g. speech and language therapy assessment</p>

Symptom/sign	Palliative interventions to be considered
Nausea/vomiting	Consider likely cause and manage reversible factors, e.g. constipation, hypercalcaemia, Pharmacological antiemetic medication via appropriate route depending on severity
Facial swelling	SVC obstruction Consider endovascular stenting Dexamethasone 12–16mg daily PO or IV Chemotherapy/radiotherapy depending of stage/type of disease
Limb weakness and numbness	Consider spinal cord compression and/or brain metastases according to signs Dexamethasone 8mg BD, PO or IV See below for management
Anorexia/cachexia	Consider reversible causes, e.g. dry/painful mouth, candidiasis Pharmacological management, e.g. steroid Dietetic advice
Constipation	Laxatives as per Palliative Care Adult Network Guidelines (PANG) Dietetic advice
Insomnia	Consider contributing factors, e.g. physical discomfort, anxiety, depression Relaxation and sleep hygiene techniques Hypnotic
Anxiety/depression	Non-pharmacological techniques: counselling, cognitive behavioural therapy Antidepressants Consider psychiatric referral if depression unresponsive to treatment or if suicide risk identified
Dysphagia	Dietary modification and dietary advice Corticosteroids Referral to speech and language therapist Possible oesophageal stent Consider radiotherapy if caused by extrinsic tumour compression

* Non-drug interventions for breathlessness should be delivered by a multidisciplinary group, coordinated by a professional with expertise in the techniques (such as a nurse, physiotherapist or occupational therapist). Patients should have access to this support in all care settings.

17.1 Specific therapies

17.1.1 Pleural effusion

- Pleurodesis should only be carried out if the patient is symptomatic from the effusion.
- Ensure that the patient understands that a pleurodesis is not always effective, especially if the lung does not reinflate completely.
- Failure of medical pleurodesis and recurrent symptomatic effusion in patients are indications for indwelling pleural catheter insertion, and this should be considered by the MDT.
- Patients with good performance status should be referred to a thoracic surgical centre for thoracoscopic pleurodesis.
- Medical thoracoscopy is an option where available and is more successful than bedside pleurodesis with talc slurry, which should be conducted according to the BTS guidelines.

17.1.2 Large airway obstruction

Approximately 70% of lung cancers develop within the large airways and frequently cause obstructive symptoms, such as cough, breathlessness and persistent infections, as they progress. Although chemotherapy and radiotherapy may provide effective palliation, they are limited by their cumulative toxicity and slowness of response. Endobronchial treatments have therefore been developed to provide rapid relief with minimal toxicity and should be regarded as being complementary. All units should have access to centres with these treatments. A list of providers within London can be found in [Appendix 12](#).

Indications for endobronchial treatment

Treatment is only offered to patients whose main symptoms are due to endobronchial disease. The benefits of treatment vary according to the level of obstruction, being most marked in patients with centrally situated tumours (e.g. trachea, main carina and proximal main bronchi), but diminish with more peripheral obstruction. Patients are likely to benefit from treatment if patent airways supplying viable lung tissue exist beyond the point of obstruction. CT scan of the chest with IV contrast should be performed prior to stenting and endobronchial therapy. Surgical endobronchial treatment includes diathermy, cryotherapy and laser therapy. Debulking of endobronchial tumour may be necessary prior to stenting.

Airway stents

The majority of airway stenting is performed using expandable metallic stents. They can be temporary or permanent. The stent is passed across the airway stricture and released under X-ray screen control under general anaesthesia. The expansile properties of the stent then gradually overcome the compressive effects of the tumour. Patients not fit for general anaesthesia can still be considered for stenting via bronchoscopy.

Endobronchial radiotherapy

This involves placing an afterloading catheter bronchoscopically within the involved airway. A high activity iridium-192 source is loaded by remote control into the catheter and then placed alongside the tumour. The dose of radiation falls off steeply with distance, so that very high doses are delivered to the tumour and peribronchial tissues but negligible doses to the lung parenchyma, spinal cord and oesophagus. It can therefore be used in areas of the lung that have previously been treated with radiotherapy. Treatment is usually completed within 10–15 minutes; the length of hospital stay depends on centre/local protocol and

the degree of sedation/anaesthesia required for the procedure. There may be more than one treatment required.

Palliative external beam radiotherapy

Palliative radiotherapy should also be considered to improve localised symptoms. This should be fractionated therapy, i.e. treatment over a number of days.

17.1.3 Superior vena cava obstruction

First-line treatment in SVC obstruction associated with NSCLC is insertion of an SVC stent. Consideration can then be given to the role of palliative radiotherapy or chemotherapy. Any role for anti-coagulation should be discussed with the interventional radiologist.

Patients with SCLC and SVC obstruction should proceed instead directly to chemotherapy if possible. If there is a delay in stent insertion or treatment, symptoms may be improved with dexamethasone 8–16mg daily.

Patients with SVC obstruction as the first presenting feature of suspected lung cancer require histological confirmation of diagnosis.

Please refer to Superior Vena Cava Obstruction, Chapter 19 in the [LCA Acute Oncology Clinical Guidelines September 2013 \(updated March 2016\)](#).

17.1.4 Anorexia and cachexia

Weight loss and poor nutritional status is common in lung cancer patients and is a negative prognostic indicator. Treatment, whether it be surgery, chemotherapy or radiotherapy, is known to be less effective and carries increased risk of complications and toxicities in those who have experienced significant weight loss.

As recommended by the NICE guidelines for nutritional support in adults (NICE 2006/CG32), all patients should be nutritionally screened on admission to hospital and on attending an outpatient appointment. Patients identified at risk of malnutrition should be managed by an appropriate care plan which should include referral to a dietitian for high-risk patients. Where formal screening tools are not in use, doctors, nurses and other healthcare professionals should ensure that patients are asked about their appetite and weight, and whether there are any particular difficulties with eating and drinking, at each visit to hospital.

The management of anorexia and cachexia should involve identifying reversible causes (e.g. dry or painful mouth, oral candida, nausea and vomiting, pain). Refer to a dietitian for advice. Nutritional supplement drinks may be appropriate to improve nutritional intake. Supplements enriched with fish oils (namely, eicosapentaenoic acid) may be of benefit but current evidence is conflicting.

Corticosteroids improve appetite and sense of well-being, but do not result in weight gain. The effect is short lived. Their effect on appetite should be reviewed after a defined period (e.g. 1 week) and discontinued if ineffective. If beneficial, the dose should be reduced after a period (e.g. 1 month).

Progesterones increase appetite and weight gain but in relatively high doses. The therapeutic effect may take weeks to become apparent. Suggested doses are megestrol acetate 160–480mg per day.

18 Survivorship

18.1 Background

As cancer survival rates improve, cancer is increasingly being viewed as a long term condition. More is known about the long term consequences of cancer and its treatments, and healthcare professionals working in cancer services should be able to provide first---line assessment and interventions for a wide variety of physical and psychological conditions and know when and how to refer onto relevant experts.

The National Cancer Survivorship Initiative ran from 2008 to 2013, providing a clear drive for a shift in the way in which services are provided to those living with and beyond cancer. The NHS England/Macmillan Cancer Support's 'Living With and Beyond Cancer Programme' is seeking new ways to further implement and embed good survivorship care. The Recovery Package is a key aspect, and three of its four components should be offered by acute cancer services.

A Holistic Needs Assessment (HNA) offers an opportunity to discuss the things which are important to the person.

A treatment summary provides the person and their GP with details of what treatment they have had to date, signs and symptoms of recurrence, plans for follow-up, likely consequences of the cancer and its treatment and what to do if these arise, and details of their key worker.

A health and well-being event provides an opportunity to learn, in a group setting, about things which are relevant to the cancer and its treatment.

Achieving world-class cancer outcomes: A strategy for England 2015-2020 is the newly published report by the Independent Cancer Taskforce. It recommends that every patient has access to all aspects of the Recovery Package by 2020. There is already a requirement through commissioning intentions and subsequent contractual agreement for the use of the Recovery Package within London.

The current system of hospital based, routine follow up is not necessarily designed to best meet the ongoing needs of those living with and beyond cancer. Alternative models of follow-up, such as stratified follow-up and supported self-management, give the person and their GP a more central role.

The evidence base for healthy lifestyle behaviours highlights the benefits to those living with and beyond cancer of being able to access healthy lifestyle information, support and intervention. Healthy lifestyle choices improve not only cancer-related mortality and morbidity, but also all-cause mortality and morbidity. This is significant, as recently published evidence shows that approximately a third of people living with and beyond cancer have one other long term condition (LTC) and a further third have three or more. Healthy lifestyle behaviours have a proven impact on many LTCs, e.g. diabetes, cardiac disease and mental health disorders.

The mental health and psychological support needs of people who have had a cancer diagnosis have been under---recognised for many years. The evidence suggests that one in four of those who receive a cancer diagnosis will need some level of psychological support, with one in ten requiring specialist intervention from a psychologist, psychotherapist, psychiatrist or other psychological support professional.

The consequences of cancer and its treatments are multiple – emotional, physical, financial, psychological and spiritual. Early discussion of these consequences, from diagnosis onwards, is essential and should form part of treatment consent prior to treatment starting. The requirement for increased shared decision-making, where the person and their treating physician jointly agree the best treatment, gives early discussion of possible consequences further weight and priority. Early and ongoing discussion ensures that the risks of consequences

are minimised when possible, recognised early if they manifest, and are addressed in a timely manner when necessary. Early referral to relevant specialist rehabilitation, including return to work or education, and to services which are able to manage consequences, minimises negative outcome, including poorer quality of life.

Achieving world-class cancer outcomes places an increased responsibility on both providers and commissioners to ensure suitable services, with an appropriately skilled workforce made available to support those living with and beyond cancer, even many years after initial treatment has ended. Healthcare professionals should be supported to recognise consequences and know how to access appropriate services. There should be clear and explicit pathways into early assessment and intervention for these consequences, locally when possible and at tertiary centres when necessary.

18.2 Recommendations and rationale

The recommendations offered in this section are based on Macmillan Cancer Support's *What to do after cancer treatment ends: Ten Top Tips* (2014), which was developed by its Consequences of Cancer Treatment Collaborative (CCaT). They cover the key components of good survivorship care and lead to one or more recommendations, which can be found in bold below. Additional information comes from *Throwing light on the consequences of cancer and its treatment* (2013) and *Living with and beyond cancer: taking action to improve outcomes* (2013).

18.2.1 Discuss a person's needs

The Holistic Needs Assessment (HNA) has been shown to be effective in identifying a person's individual concerns. It can take many forms and the LCA has developed, in collaboration with *London Cancer*, a version (the pan-London tool) which includes a concerns checklist and a distress thermometer that allows people to specify issues that are of most concern to them. It covers physical, emotional, spiritual, financial, and welfare and practical concerns. Subsequent discussion with a healthcare professional provides an opportunity to explore the issues raised and to jointly agree how to best address them. This could include provision of information, intervention by that healthcare professional, referral to a specialist, or the person themselves taking action. Following the discussion, a care plan which outlines the agreed actions is completed as a record of the discussion.

Recommendations:

- Every patient should be offered a Holistic Needs Assessment and associated care plan at key pathway points, including at diagnosis and end of treatment, and whenever a person requests one.
- The use of the pan-London tool is strongly encouraged and can be found in [Appendix 1](#) and here: <http://www.londoncanceralliance.nhs.uk/information-for-healthcare-professionals/forms-and-guidelines/lca-patient-experience-programme/>

18.2.2 Provide a treatment summary

A treatment summary is given to the person (unless they have opted out of receiving letters from the hospital) and their GP at the end of treatment or end of set of treatments. It provides a summary of the treatments received during that time, including planned follow-up and signs and symptoms of which to be aware. These symptoms include possible consequences of cancer and its treatment, signs of recurrence and other important information.

Recommendations:

- A treatment summary should be provided to the person and their GP at end of a defined treatment or series of treatments, when being discharged from regular follow-up, or when changes are made to long standing treatment regimes.
- The use of the NCSI treatment summary template is encouraged, and is embedded within both Somerset and Infoflex. A copy can be found in [Appendix 2](#) and here: <http://www.londoncanceralliance.nhs.uk/information-for-healthcare-professionals/forms-and-guidelines/lca-patient-experience-programme/>

18.2.3 Provide a main contact

UK and England wide work including the national Cancer Patient Experience Survey has shown the necessity of a key contact, or key worker. People living with and beyond cancer, their GPs and other healthcare professionals, benefit from having a named person to contact if they need help or advice about issues related to consequences of cancer and its treatment.

Recommendation:

The treatment summary must include the details of the person's key worker and who to contact out of hours. This should be sent to the GP, the patient and any others whom the patient identifies as necessary.

18.2.4 Identify and make early referrals for consequences of cancer and its treatments

Cancer and its treatments have far-reaching consequences and those with associated unmet needs are more likely to access healthcare services than their age-matched counterparts. Providing information on likely post-treatment symptoms, e.g. early lymphoedema or faecal incontinence, and how these can be managed or avoided, allows people to seek the right help from the right people at the right time.

Where prompt questions for specific symptoms have been developed, these should be used to help identify when treatment and/or onward referral is indicated.

The LCA Survivorship Pathway Group is leading work to develop pathways for management of several consequences of treatment, which reflect NHS England (London)'s *Five Year Commissioning Strategy for Cancer* (2014): Completed guidelines for fertility, lymphoedema and referral to complementary therapy can be found here: <http://www.londoncanceralliance.nhs.uk/information-for-healthcare-professionals/forms-and-guidelines/lca-patient-experience-programme/>

Guidelines on sexual consequences, gastro-intestinal (GI) consequences, endocrine symptoms and cancer rehabilitation service referrals will be published during 2015/6 and will be available on the LCA website.

Recommendations:

- Information on possible consequences of cancer treatment and what to do if they occur should be routinely provided to all patients. This should be done from the time of discussion of treatment onwards, with the information clearly reiterated during the end of treatment consultation and in the treatment summary.
- Written information should be offered to support any information given verbally.
- When a person presents with symptoms indicative of a known consequence of cancer and its treatments use prompt questions and screening tools in order to treat, manage or make onward referrals to address these.

18.2.5 Encourage people to talk about how they feel

A cancer diagnosis has an emotional impact, with one in four people needing professional support as a result of anxiety or depression impacting on their quality of life, and one in ten experiencing symptoms severe enough to warrant interventions by a psychologist or psychiatrist in the year following diagnosis.

Recommendation:

Use an HNA including distress thermometer to help identify psychological distress, anxiety or other psychological support need. If a distress score of over 4 is recorded, the problem should be discussed with the person, and onward referral to psychological support services considered.

18.2.6 Healthy lifestyle

There is a strong body of evidence which supports the adoption of a healthy lifestyle for those who have had a cancer diagnosis.

Recommendation:

Individuals should be offered access to a health and well-being event (HWBE) to provide them with the information they need to help make healthy lifestyle choices.

The LCA guidance on HWBE can be found here: <http://www.londoncanceralliance.nhs.uk/media/100126/lca-guidance-on-health-and-well-being-events-may-2015.pdf>

18.2.7 Smoking cessation

Tobacco smoking is the main cause of preventable morbidity and premature death in England. Receiving a cancer diagnosis can give a 'teachable moment' where people may be more susceptible to health advice and hence more motivated to quit.

Recommendation:

All current smokers should be asked about their smoking habit at key pathway points, e.g. at diagnosis, after surgery and at follow-up appointments, and offered smoking cessation advice with onward referral to local services as necessary. Local services can be found here: <http://www.nhs.uk/Service-Search/Smoking-cessation-clinic/London/Results/557/-0.085/51.511/636/13136?distance=25>

18.2.8 Diet

The role that diet can play in cancer incidence has been widely documented. However, with smoking being the major risk factor for lung cancer, it is difficult to establish the much weaker relationship between dietary factors and the development of lung cancer. The nutritional issues during or following treatment include weight loss or gain; changes in body composition (e.g. loss of muscle mass); and particular eating difficulties (e.g. anorexia, swallowing problems, taste changes and limited capacity for food). There are also longer term side effects that can arise from treatment (e.g. oesophageal strictures as a result of high dose radiotherapy).

With lung cancer, the completion of one treatment is often closely followed by the initiation of another (e.g. adjuvant chemotherapy following surgery; sequential radiotherapy following chemotherapy or surgery) and therefore dietary advice should be focused on maintaining weight and strength and optimising nutritional intake where the symptoms or side effects of treatment may make this difficult. Due to the large proportion of lung cancer patients presenting with advanced disease, they are often managed palliatively with a focus on symptom control and quality of life; dietary advice should fall in line with these goals.

In those who are treated with a curative intent, diet and lifestyle advice should be focused on preventing recurrence or the development of other cancers/chronic diseases; advising on the WCRF (2007) dietary recommendations may be appropriate. However, many lung cancer patients would already have had co-morbidities at presentation, including COPD, and it is important that, when providing healthy eating advice, there should remain a focus on adequate calorie and protein intake to maintain/restore lean body mass, in particular with those who have a low body mass index (BMI).

Recommendation:

Patients are provided with dietary advice, based on the WCRF recommendations, at the end of treatment with referral to specialist dietitians as needed.

Tumour specific updates made within the WCRF's programme of continuous update can be found here: <http://www.wcrf.org/int/research-we-fund/continuous-update-project-findings-reports>

Recommendation:

Patients are provided with dietary advice, based on the WCRF recommendations, at the end of treatment with referral to specialist dieticians as required.

18.2.9 Physical activity

There has been a dramatic rise in the amount of high quality published research on the role of exercise in cancer in recent years. Physical activity results in improvement in quality of life, fitness and function and in symptoms related to cancer and its treatments. It can reduce length of stay and improve cellular recovery post chemotherapy. It reduces cancer recurrence, incidence of second cancers and reduces both all cause and cancer-specific mortality.

There is international consensus that people living with and beyond cancer should exercise to the same level as the general population for health benefits. Research suggests that a combination of cardiovascular and muscular strength training has an important additional benefit over only undertaking either alone.

Recommendations:

- People should be encouraged to maintain or increase their level of physical activity both during and after treatment in line with national guidance.
<http://www.nhs.uk/livewell/fitness/pages/physical-activity-guidelines-for-adults.aspx>
http://ncsi.org.uk/wp-content/uploads/EvidenceBasedGuidance_4_Br0566_WEB.pdf
- Their need for support to increase or maintain their activity should be assessed, with referral to local exercise opportunities, such as exercise on prescription, considered.
<https://www.nice.org.uk/guidance/ph2>
- They should be referred for specialist assessment by a physiotherapist as necessary.

18.2.10 Pulmonary rehabilitation**Definition:**

“Pulmonary rehabilitation is an evidence-based, multidisciplinary, and comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities. Integrated into the individualized treatment of the patient, pulmonary rehabilitation is designed to reduce symptoms, optimize functional status, increase participation, and reduce health-care costs through stabilizing or reversing systemic manifestations of the disease. Comprehensive pulmonary rehabilitation programs include patient assessment, exercise training, education, and psychosocial support.”

(American Thoracic Society/European Respiratory Society 2006)

There is evidence to support the use of pulmonary rehabilitation in patients with lung cancer, particularly in the context of promoting cancer survivorship post-treatment. Evidence demonstrates improved quality of life and fitness levels. The generally accepted description for patients suitable for pulmonary rehabilitation suggests patients with long-standing dyspnoea secondary to a respiratory diagnosis. As pulmonary rehabilitation tends to involve a programme of exercises and education sessions, the patients may need individual assessment for suitability for referral.

Pulmonary rehabilitation programmes utilise expertise from various healthcare disciplines that is integrated into a comprehensive, cohesive programme tailored to the needs of each patient; a multidisciplinary approach is therefore recommended. Referral should be according to local working practices and guidelines.

Recommendation:

Lung cancer patients should be referred for specialist assessment to a pulmonary rehabilitation service.

18.2.11 Stratified, self-managed follow-up

There is a move towards increased self-management, with fewer hospital based appointments and a requirement for primary or local secondary care to respond to more routine issues. Research has shown that recurrence is more likely to be detected by the patient themselves between appointments, rather than during an outpatient appointment. This has clear benefits to people living with or beyond cancer, including reduced anxiety in the lead up to routine appointments and less interference in their day-to-day life caused by having to attend hospital appointments. In addition, by reducing unnecessary appointments, Trusts are able to see new patients more quickly and spend more time with those with more complex needs.

For self-management to be effective, people living with and beyond cancer and their primary care providers need to be given the right information about signs and symptoms of recurrence, clear pathways to follow if they are concerned and guaranteed a fast, explicit route to re-access services if necessary.

Recommendation:

- Treatment summaries, as described above, should be routinely used to provide the person and GP with details of planned follow-up.
- Services should use LCA tumour specific guidelines to define those people for whom stratified follow up is clinically feasible and develop local policies and procedures to enable their roll out.

18.2.12 Encourage survivors to share their experience

Sharing the experience of living with and beyond cancer can be beneficial to the person themselves, carers, and others who have a cancer experience. Providing feedback on experience, volunteering and participation in research, can all impact on the person.

Recommendations

- People living with and beyond cancer should be offered information on local support groups and where they can access further information on sharing experience.
- Health and well-being events should be co-facilitated and run with those living with and beyond cancer whenever practicable.

Appendix 1: Pan-London Suspected Lung and Pleural Cancer Urgent Referral Form Example

This is an example of the pan-London suspected lung cancer referral form, which can be found at: <https://www.myhealth.london.nhs.uk/healthy-london/cancer/pan-london-suspected-cancer-referrals>.

DOB:	NHS no:	PAN-LONDON SUSPECTED LUNG & PLEURAL CANCER REFERRAL FORM		REFERRAL DATE: <input style="width: 80%;" type="text"/>
<p>Please email or send e-referral within 24 hours.</p> <p>Fax is no longer supported due to patient safety and confidentiality risks.</p> <p style="background-color: yellow;">Press the <Ctrl> key while you click here to view the list of hospitals you can refer to</p> <p>Copy the hospital details from the webpage and paste them onto the line below.</p>				
PATIENT DETAILS				
SURNAME: <input style="width: 80%;" type="text"/>		FIRST NAME: <input style="width: 80%;" type="text"/>		TITLE: <input style="width: 80%;" type="text"/>
GENDER: <input style="width: 80%;" type="text"/>	DOB: <input style="width: 80%;" type="text"/>	AGE: <input style="width: 80%;" type="text"/>	NHS NO: <input style="width: 80%;" type="text"/>	
ETHNICITY: <input style="width: 80%;" type="text"/>		LANGUAGE: <input style="width: 80%;" type="text"/>		
<input type="checkbox"/> INTERPRETER REQUIRED		<input type="checkbox"/> TRANSPORT REQUIRED		
PATIENT ADDRESS: <input style="width: 80%;" type="text"/>		POSTCODE: <input style="width: 80%;" type="text"/>		
DAYTIME CONTACT ☎: <input style="width: 80%;" type="text"/>				
HOME ☎: <input style="width: 80%;" type="text"/>	MOBILE ☎: <input style="width: 80%;" type="text"/>	WORK ☎: <input style="width: 80%;" type="text"/>		
EMAIL: <input style="width: 80%;" type="text"/>				
CARER/KEY WORKER DETAILS				
NAME: <input style="width: 80%;" type="text"/>		CONTACT ☎: <input style="width: 80%;" type="text"/>		RELATIONSHIP TO PATIENT: <input style="width: 80%;" type="text"/>
COGNITIVE, SENSORY OR MOBILITY IMPAIRMENT				
<input type="checkbox"/> COGNITIVE		<input type="checkbox"/> SENSORY		<input type="checkbox"/> MOBILITY
<input type="checkbox"/> DISABLED ACCESS REQUIRED				
PLEASE INCLUDE RELEVANT DETAILS: <input style="width: 80%;" type="text"/>				
SAFEGUARDING				
<input type="checkbox"/> SAFEGUARDING CONCERNS				
PLEASE INCLUDE RELEVANT DETAILS: <input style="width: 80%;" type="text"/>				
GP DETAILS				
USUAL GP NAME: <input style="width: 80%;" type="text"/>				
PRACTICE NAME: <input style="width: 80%;" type="text"/>		PRACTICE CODE: <input style="width: 80%;" type="text"/>		
PRACTICE ADDRESS: <input style="width: 80%;" type="text"/>				
BYPASS ☎: <input style="width: 80%;" type="text"/>				
MAIN ☎: <input style="width: 80%;" type="text"/>	FAX: <input style="width: 80%;" type="text"/>	EMAIL: <input style="width: 80%;" type="text"/>		
REFERRING CLINICIAN: <input style="width: 80%;" type="text"/>				

DOB: NHS no:

CLINICAL RISK FACTORS

- | | |
|--|---|
| <input type="checkbox"/> COPD | <input type="checkbox"/> Current smoker |
| <input type="checkbox"/> Asbestos exposure | <input type="checkbox"/> Ex-smoker |

PLEASE ARRANGE AN EMERGENCY ADMISSION IF THERE IS EVIDENCE OF SUPERIOR VENA CAVA OBSTRUCTION OR STRIDOR**REFERRAL FOR DIRECT ACCESS INVESTIGATIONS**

GPs should arrange urgent chest x-ray (to be performed within 2 days) for patients presenting with symptoms which raise suspicion of lung cancer or mesothelioma.

Press the <Ctrl> key while you click here to view [Pan-London Suspected Lung Cancer Referral Guide](#)

REASON FOR SUSPECTED CANCER REFERRAL

- | | | |
|--|--|---|
| <input type="checkbox"/> Abnormal chest x-ray suggestive of lung cancer or mesothelioma (please attach report) | | |
| <input type="checkbox"/> Abnormal CT scan suggestive of lung cancer or mesothelioma (please attach report) | | |
| <input type="checkbox"/> Age ≥ 40 years with haemoptysis in a smoker or ex-smoker | | |
| <input type="checkbox"/> Age ≥ 40 years with one or more of the following UNEXPLAINED conditions: | | |
| <input type="checkbox"/> Finger clubbing | <input type="checkbox"/> Thrombocytosis | |
| <input type="checkbox"/> Lymphadenopathy cervical or supraclavicular | <input type="checkbox"/> Chest signs consistent with lung cancer | |
| <input type="checkbox"/> Persistent or recurrent chest infection | | |
| <input type="checkbox"/> Age ≥ 40 years with the following UNEXPLAINED symptoms. If smoker/ex-smoker/asbestos exposure ONE symptom is needed. If never smoked/no asbestos exposure TWO symptoms are needed. | | |
| <input type="checkbox"/> Cough | <input type="checkbox"/> Wheeze/dyspnoea | <input type="checkbox"/> Weight loss/anorexia |
| <input type="checkbox"/> Chest/shoulder pain | <input type="checkbox"/> Hoarseness | <input type="checkbox"/> Fatigue |
| <input type="checkbox"/> Normal chest X-ray but high suspicion of lung cancer | | |
| <input type="checkbox"/> Features suggestive of lung cancer metastasis including bone pain, paraneoplastic signs or history of cancer | | |
| <input type="checkbox"/> Referral is due to CLINICAL CONCERNS that do not meet NICE/pan-London referral criteria (the GP MUST give full clinical details in the 'additional clinical information' box at time of referral) | | |

Please enter the WHO Performance Score to establish if patient is suitable for pre-appointment CT

- | | |
|--------------------------|--|
| <input type="checkbox"/> | 0 Fully active, able to carry on all pre-disease performance without restriction. |
| <input type="checkbox"/> | 1 Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g. light housework, office work. |
| <input type="checkbox"/> | 2 Ambulatory and capable of all self-care but unable to carry out any work activities. The patient is up and about more than 50% of waking hours. |
| <input type="checkbox"/> | 3 Capable of only limited self-care; confined to bed or chair more than 50% of waking hours. |
| <input type="checkbox"/> | 4 Completely disabled; cannot carry out any self-care. The patient is totally confined to bed or chair. |

DOB: NHS no:

Additional clinical information:

Personal/relevant patient information:

Past history of cancer:

Relevant family history of cancer:

- I have discussed the possible diagnosis of cancer with the patient
- The patient has been advised and confirmed they will be available for an appointment within the next two weeks
- I have counselled the patient regarding the referral process and offered the pan-London information leaflet. Offering written patient information increases patient experience and reduces non-attendance. These are available in 11 different languages.
 Press the <Ctrl> key while you click here to view the leaflet
- This patient has been added to the practice suspected cancer safety-netting system
 Press the <Ctrl> key while you click here to view Pan-London Practice-based Suspected Cancer Safety Netting System

INVESTIGATIONS

Please ensure this referral includes ALL the relevant investigations including blood tests and imaging. If there are any pending test results that you have organised at the time of this referral please provide information including TYPE OF INVESTIGATION requested (bloods, imaging) and TRUST performing the tests in the box below.

IMAGING STUDIES (in past 3 months) Please include date: and location:

RENAL FUNCTION (most recent recorded in past 3 months)

FULL BLOOD COUNT (most recent recorded in past 3 months)

MEDICAL HISTORY

ALLERGIES

MEDICATION

Appendix 2: Systemic Anti-cancer Therapy in Lung Cancer

Please refer to local Trust policies and guidelines for doses of drugs administered, approved blood parameters for drug administration, supportive care medication, criteria for dose modification or dose delay, and management of drug toxicities. Drugs may be funded via NICE, the Cancer Drugs Fund, co-payment, or local Trust business case.

ADMINISTRATION

Gefitinib is usually prescribed at a dose of 250mg daily as per NICE 2010/TA192. Given as 28-day cycle.

Erlotinib is usually prescribed at a dose of 150mg daily as per NICE 2012/TA258. Given as 28-day cycle.

Pemetrexed is usually given at a dose of 500mg/m² every 21 days with Vitamin B12 intramuscular and folic acid oral supplementation, and dexamethasone prophylaxis, as per NICE 2010/TA190, or NICE 2009/TA181.

Topotecan is usually given every 21 days at a dose of 2.3mg/m² orally days 1–5, as per NICE 2009/TA184.

The following are recognised by NICE 2011/CG121 as treatment options:

- **Cisplatin** is usually given every 21 days at a dose of 75–80mg/m².
- **Carboplatin** is usually given every 21 days at a dose of AUC5.
- **Gemcitabine** is usually given on days 1 and 8 of a 21-day cycle at doses 1,000–1,250mg/m².
- **Vinorelbine** is given either PO or IV, usually on days 1 and 8 of a 21-day cycle at usual doses of 25mg/m² (IV) or 60mg/m² (PO) and 30mg/m² (IV) or 80mg/m² (PO).
- **Docetaxel** is usually given at 60–75mg/m² IV every 21 days.
- **Paclitaxel** is usually given every 21 days at a dose of 175–225mg/m².
- **Etoposide** is usually given on days 1–3 every 21 days, at a dose of 100mg/m² IV on day 1 and then either 100mg/m² OD IV or 100mg/m² BID PO on days 2 and 3.
- **Etoposide** may be given orally every 21 days at a usual dose of 50mg BID days 1-14.

Other regimes include:

- **MVP** (mitomycin 6mg/m², vinblastine 6mg/m², cisplatin 50–75mg/m²) and usually given every 21 days.
- **ACE** (doxorubicin 50mg/m², cyclophosphamide 600mg/m², etoposide 100mg/m²) and usually given every 21 days.
- **CAV** (doxorubicin 50mg/m², cyclophosphamide 750mg/m², vincristine 2mg) and usually given every 21 days.

Appendix 3: SCLC Chemotherapy Regime – Oral Etoposide

AIM

Palliative therapy for patients with poor performance status.

ADMINISTRATION

Days 1–14, 50mg orally every 3 weeks.

MONITORING

Baseline: FBC and electrolytes/creatinine

Day 1 each cycle: proceed if Hb >10g/dl, neutrophils >1.5 x 10⁹/l, platelets >100 x 10⁹/l. If not, defer 1 week.

DOSE REDUCTION

Discuss with consultant oncologist.

PRESCRIBERS

Only consultants and specialist registrars in oncology.

Senior house officers/non-medical prescribers (NMPs) can prescribe subsequent course if there is no change in dose and the patient has been discussed with specialist registrar/consultant.

COMMON SIDE EFFECTS

Neutropenia and sepsis, thrombocytopenia, anaemia, alopecia, diarrhoea.

Platinum-Gemcitabine

As per NSCLC (see [Chapter 12](#)).

Appendix 4: Radiotherapy: Radiotherapy Normal Tissue Delineation and Tolerances for Radical Treatment

Values given are for a 2Gy per fraction schedule. For alternative fractionation, adjustments should be made for radiobiological equivalence.

- **Normal lung:** $V_{20} \leq 30\text{--}35\%$, $D_{\text{mean}} \leq 18\text{Gy}$. The normal lung consists of both lungs considered together as one organ but excluding the GTV/CTV/ITV. It is important to ensure that both lungs are contoured from apex to base and care should be taken to exclude the trachea and proximal bronchi.
- **Spinal cord:** $D_{\text{max}} \leq 46\text{Gy}$. The spinal canal will be contoured and taken to represent the cord. The spinal cord PRV should be created by expanding the canal appropriately for local set-up.
- **Oesophagus:** Ideally $D_{\text{mean}} < 34\text{Gy}$, $V_{60} < 30\%$, treated length $< 13.5\text{cm}$, $D_{\text{max}} < 58\text{Gy}$. The oesophagus should be contoured from the cricoid cartilage to the gastro-oesophageal junction.
- **Heart:** $V_{40} < 100\%$, $V_{60} < 33\%$. The heart including the pericardium will be contoured. The cranial extent should include the infundibulum of the right ventricle and the apex of both atria. The caudal extent should be defined by the lowest part of the left ventricle's inferior wall that is distinguishable from the liver.

Appendix 5: Competencies for Key Worker Role

- Work as an integral member of the multidisciplinary team to ensure continuity of patient care.
- Initiate and participate in case conferences with all professionals involved in the delivery of patient care.
- Communicate and coordinate information to patients and carers, evaluating their levels of understanding and utilising a range of skills/techniques to overcome any communication difficulties.
- Demonstrate ability to verbally summarise patient information to facilitate understanding.
- Act as an advocate for the patient.
- Act as a communication resource and coordinator for other members of the multiprofessional team in the care of the key worker's patient caseload.
- In conjunction with the MDT, provide patients with comprehensive information on the options available to them for treatment and care. Utilise their specialist knowledge and skills regarding disclosure of information.
- Coordinate the onward referral of patient and/or family members to appropriate clinical or support services.
- Ensure accurate follow-up documentation is maintained, including any changes in the named key worker.
- Utilise support strategies and interventions available to care for patients with complex needs, for example patient exhibiting denial/anger following a cancer diagnosis, adverse reactions to alteration in body image or reaching end of life.
- Demonstrate knowledge of holistic care relating to areas across the patient journey such as screening, curative and palliative treatment, spiritual care, aspects of nutrition and pharmacology, rehabilitation, discharge and collaborative working.
- Initiate appropriate referral or access to sources of specialist support for those experiencing, for example, sexual difficulties as a result of their illness or treatment.
- Utilise all forms of patient information to enable the patient to have a better understanding of their diagnosis and treatment plan. This will include the use of specific resources for patient/carers from minority groups.
- Facilitate the development of teaching and learning skills used to educate patients and other personnel.
- Contribute to the monitoring, audit and evaluation of adherence to policy/procedures/guidelines and standards of practice, initiating changes where appropriate to improve delivery of care to patients/carers within the MDT.
- Demonstrate ability to recognise abnormal grief reactions and refer on to appropriate agencies and healthcare professionals.
- Demonstrate a comprehensive knowledge of the assessment, care, management support, training education and information requirements for patients and carers across the care pathway for the particular specialty area.

- Assess and provide support that is appropriate to the context and sensitive to meet the patient/carer and/or family's needs, facilitating access to additional support from other healthcare professionals or agencies as applicable and with the agreement of the patient and/or carer.
- Understand the ethical issues relating to treatment in advanced disease.
- Have sufficient knowledge and links with national/local support groups and be able to provide/record information relating to these groups to guide and advise patients.
- Provide information, education and relevant telephone contacts to patients and carers regarding the procedures and management of the side effects of treatment associated with the client group encountered in their practice.
- Be aware of local contact arrangements in the event of patients experiencing unwanted side effects.
- Demonstrate knowledge to prepare, inform and educate patients/carers for survivorship and, where applicable, primary care personnel regarding any associated care requirements, symptom management and contact details on discharge.
- Participate in inter-professional/inter-agency evaluation and audit to effect change for the continued improvement of the quality of care and service for patients.

Appendix 6: LCA Key Worker Policy

Definition

A key worker is a person who, with the patient's consent and agreement, takes a key role in coordinating the patient's care and promoting continuity, ensuring the patient knows who to access for information and advice in relation to their cancer diagnosis. In addition, the key worker will facilitate patients making informed decisions about their treatment.

The implementation of the key worker role is a requirement of the National Cancer Peer Review Programme and detailed in the *Manual for Cancer Services*, published by the National Cancer Action Team (NCAT), and related site-specific *Improving Outcomes Guidance*, issued by the National Institute for Health and Care Excellence (NICE).

Principles and responsibilities

Designation

- 1) The key worker is a named clinical member of the site-specific multidisciplinary team (MDT), and acts as the point of contact between the patient and MDT.
- 2) The key worker is a healthcare professional.
- 3) The key worker is assigned by the core Clinical Nurse Specialist (CNS) of an MDT, agreed by the MDT and recorded within the patient record and multidisciplinary meeting proforma.
- 4) The name of the key worker, designation and contact details will also be recorded in the patient handheld record (PHR), if used, and included in all correspondence and in the patient medical records. All entries in the medical notes will comply with the NHS Litigation Authority standards.

Access

- 5) All cancer patients will be made aware of their allocated key worker, but have the right to ask for an alternative if they prefer. This will usually happen at diagnosis.
- 6) The key worker will provide a contact number to all the patients for whom they act as the key worker.

Multi-professional communication

- 7) If a more appropriate person is identified as a key worker at a point in the patient's pathway, this will be discussed and agreed by the patient and the new key worker, and recorded in the patient's notes. This situation is most likely to arise with referral to the palliative care team. In such cases the palliative care CNS will check if a key worker has already been identified for the patient by the relevant tumour MDT. The palliative care CNS will then negotiate and document care responsibilities in the patient's notes.
- 8) The key worker may change as patients pass through various stages of the care trajectory or when care is transferred to a different Trust. It is the responsibility of the key worker to hand over to the next one, to document this in the patient's notes and to keep the patient informed.
- 9) The key worker will lead on patient communication issues and coordination of the pathway for patients referred to the team.

- 10) The key worker will ensure that the patient pathway is coordinated and that all relevant information is transferred to the appropriate professionals as the patient moves across care boundaries, e.g. on admission to and discharge from institutions, when care is transferred between teams.
- 11) The key worker has responsibility for ensuring that holistic needs assessments (HNA) are recorded/documentated in patient records.

Patient communication and support

- 12) Where possible, the key worker will be available to support the patient on diagnosis to signpost and provide them with information and contacts for the MDT, national information and support services, self-help groups and associated site-specific support.
- 13) If the key worker is not available at the time of diagnosis, the person who is providing support at the time will ensure that the patient is aware of the key worker role and provide the relevant contact details.
- 14) The key worker will be accessible to the patient as a constant point of contact, handing over to colleagues when unavailable and making sure that the patient has clear information about alternative contacts and cover arrangements.
- 15) The key worker will provide information, care and support throughout the patient journey regardless of the patient's condition, liaising between health professionals to ensure continuity of care and a seamless service.

Data/audit

- 16) The key worker will contribute to the audit of key worker role in their organisation.

Annex A

NCAT peer review standard

There should be an operational policy whereby a single named key worker for the patient's care at a given time is identified by the MDT members for each individual patient and the name and contact number of the current key worker is recorded in the patient's case notes. The responsibility for ensuring that the key worker is identified should be that of the nurse MDT member(s).

The above policy should have been implemented for patients who came under the MDT's care after publication of these measures and who are under their care at the time of the peer review visit.

Notes

- According to the NICE supportive and palliative care guidance, a key worker is a person who, with the patient's consent and agreement, takes a key role in coordinating the patient's care and promoting continuity, e.g. ensuring that the patient knows who to access for information and advice. This is not intended to have the same connotation as the key worker in social work.
- It may be necessary to agree a single key worker across both a cancer site-specific MDT and the specialist palliative care MDT for certain patients.

October 2013

Appendix 7: LCA Holistic Needs Assessment Tool



London Holistic Needs Assessment

For each item below, please tick **yes** or **no** if they have been a concern for you during the last week, including today. Please also tick **discuss** if you wish to speak about it with your health professional.
Choose not to complete the assessment today by ticking this box

Date:		Practical concerns	Yes	No	Discuss	Physical concerns	Yes	No	Discuss
Name:		Caring responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	High temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hospital/NHS number:		Housing or finances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wound care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please tick the number that best describes the overall level of distress you have been feeling during the last week, including today:		Work or education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Passing urine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 <input type="checkbox"/> Extreme distress		Information needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Constipation or diarrhoea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 <input type="checkbox"/>		Difficulty making plans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Indigestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 <input type="checkbox"/>		Grocery shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nausea and/or vomiting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 <input type="checkbox"/>		Preparing food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 <input type="checkbox"/>		Bathing or dressing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Changes in weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 <input type="checkbox"/>		Laundry or housework	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Eating or appetite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 <input type="checkbox"/>		Family concerns				Changes in taste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 <input type="checkbox"/>		Relationship with children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Family concerns			
2 <input type="checkbox"/>		Relationship with partner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sore or dry mouth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1 <input type="checkbox"/>		Relationship with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Feeling swollen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0 <input type="checkbox"/> No distress		Emotional concerns				Breathlessness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Loneliness or isolation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Sadness or depression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dry, itchy or sore skin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Worry, fear or anxiety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tingling in hands or feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Anger, frustration or guilt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hot flushes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Memory or concentration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Moving around or walking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Hopelessness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fatigue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Sexual concerns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sleep problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						Communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						Personal appearance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						Other medical condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For health professional use		Spiritual concerns							
Date of diagnosis:		Regret about the past	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Diagnosis:		Loss of faith or other spiritual concern	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Pathway point:		Loss of meaning or purpose in life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

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Care Plan

During my holistic needs assessment, these issues were identified and discussed:

Preferred name:

Hospital/NHS number:

Number	Issue	Summary of discussion	Actions required/by (name and date)
Example	Breathlessness	Possible causes identified Coping strategies discussed Printed information provided	Referral to anxiety management programme; CNS to complete by 24 th Dec
1			
2			
3			
4			

Other actions/outcomes e.g. additional information given, health promotion, smoking cessation, 'My actions':

Signed (patient):	Date:
Signed (healthcare professional):	Date:

For health professional use		
Date of diagnosis:	Diagnosis:	Pathway point:

Appendix 8: NCSI Treatment Summary



GP Name
GP Address

Dear Dr X

Re: Add in patient name, address, date of birth and record number

Your patient has now completed their initial treatment for cancer and a summary of their diagnosis, treatment and on-going management plan are outlined below. The patient has a copy of this summary.

Diagnosis:	Date of Diagnosis:	Organ/Staging Local/Distant
Summary of Treatment and relevant dates:		Treatment Aim:
Possible treatment toxicities and / or late effects:		Advise entry onto primary care palliative or supportive care register Yes / No
		DS 1500 application completed Yes/No
		Prescription Charge exemption arranged Yes/No
Alert Symptoms that require referral back to specialist team:		Contacts for re referrals or queries: In Hours: Out of hours:
		Other service referrals made: (delete as nec) District Nurse AHP Social Worker Dietitian Clinical Nurse Specialist Psychologist Benefits/Advice Service Other
Secondary Care Ongoing Management Plan: (tests, appointments etc)		
Required GP actions in addition to GP Cancer Care Review (e.g. ongoing medication, osteoporosis and cardiac screening)		
Summary of information given to the patient about their cancer and future progress:		
Additional information including issues relating to lifestyle and support needs:		

Completing Doctor:

Signature:

Date:

GP READ CODES FOR COMMON CANCERS (For GP Use only). Other codes available if required.
(Note: System codes are case sensitive so always ensure codes are transcribed exactly as below).

System 1	(5 digit codes)	All other systems	Version 3 five byte codes (October 2010 release)
Diagnosis:		Diagnosis	
Lung Malignant Tumour	XaOKG	Malignant neoplasm of bronchus or lung	B22z.
Carcinoma of Prostate	X78Y6	Malignant neoplasm of prostate	B46..
Malignant tumour of rectum	XE1vW	Malignant neoplasm of Rectum	B141.
Bowel Intestine	X78gK	Malignant neoplasm of Colon	B13..
Large Bowel	X78gN	Malignant neoplasm of female breast	B34..
Female Malignant Neoplasia	B34..	Malignant neoplasm of male breast	B35..
Male Malignant Neoplasia	B35..		
Histology/Staging/Grade:		Histology/Staging/Grade:	
Histology Abnormal	4K14.	Histology Abnormal	4K14.
Tumour grade	X7A6m	Tumour staging	4M...
Dukes/Gleason tumour stage	XaOLF	Gleason grading of prostate Ca	4M0..
Recurrent tumour	XaOR3	Recurrence of tumour	4M6..
Local Tumour Spread	X7818		
Mets from 1°	XaFr.	Metastatic NOS	BB13.
Treatment		Treatment	
Palliative Radiotherapy	5149.	Radiotherapy tumour palliation	5149.
Curative Radiotherapy	XalpH	Radiotherapy	7M371
Chemotherapy	x71bL	Chemotherapy	8BAD.
Radiotherapy	Xa851		
Treatment Aim:		Treatment Aim:	
Curative procedure	Xallm	Curative treatment	8BJ0.
Palliative procedure	XaiL3	Palliative treatment	8BJ1.
Treatment toxicities/late effects:			
Osteoporotic #	Xa1TO	At risk of osteoporosis	1409.
Osteoporosis	XaELC	Osteoporosis	N330.
Infection	Xa9ua		
Ongoing Management Plan		Ongoing Management Plan	
Follow up arranged (<1yr)	8H8..	Follow up arranged	8H8..
Follow up arranged (>1yr)	XaL..		
No FU	8HA1.	No follow up arranged	8HA..
Referral PRN	8HAZ.		
Referrals made to other services:		Referrals made to other services:	
District Nurse	XaBsn	Refer to District Nurse	8H72.
Social Worker	XaBsr	Refer to Social Worker	8H75.
Nurse Specialist	XaAgq		



SALT	XaBT6		
Actions required by the GP		Actions required by the GP	
Tumour marker monitoring	Xalqg	Tumour marker monitoring	8A9..
PSA	Xalqh	PSA	43Z2.
Osteoporosis monitoring	XalSd	Osteoporosis monitoring	66a..
Referral for specialist opinion	Xalst		
Advised to apply for free prescriptions	9D05	Entitled to free prescription	6616.
Cancer Care Review	Xalyc	Cancer Care Review	8BAV.
Palliative Care Review	XalG1	Palliative Care Plan Review	8CM3.
Medication:		Medication:	
New medication started by specialist	XEOhn	Medication given	8BC2.
Medication changed by specialist	8B316	Medication changed	8B316
Advice to GP to start medication	XaKbF		
Advice to GP to stop medication	XaJC2		
Information to patient:		Information to patient:	
DS1500 form claim	XaCDx	DS1500 completed	9EB5.
Benefits counselling	6743.	Benefits counselling	6743.
Cancer information offered	XalmL	Cancer information offered	677H.
Cancer diagnosis discussed	XalpL	Cancer diagnosis discussed	8CL0.
Aware of diagnosis	XaQly		
Unaware of prognosis	XaVzE		
Carer aware of diagnosis	XaVzA		
Miscellaneous:		Miscellaneous:	
On GSF palliative care framework	XaJv2	On GSF Palliative Care Framework	8CM1.
GP OOH service notified	Xaltp	GP OOH service notified	9e0..
Carers details	9180.	Carer details	9180.

Lung pathway group metrics

Last updated January 2016 [Log of updates](#)



<p>1. Cancer Waiting Times</p> <p>1.1. 2 week wait GP urgent referral to 1st seen</p> <p>1.2. 31 day decision to treat to 1st treatment</p> <p>1.3. 31 day subsequent surgery</p> <p>1.4. 31 day subsequent drugs</p> <p>1.5. 31 day subsequent radiotherapy</p> <p>1.6. 62 day GP urgent referral to 1st treatment</p> <p>1.7. 62 day consultant upgrade to 1st treatment</p> <p>1.8. 62 day GP urgent referral to 1st treatment - distribution of week treated</p>	<p>3. Patient experience</p> <p>3.1. NCPES - Q12 - Patient felt they were told sensitively they had cancer</p> <p>3.2. NCPES - Q21 - Patient given name of the CNS in charge</p> <p>3.3. NCPES - Q22 - Patient finds it easy to contact CNS</p> <p>3.4. NCPES - Q30 - Cancer Research discussed with patient</p> <p>3.5. NCPES - Q38 - Patient had confidence in doctors treating patient</p> <p>3.6 - NCPES Q44 - Enough/nearly enough ward nurses on duty</p> <p>3.7. NCPES Q53 - Patient given clear written information about what should/should not do post discharge</p> <p>3.8. NCPES Q67 - Patient given right amount of information about condition and treatment</p> <p>3.9. NCPES Q70 - Patient's rating of care very good/excellent</p>	<p>5. Diagnosis</p> <p>5.4 - Stage at diagnosis</p> <p>5.4.1 By CCG (from NCRS data)</p> <p>5.4.2 By provider (LUCADA)</p> <p>5.5 - CT before 2 week wait OPA</p> <p>5.6 - Proportion of NSCLC with a PET scan by stage</p> <p>5.7 Performance status at diagnosis (LUCADA)</p>	<p>6. Treatment</p> <p>6.5 AHP access (NCPES)</p> <p>6.5.1 - Physiotherapist</p> <p>6.5.2 - Occupational Therapist</p> <p>6.5.3 - Dietician</p> <p>6.6- HNA/Recovery package</p> <p>6.6.1 HNA At Diagnosis</p> <p>6.6.2 HNA At End of Treatment</p> <p>6.6.3 End of treatment summary</p> <p>6.6.4 Health and Wellbeing event</p> <p>6.7 - Numbers of surgical procedures by provider</p>	<p>2. Data collection /Numbers</p> <p>2.1. COSD MDT feed data quality (Level 2)</p> <p>2.1.1. Staging</p> <p>2.1.2 Basis of diagnosis</p> <p>2.1.3 Performance status</p> <p>2.1.4 CNS indicator</p> <p>2.2 COSD completeness all feeds combined (Level 3)</p> <p>2.2.1 Staging</p> <p>2.2.2 Basis of diagnosis</p> <p>2.2.3 Performance status</p> <p>2.2.4 CNS indicator</p> <p>2.2.5 Discussed at MDI</p> <p>2.3. SACT data completeness</p> <p>2.4. LUCADA data quality</p>	<p>4. Prevention/Early diagnosis</p> <p>4.1. % emergency presentation</p>	<p>6. Treatment</p> <p>6.1 SACT top 10 regimens</p> <p>6.1.1 Overall England - NSCLC</p> <p>6.1.2 By Trust - NSCLC</p> <p>6.1.3 Overall England - SCLC</p> <p>6.1.4 - By Trust - SCLC</p> <p>6.1.5 - Overall England - Mesothelioma</p> <p>6.1.6 - By Trust - Mesothelioma</p> <p>6.2 - SACT chemotherapy mortality</p> <p>6.2.1 - All lung cancers - All treatment intents</p> <p>6.2.2 - All lung cancers - Curative intent</p> <p>6.2.3 - All lung cancer - Palliative intent</p> <p>6.2.4 - Mesothelioma - All treatment intents</p> <p>6.2.5 - Mesothelioma - Palliative intent</p> <p>6.2.6 - SCLC - All treatment intents</p> <p>6.2.7 - SCLC - Curative intent</p> <p>6.2.8 - SCLC - Palliative intent</p> <p>6.2.9 - NSCLC - All treatment intents</p> <p>6.2.10 - NSCLC - Curative intent</p> <p>6.2.11 - NSCLC - Palliative intent</p> <p>6.3 Lung cancer resection rates</p> <p>6.3.1 - Resection rates (NCRS) by CCG</p> <p>6.3.2 - NSCLC (LUCADA) by provider</p> <p>6.4 Chemotherapy rates</p> <p>6.4.1 - SCLC chemotherapy rates (LUCADA)</p> <p>6.4.2 - Stage 2b and 4 NSCLC rates with performance status 0 or 1 (LUCADA)</p>	<p>7. Incidence/mortality/survival</p> <p>7.1 - Incidence rates</p> <p>Trachea, Bronchus and Lung (C33-34)</p> <p>Mesothelioma (C45)</p> <p>7.2 - Mortality rates</p> <p>Trachea, Bronchus and Lung (C33-34)</p> <p>Mesothelioma (C45)</p> <p>7.3 - Population Survival rates</p> <p>- Trachea, Bronchus and Lung (C33-34)</p> <p>- 1 year survival by cancer network</p> <p>- 1 year survival by age group</p> <p>7.4 - Provider level survival rates (LUCADA)</p> <p>7.4.1 - Median Survival of patients</p> <p>7.4.2 - 3 month survival</p> <p>7.4.3 - 1 year survival</p> <p>7.5 - Number of cases</p> <p>7.6 Number of deaths</p> <p>7.7 - Prevalence rates</p> <p>Male</p> <p>Female</p>	<p>8. Cancer research</p> <p>8.1 - Details of NCRS backed trials</p>
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Appendix 10: Treatment of Teenagers and Young Adults

Treatment for patients from the age of 16 to their 25th birthday should be in line with national guidance regarding the management of teenagers and young adults with cancer.

Patients from the age of 16 to the end of their 18th year should be treated in the principal treatment centre.

Teenagers and young adults (TYA) from the age of 19 to their 25th birthday will follow the adult pathway but should be offered choice of treatment in a TYA-designated hospital or at the principal treatment centre. TYAs in this age group should be treated either in the principal treatment centre or a designated hospital.

The principal treatment centre for South Thames is The Royal Marsden NHS Foundation Trust. The North West London TYA principal treatment centre is University College London Hospitals NHS Foundation Trust.

Principal treatment centre contacts

The Royal Marsden NHS Foundation Trust	Lead Clinician – Julia Chisholm julia.chisholm@rmh.nhs.uk TCT Nurse Consultant for Adolescents and Young Adults – Louise Soanes lsoanes@nhs.net
University College London Hospitals	Lead Clinician – Rachael Hough rachael.hough@uclh.nhs.uk TCT Nurse Consultant – Wendy King wendy.king@uclh.nhs.uk

TYA-designated centre contacts

Joint Centre (Guy's and St Thomas' NHS Foundation Trust/King's College Hospital NHS Foundation Trust)	Guy's and St Thomas'	Lead Clinician – Robert Carr robert.carr@gstt.nhs.uk Lead Nurse – Gavin Maynard-Wyatt gavin.maynard-wyatt@gstt.nhs.uk
Joint Centre (Guy's and St Thomas' NHS Foundation Trust/King's College Hospital NHS Foundation Trust)	King's College Hospital	Lead Clinician – Donal.Mclornan donal.mclornan@nhs.net Lead Nurse – Gavin Maynard-Wyatt Gavin.maynard-wyatt@gstt.nhs.uk
St George's Healthcare NHS Trust	St George's Hospital	Lead Clinician – Jens Samol jens.samol@stgeorges.nhs.uk Lead Nurse – Linda Shephard linda.shephard@stgeorges.nhs.uk
Chelsea and Westminster Hospital NHS Foundation Trust	Chelsea and Westminster (HIV and skin only)	Lead Clinician – Mark Bower (interim) mark.bower@chelwest.nhs.uk Lead Nurse – Kate Shaw (interim) kate.shaw@chelwest.nhs.uk
Imperial College Healthcare NHS Trust	Charing Cross	Lead Clinician – Josu de la Fuente (deputy) j.delafuente@imperial.ac.uk Lead Nurse – Sinead Cope sinead.cope@imperial.nhs.uk
East and North Hertfordshire NHS Trust	Mount Vernon Cancer Centre	Lead Clinician – Gordon Rustin grustin@nhs.net Lead Nurse – Laura Miles laura.miles@nhs.net

Appendix 11: Referral Form for SABR Early Stage Lung Cancer 3 to 5

Patient Details			
Patient NHS No.		Registered GP name	
Patient Hospital No.		GP post code	
Patient initials		Patient Date of Birth	
Patient's PCT			
Patient address			
Patient telephone number			
LUNG MDT Discussion Date			

1) MDT confirmed diagnosis of non-small cell lung cancer based on findings of positive histology OR positive PET scan with evidence of growth on serial CT scans	YES / NO
2) T1-T2a N0 M0 (\leq 5cm diameter)	
3) Peripheral lesions, defined as tumour edge outside a 2cm radius of main airways and proximal bronchial tree (ref to diagram of 'no-fly zone' in LCA lung SBRT guidance) – If there is uncertainty about overlap with the no fly zone the case should be referred and will be rediscussed at the treating centre's MDT	YES / NO
4) Patient declined surgery Specify	YES / NO
5) Deemed medically inoperable by a lung cancer MDT. Specify.....	YES / NO
WHO performance status 0-2	PS
Lung function FEV1 FVC Transfer factor	

The answer YES should apply to questions 1-3, 4 or 5 in order to meet the criteria for eligibility for SBRT.

Consultant making request:	Consultant Contact details:
Consultant's/SPR Name:	Consultants' signature or email:
Form completed by Date	
Please fax form to SBRT Consultant covering your MDT Fax number for DR	

Selection of Patients for Stereotactic Ablative Body Radiotherapy (SABR) for Lung

Stereotactic Radiosurgery/stereotactic Ablative Body Radiotherapy (SRS/SABR) is a form of radiation therapy that uses many small beams of radiation that are precisely targeted at the tumour or treatment site using advanced imaging systems. SABR delivers a high biologically effective dose in a limited number of fractions, with low rates of associated toxicity due to relative sparing of normal tissue.

Considerations for the MDT

- A clinical oncologist and a thoracic surgeon should be present at the MDT when the decision for SABR is made. If no thoracic surgeon is present and a decision for SABR is made, then the MDT should ensure the patient's tumour has been deemed inoperable based on local or regional surgical guidelines.

Early stage non-small cell lung cancer (Stage I and II) is optimally managed with definitive surgical resection and is considered the gold standard.

Some patients are unfit for surgery due to underlying medical co-morbidities, such as cardiopulmonary disease. Medical inoperability is regarded as the presence of co-morbid illnesses that renders the patient at higher than acceptable risk of surgical morbidity and mortality. Some patients may decline surgery, or be inoperable for technical reasons.

Patients may be medically inoperable due to:

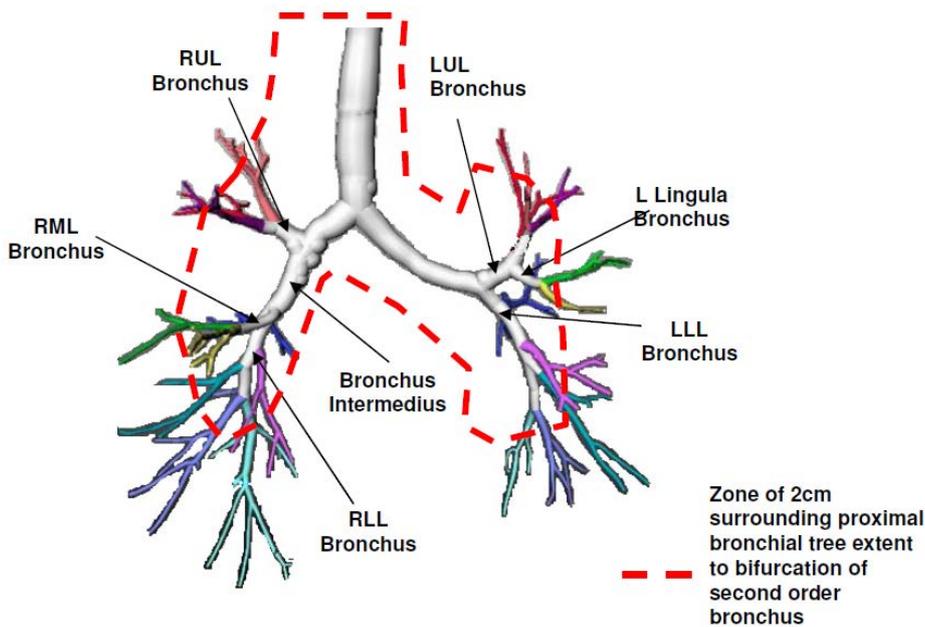
- Medical co-morbidities
- Contraindications to surgery such as those listed in the current LCA Lung Cancer Clinical Guidelines for non-small cell lung cancer. Please refer to section 10.2 of the Lung Clinical Guidelines.

These factors should be considered at the MDT in deciding a patient's suitability for surgery. If they are not suitable for surgery then SABR provides an alternative option of radical management and should be offered to the patient.

SABR is a non-invasive option for medically inoperable patients or those declining surgery. SABR involves the delivery of a high biologically effective dose of radiation in a limited number of fractions, with low rates of associated toxicity due to relative sparing of normal tissue

The following selection criteria must be satisfied in order for the patient to be considered for SABR:

- MDT diagnosis of NSCLC based on findings of positive histology **OR** positive PET scan with evidence of growth on serial CT scans and MDT consensus view that lesion is NSCLC on radiological grounds (not bronchoalveolar NSCLC carcinoma)
- Performance status 0-2
- Not suitable for surgery because of medical co-morbidity, lesion is technically inoperable or patient declines surgery
- Lung function not generally a consideration unless considering fiducial marker insertion. However most patients can manage SBRT with FEV1 as low as 25%
- T1-T2a N0 M0 (≤ 5 cm diameter)
- T3N0M0 by virtue of chest wall invasion and ≤ 5 cm diameter
- Clinical stages of T1 N0 M0 or T2 N0 M0 or T3 N0 M0 (≤ 5 cm)
- Peripheral lesions, defined as tumour edge outside a 2cm radius of main airways and proximal bronchial tree, i.e. the no fly zone. See Figure 1.

Figure 1. No-fly zone

Exclusion criteria

- Interstitial lung disease (unless the risk of SBRT has been fully considered and the patient has been appropriately consented)
- If considering fiducial marker insertion: allergy to gold, unsuitable for procedure due to medical comorbidities, coagulation that cannot be safely corrected
- Disease in no fly zone. NB some centres are now treating these patients either in the LungTECH trial or off study, so this is not necessarily an exclusion criterion. Please refer to Dr Merina Ahmed at the Royal Marsden or Dr Shareen Ahmad at Guys and St Thomas' Hospital for the trial.

Delays in referral pathway

Once a patient is considered suitable for lung SABR, the referring chest physician, surgeon or clinical oncologist should fax through a referral to a clinical SABR oncologist *within 2 days* of the MDT discussion. The MDT coordinator from the referral centre should liaise with the MDT coordinator at the treating centre to ensure that all required information has transferred across.

Delays in pathway can occur by waiting for the stereotactic meeting outcome. The MDT coordinator should ensure images are available at first MDT meeting. There can be further delays if the patient is to undergo fiducial implantation.

All the delays in the pathway can result in disease progression which could require further staging, and therefore the patient may no longer fulfil the selection criteria for SABR.

Oligometastatic disease

Oligometastatic disease – lung metastases can be considered for treatment with SABR within the commissioning through evaluation (CTE) process:

- SABR proposed treatment discussed and agreed at site specific MDT.
- Histologically or radiologically confirmed lung metastases. Histological confirmation of malignancy from either initial primary or metastases is mandatory. Consider PET-CT where appropriate to confirm staging.
- Not suitable for surgery due to medical co-morbidities, inadequate lung function or disease status.
- Tumour dimension 5cm or less in maximal size.
- Treatment of multiple lesions up to a maximum of 3 can be considered if dosimetrically achievable whilst respecting normal tissue (lung) tolerance doses using a sum plan.

Centrally located lesions lying within a 2cm radius of main airways and proximal bronchial tree are eligible for treatment with an 8# regimen (60Gy/8#).

NB: This dose and fractionation should also be used for mediastinal lymph nodes lying in this region.

No chemotherapy within 4 weeks prior to SABR.

Disease free interval from primary disease to development of metastases > 6 months.

Patient willing to attend follow up and have details collected on prospective database.

Exclusion criteria

- Previous RT within the planned treatment volume (e.g. breast RT)
- Tumour that is not clinically definable on the planning CT, e.g. surrounded by consolidation or atelectasis, unless visible on fused PET
- Interstitial lung disease (unless the risk of SABR has been fully considered and the patient has been appropriately consented)

Appendix 12: Palliative Endobronchial Therapies available for London Cancer Alliance Sites

Chelsea and Westminster Hospital

Argon plasma, diathermy and stents via flexible bronchoscopy	Contact Dr Pallav Shah Tel: 020 3315 8063
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Guy's and St Thomas's NHS Foundation Trust

Rigid Bronchoscopy under GA: Tumour debulking, cryotherapy, stent insertion	Contact: Thoracic Surgical SpR on-call Tel: 020 7188 7188
--	--

Imperial College Healthcare NHS Trust

Brachytherapy via flexible bronchoscopy	Contact Dr Frances Bowen Referral via MDT coordinator: Lung.MDT@imperial.nhs.uk
---	---

Royal Brompton & Harefield Hospital NHS Trust

Flexible Bronchoscopy: Diathermy, cryotherapy and brachytherapy. Stent Insertion.	Contact: Dr Pallav Shah Tel: 020 7351 8021
Rigid Bronchoscopy under GA: (RBH) Tumour debulking, diathermy resection, argon plasma. Stent insertion (covered and uncovered self-expanding metal and silastic/Y-stent)	Contact: Thoracic Surgical SpR on-call Tel: 020 7352 8121
Rigid Bronchoscopy under GA: (Harefield) Cryotherapy, tumour debulking, stent insertion	Contact: Thoracic Surgical SpR on-call Tel: 01895 823737

St George's University Hospital

Laser therapy, cryotherapy, stent insertion and the use of bioglue to seal fistulas via rigid bronchoscopy	Contact Prof Brendan Madden Tel 020 8725 1094 Or Thoracic SpR on-call
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University College Hospital:

Debulking of intraluminal tumour: Laser resection (GA only) Cryotherapy	Contact Dr Jeremy George Dr Neal Navani Prof Sam Janes or Airway fellow
Relief of extrinsic airway compression: Self-expanding covered removable airway stents Silicone rubber stents - jointly with ENT surgeon (GA only) Combined intraluminal and extrinsic disease brachytherapy with Iridium 192	Tel 020 3447 9005

Abbreviations

2ww	2 week wait
4-D	Four-dimensional
ABC	Active breathing control
BTS	British Thoracic Society
CNS	Clinical nurse specialist
COPD	Chronic obstructive pulmonary disease
CT	Computerised tomography
CTCAE	Common Terminology Criteria for Adverse Events (formerly known as the Common Toxicity Criteria)
CTV	Clinical target volume
CXR	Chest X-ray
DH	Department of Health
DVH	Dose-volume histogram
EBUS	Endobronchial ultrasound
ECG	Electrocardiogram
EGFR	Epidermal growth factor receptor
ERAS	Enhanced recovery after surgery
FBC	Full blood count
FEV ₁	Forced expiratory volume in one second
FNA	Fine needle aspiration
FVC	Forced vital capacity
GP	General practitioner
GTV	Gross tumour volume
Gy	Gray
HNA	Holistic needs assessment
IGRT	Image guided radiotherapy
ITV	Internal target volume
IV	Intravenous
LCA	London Cancer Alliance
LFT	Liver function test
MDM	Multidisciplinary meeting
MDT	Multidisciplinary team
MRI	Magnetic resonance imaging
NCSCCT	NHS Centre for Smoking Cessation and Training

NCSI	National Cancer Survivorship Initiative
NICE	National Institute for Health and Care Excellence
NLCFN	National Lung Cancer Forum for Nurses
NSCLC	Non-small cell lung cancer
OAR	Organ at risk
PET	Positron emission tomography
PRV	Planning organ at risk volume
PS	Performance status
PTTA	Percutaneous thermal tumour ablation
PTV	Planning target volume
RCPATH	Royal College of Pathologists
SABR	Stereotactic ablative radiotherapy
SCLC	Small cell lung cancer
SRS	Stereotactic radiosurgery
SVC	Superior vena cava
TBNA	Transbronchial needle aspiration
TKI	Tyrosine kinase inhibitor
TLCO	Total gas transfer of the lung for carbon monoxide
UEC	Urea, electrolytes and creatinine
WHO	World Health Organization

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