West Yorkshire & Harrogate* Cancer Alliance

Guidelines for the diagnosis, staging and general management of lung cancer

Updated version December 2018

*including York
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Valid on the date of publication
1. Foreword

A guideline is ‘not a rigid constraint on clinical practice, but a concept of good practice against which the needs of the individual patient can be considered’. (RCR, 1990)

It therefore remains the responsibility of the practising clinicians to interpret the application of guidelines, taking into account local service constraints and the needs and wishes of the patients.

2. Scope of guidelines

These guidelines are for patients referred with suspected lung cancer (small cell and non-small cell lung cancer).

Guidelines define structure, process and standards against which the development and quality of the service can be assessed through audit. They also allow the service to be reviewed against the ideal, in order to direct effective service development and investment, and ensure seamless care is delivered and maintained between primary, secondary and tertiary sectors.

They are intended to be used in conjunction with:

- NICE guidelines for referral of patients with suspected cancer (June 2015)
- NICE Lung cancer: diagnosis and management (April 2011)
- BTS guidelines for management of solitary pulmonary nodules (August 2015)

3. Introduction

Lung cancer is the most common cause of death from cancer for both males and females in the United Kingdom. Lung cancer incidence in Yorkshire is the third highest in the UK, and the mortality rate is also higher here than in the rest of the country.

<table>
<thead>
<tr>
<th></th>
<th>No. cases</th>
<th>Incidence</th>
<th>No. deaths</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>37436</td>
<td>78.4</td>
<td>28847</td>
<td>60.6</td>
</tr>
<tr>
<td>WY&amp;H</td>
<td>1919</td>
<td>94.7</td>
<td>1435</td>
<td>72.3</td>
</tr>
</tbody>
</table>

Table 1: Cancer incidence and deaths (2014) WY&H
Survival from lung cancer in the UK is improving, though this remains poor in comparison with other countries in Europe and North America. Lung cancer incidence is directly related to smoking and therefore tobacco use is the most important preventable cause of lung cancer in the UK. Other risk factors include exposure to occupational carcinogens (particularly asbestos) as well as naturally-occurring radon gas. Prevention of lung cancer is more likely to improve outcomes than developments in treatment, and the potential role of lung cancer screening is under review nationally.

The best chance of cure once lung cancer has developed is through early diagnosis and radical therapy. These guidelines therefore reflect developments focussing on early diagnosis, such as ‘straight to CT’, and on combining the highest-quality diagnostic and staging investigations to limit time taken treatment and diagnostic burden for patients.

The National Lung Cancer Audit (NLCA) underwent 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 shown that the NLCA has been key to significant improvements in the structure of UK lung cancer services, as well as a rise in survival rates. In addition there is a National Awareness and Early Diagnosis Initiative (NAEDI) to try and diagnose lung cancer earlier and thereby improve outcomes.

These guidelines are designed to be used by all healthcare professionals involved in lung cancer care in Trusts within the West Yorkshire & Harrogate Cancer Alliance (including York). They have been developed to take into account a wide range of clinical experience and settings. The guidelines are intended to assist in the initial assessment, investigation and management of patients. Adoption of the 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 West Yorkshire & Harrogate Cancer Alliance.

All Trusts are expected to be able to provide the standard of care detailed in these guidelines. These guidelines will be reviewed on a biennial basis in line with guidance from the National Institute for Health and Care Excellence (NICE), the British Thoracic Society (BTS), 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 guideline covers small cell, non-small cell lung cancer, and carcinoid; it does not currently cover investigation and management of mesothelioma.
4. **Smoking cessation**

Smoking is by far the most significant risk factor for lung cancer, with up to 90% of lung cancers occurring in current or ex-smokers. Lifelong ex-smokers are less likely to die from lung cancer, and smoking increases risks associated with treatment, including pulmonary complications after surgery. Smoking cessation has many health benefits beyond reduction in lung cancer risk, and Trusts should ensure that systems are in place to provide evidence-based smoking cessation support to individuals with suspected or confirmed lung cancer.

Patients should be advised to stop smoking as soon as the diagnosis of lung cancer is suspected, and the reasons for this should be explained. Nicotine replacement and other pharmacological therapies to facilitate this should be offered in line with local services and national guidelines.

Wider smoking cessation services for patients not on a lung cancer pathway should be provided by local Trusts and CCGs, as this is a highly cost-effective intervention to reduce lung cancer incidence and other cardiovascular morbidity at a population level. It is strongly recommended that the Alliance support measures to try to prevent/reduce smoking uptake among schoolchildren and to help them to stop smoking.

5. **Access to services and referral**

Lung cancer may present with a range of symptoms, or may be an asymptomatic incidental finding. GPs and secondary care physicians should maintain a high degree of clinical suspicion, particularly when assessing patients with a history of smoking or other occupational risk factors.

Patients may enter lung cancer services through a number of routes, and it is important for individual hospitals to develop pathways to ensure that patients presenting through any of these routes are triaged and receive scan and outpatient appointments in a timely manner.

A lung cancer nurse specialist (CNS) should be available at all stages of care to support patients and carers, and patients should be given the opportunity to be accompanied by relatives or friends at all appointments.

5.1 **Links with primary care**

Communication with primary care is essential both to ensure the cancer team have the information needed to triage patients and arrange appointments; and to ensure GPs are aware of diagnoses and investigation/management plans in order
to support patients in this pathway. Collaboration with primary care and emergency departments regarding referral pathways and systems will improve communication and expedite referrals and investigations.

5.2 Lung cancer referral guidelines

**GP presentation/referral for CXR**

GPs should have access to urgent chest x-rays (CXR) with rapid reporting for patients with concerning symptoms or clinical findings, and Trusts should ensure pathways are in place to alert both GP and the lung cancer MDT of the result, or to trigger an automatic CT and fast-track referral. Similarly, Trusts should have systems in place to flag scans suggesting lung cancer to the lung cancer MDT.

NICE produced guidelines in 2015 detailing indications for referral for urgent CXR:

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**Offer an urgent chest X-ray (to be performed within 2 weeks) to assess for lung cancer in people aged 40 and over if they have 2 or more of the following unexplained symptoms, or if they have ever smoked and have 1 or more of the following unexplained symptoms:**

- 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 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

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**Secondary care (2WW) referral**

A normal CXR does not exclude lung cancer and if symptoms are concerning, further cross-sectional (CT) imaging and clinical review should be arranged through the 2WW system. Referral proformas should be agreed between primary and secondary care to provide information needed to enable triage and appropriate investigations. Patients should be told at the time of referral that they are being referred on a suspected cancer pathway, and direct-to-CT pathways may be appropriate to expedite investigations. Referrals should be completed and submitted within one working day of the decision to refer.
NICE produced guidelines in 2015 to guide practitioners in identifying patients for whom urgent suspected cancer referral should be considered:

<table>
<thead>
<tr>
<th>Refer people using a suspected cancer pathway referral (for an appointment within 2 weeks) for lung cancer if they:</th>
</tr>
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<tbody>
<tr>
<td>• have chest X-ray findings that suggest lung cancer or</td>
</tr>
<tr>
<td>• are aged 40 and over with unexplained haemoptysis</td>
</tr>
</tbody>
</table>

These patients must be seen in secondary care within two weeks of referral to avoid a breach, though with the new National Optimal Lung Cancer Pathway (NOLCP) and upcoming changes to cancer wait time (CWT) targets in 2020, it is recommended that Trusts aim for patients to be seen in a clinic appointment within 7 days of referral, ideally with a reported CT and outcome of diagnostic MDT discussion.

Expediting initial clinic review is also important to allow for patients who are unable to attend or who ‘DNA’ their first clinic appointment, as these patients will need to be reappointed within the two-week window in order to avoid a target breach.

2WW referrals may be seen in a dedicated ‘fast track’ clinic, or in individual fast-track slots spread throughout clinics during the week. There are advantages and disadvantages to each, and trusts of different sizes are likely to find different models appropriate. It is however important that these slots are designated and protected as 2WW slots in order to expedite diagnosis and treatment pathways.

*Emergency referral*

Patients may present to Emergency Departments or Admission Units with symptoms of cancer as their first presentation. Emergency presentation is associated with advanced disease and (independent of stage) poorer prognosis.

As well as promoting early diagnosis initiatives, Trusts should consider use of admission avoidance or ‘hot’ clinics to facilitate rapid outpatient assessment and treatment where this may avoid the need for admission, such as in patients with symptomatic pleural effusions.

Patients with stridor, significant hypercalcaemia, suspected acute superior vena cava obstruction (SVCO) or suspected metastatic spinal cord compression (MSCC) should be referred directly to hospital for admission rather than via the 2WW system, as these are oncological emergencies that may require urgent treatment.

*Referrals from secondary care/ED*

Lung cancer may be suspected during inpatient or outpatient care for unrelated conditions. Such patients should be referred to the lung cancer team either as an inpatient or within two weeks as an outpatient. These will not always trigger the
start of a cancer wait pathway, and may need to be manually upgraded for treatment targets to apply. Trusts should consider use of direct referral pathways to avoid delays through being referred back to primary care for a 2WW referral.

6. Service Organisation

6.1 Organisation of the 2 week wait (2WW) Urgent Suspected Cancer (USC) service

The 2WW office or MDT coordinator should be informed of all abnormal X-rays that have been reported so that the patient can be tracked and appropriate review arranged.

Ideally patients should have a staging CT before their first clinic appointment if their CXR or symptoms are suspicious for lung cancer. Where locally agreed pathways exist to provide direct access CT for GPs, this should continue, provided that CTs are being performed in an appropriate timescale.

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

All 2WW 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. There should be cross cover for annual and study leave. The 2WW referral should be of sufficient quality to allow the clinician and radiologist 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 a drug history (especially metformin and anticoagulants)

Once the patient has been triaged for ‘straight to CT’, a contrast-enhanced staging CT (chest and upper abdomen +/- supraclavicular fossa) should be requested, with the scan being performed and reported before the patient’s first appointment. National target is currently 7 days but the National Optimal Pathway suggests that the CT should be completed and reported within 72 hours of referral or abnormal CXR.

CT reporting by a specialist thoracic radiologist is advocated wherever possible, with a view to planning tests following the patient’s first outpatient appointment.

If the CT scan shows no evidence of lung cancer the patient and GP can be informed and managed in the most appropriate way depending on findings. This may be in an alternative setting to the urgent suspected lung cancer clinic.
7. Diagnosis

7.1 Initial assessment

Primary and secondary care health professionals should be aware of symptoms and signs that could point to a diagnosis of lung cancer, and alert to unusual symptoms or failure to improve from what was thought to be a benign condition.

Initial assessment in secondary care should include a full, history and examination, including assessment of performance status, exercise tolerance, comorbidities and medications (including anticoagulants/anti-platelets). These should be clearly documented in clinic letters to facilitate management planning. Discussions with patients including diagnosis, prognosis and investigation/management plan should also be clearly documented. An initial assessment as to fitness for surgery and non-surgical oncological therapies should be made, and appropriate investigations arranged to clarify fitness for treatment. Patients with lung cancer may have significant comorbidities which may need optimisation to facilitate active anti-cancer treatment.

A lung CNS should be present at the initial fast track appointment to support the patient, assist in breaking bad news and should conduct a comprehensive Holistic Needs Assessment (HNA).

The following factors should be assessed at the first out-patient appointment:

- Age
- Previous/current occupation
- Smoking history (number of pack-years) and quit attempts
- Presenting symptoms of lung cancer
- Weight loss
- Comorbidity
- Social and family history
- Industrial exposure
- Drug and allergy history
- Performance status (ECOG/WHO):

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Fully active, able to carry on all pre-disease performance without restriction</td>
</tr>
<tr>
<td>1</td>
<td>Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work</td>
</tr>
<tr>
<td>2</td>
<td>Ambulatory and capable of all self-care but unable to carry out any work activities; up and about more than 50% of waking hours</td>
</tr>
<tr>
<td>3</td>
<td>Capable of only limited self-care; confined to bed or chair more than 50% of waking hours</td>
</tr>
<tr>
<td>4</td>
<td>Completely disabled; cannot carry on any self-care; totally confined to bed or chair</td>
</tr>
</tbody>
</table>
Full examination should be performed, 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

Initial blood tests (if not already performed at the time of referral) should include:

- Urea, electrolytes and creatinine
- Liver function
- Bone profile including calcium
- FBC and clotting screen

7.2 Investigations

Investigations in primary care should not delay referral unless local systems are in place to ensure that GP-arranged investigations are expedited to the same degree as those for patients referred under the 2WW system.

Patients referred with clinical or radiological concern for lung cancer should have a staging CT, which should be reviewed by a chest radiologist and lung cancer clinician (either through a diagnostic MDT or other pathway triage system) prior to their 2WW appointment. Consideration may be given to live-reporting of CT scans with extension of scanning to include the brain if a likely cancer is identified, though not all Trusts will be able to deliver live-reporting to facilitate this. As discussed above, pathways should be in place to facilitate arrangement of pre-clinic CT scans – this may involve clinician triage and requesting of scans, or may be achieved using a direct-to-CT protocol for all fast-track referrals.

Diagnostic investigations should be selected to give the maximum information regarding staging and histology, while minimising risk of complications. All patients who may be candidates for radical therapy should have a PET-CT scan and pulmonary function tests including spirometry and TLCO as a minimum, and consideration should be given to the need for additional fitness testing at the initial appointment, to avoid delays later in the pathway. This may include echocardiogram and/or cardio-pulmonary exercise testing (CPEX/CPET) for patients with cardiac history or risk factors, and optimisation of any cardiac or other comorbidities.
Advance planning of investigations is crucial to avoid delay, and pre-booking should be used where possible. This may result in cancellation of some investigations if, for example, PET-CT identifies more appropriate biopsy sites, but pre-booking avoids delays and can reduce 62-day breaches.

In order to expedite patient pathways and reduce repeated MDT discussions, ordering tests in parallel (or as ‘bundles’) is encouraged. For example fitness tests

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>CXR</td>
<td>As per NICE guidelines. May be normal even in advanced disease.</td>
</tr>
<tr>
<td>CT lower neck, chest and upper abdomen (with IV contrast)</td>
<td>Staging CT should be arranged in all suspected/newly diagnosed lung cancers to evaluate stage and treatment options – should cover liver, adrenals and supra-clavicular fossa. Results should be available at the first outpatient appointment.</td>
</tr>
<tr>
<td>CT/MRI brain</td>
<td>Should be performed in patients with neurological symptoms or other clinical concern for brain metastases; should be considered in patients for whom radical treatment is proposed, particularly for those with ≥T3 or ≥N2 disease (agreed minimal requirement).</td>
</tr>
<tr>
<td>PET-CT</td>
<td>Should be performed in all cases where radical treatment is being considered (including limited N2/3 disease on CT of uncertain pathological significance), to confirm staging and assess for occult metastatic disease. May also be indicated to target EBUS sampling in non-radically treatable patients, and to evaluate solitary pulmonary nodules, particularly when these are larger than 8mm.</td>
</tr>
<tr>
<td>CT/US-guided biopsy</td>
<td>Biopsy either primary lung lesion, neck node, adrenal or soft tissue/chest wall masses.</td>
</tr>
<tr>
<td>EBUS-TBNA/EUS</td>
<td>Indicated for histological diagnosis when mediastinal lymph nodes are the easiest/safest biopsy site in non-radically treatable disease; and for mediastinal staging (after PET-CT) in potentially radically treatable</td>
</tr>
<tr>
<td>Mediastinoscopy</td>
<td>Should be considered where there is high clinical suspicion for mediastinal nodal disease despite negative EBUS/EUS sampling; or where larger tissue sample is indicated (e.g. for lymphoma).</td>
</tr>
<tr>
<td>Adrenal MRI</td>
<td>May be used to further assess equivocal adrenal masses</td>
</tr>
<tr>
<td>MRI</td>
<td>Assessment of chest wall, vertebral, brachial plexus or great vessel involvement, particularly in superior sulcus tumours. Axial T1W &amp; T2W should be used, ideally with contrast enhancement. Coronal +/- sagittal T1W views for suspected brachial plexus involvement. STIR sequences may be helpful. MR angiography should be performed for vessel assessment if required.</td>
</tr>
<tr>
<td>Bone scan/MRI</td>
<td>Symptoms of bone metastases, neurology suggestive of spinal cord or nerve root compression</td>
</tr>
<tr>
<td>Pulmonary Function Tests</td>
<td>Indicated in all patients who may be candidates for radical treatment, or where comorbidities/symptoms suggest obstructive/restrictive lung disease. Should include spirometry and gas transfer as a minimum.</td>
</tr>
<tr>
<td>CPEX/CPET</td>
<td>Should be arranged for patients with potentially resectable disease who are of borderline fitness for surgery (see Section 11.1) or have cardiac/respiratory comorbidites.</td>
</tr>
</tbody>
</table>

Valid on the date of publication
should be arranged in parallel with the diagnostic tests for any patient with potentially resectable disease, so that fitness testing does not then delay surgical resection. Similarly, if the initial staging CT shows likely mediastinal nodal disease, it is recommended that EBUS be requested and pre-booked at an appropriate time to enable test to be performed as soon as possible after the PET-CT result is available. Careful and timely review of test results is required to ensure unexpected findings or delays are acted upon appropriately, and a daily ‘board-round’ of patients undergoing active cancer investigations is recommended.

**Diagnostic investigations**

Histological or in some instances cytological diagnosis should be established in all patients before starting treatment (i.e. before surgical intervention), unless specific circumstances (lack of fitness, patient choice or inaccessibility to biopsy) make this inappropriate. Investigations should be selected to offer the most diagnostic information with the least risk of harm. Where there is evidence of distant metastases, the biopsies may be taken from the metastatic site if this can be achieved more easily than from the primary site.

**Staging investigations**

Involvement of hilar or mediastinal lymph nodes will frequently influence optimal treatment modality, and may require careful sampling to clarify staging and amenability to radical treatment. Any patient with potentially radically treatable disease on initial staging CT should have a PET-CT to look for nodal and metastatic disease, and biopsies should be arranged to give both histological and staging information where possible. This may result in multiple biopsies to clarify staging, for example if there is an equivocal neck node on PET-CT, involvement of which would preclude radical treatment.

PET-CT is a crucial investigation in the diagnosis and staging of lung cancer, and while investigations (including biopsies) should be requested in parallel as early as possible in the pathway, PET-CT is often a ‘rate-limiting’ test. Clinicians and the Alliance should work with service delivery teams to expedite access to PET-CT and to ensure that national contract targets are met.

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

Brain imaging should be considered in patients with concerning symptoms, and in asymptomatic patients with ≥T3 or ≥N2 disease in whom radical treatment is planned (agreed minimal requirement). Some Trusts perform brain imaging more routinely either as part of the initial staging scan or in all patients planned for radical treatment.
8. Lung cancer staging & pathways

8.1 TNM 8

The TNM Classification of Malignant Tumours, 8th edition (TNM 8), has recently been released and is being incorporated into NLCA data collection. While systems are being updated it may be necessary for Trusts to collect staging information under both TNM 8 and TNM 7. Radiological staging should be included in the staging CT report and PET-CT report. Final staging (prior to surgical mediastinal sampling if applicable) should be a consensus decision made at the MDT.

TNM 8 staging and stage groupings are summarised in the tables below:

<table>
<thead>
<tr>
<th>T: Primary tumour</th>
</tr>
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<tbody>
<tr>
<td>Tx</td>
</tr>
<tr>
<td>T0</td>
</tr>
<tr>
<td>Tis</td>
</tr>
<tr>
<td>T1</td>
</tr>
<tr>
<td>T1a(mi)</td>
</tr>
<tr>
<td>T1a</td>
</tr>
<tr>
<td>T1b</td>
</tr>
<tr>
<td>T1c</td>
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<tr>
<td>T2</td>
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<td>T2a</td>
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<tr>
<td>T2b</td>
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<td>T3</td>
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<td>T4</td>
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<table>
<thead>
<tr>
<th>N: Regional lymph node involvement</th>
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<tbody>
<tr>
<td>Nx</td>
</tr>
<tr>
<td>N0</td>
</tr>
<tr>
<td>N1</td>
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<tr>
<td>N2</td>
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<td>N3</td>
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### M: Distant metastasis

| M0 | No distant metastasis |
| M1 | Distant metastasis |
| M1a | Separate tumour nodule(s) in a contralateral lobe; tumour with pleural or pericardial nodule(s) or malignant pleural or pericardial effusion |
| M1b | Single extrathoracic metastasis in a single organ |
| M1c | Multiple extrathoracic metastases in one or several organs |

### Stage groupings

<table>
<thead>
<tr>
<th>Occult carcinoma</th>
<th>T0</th>
<th>N0</th>
<th>M0</th>
</tr>
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<tbody>
<tr>
<td>IA1</td>
<td>T1(mi)</td>
<td>N0</td>
<td>M0</td>
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<td>IA2</td>
<td>T1a</td>
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<tr>
<td>IVA</td>
<td>T4</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>IV B</td>
<td>T4</td>
<td>N0</td>
<td>M0</td>
</tr>
</tbody>
</table>
8.2 Regional (West Yorkshire) pathways

The current diagnostic/treatment pathways agreed by the West Yorkshire Lung Cancer MDT Clinical Leads are detailed below. The stipulated timescales represent a local consensus opinion of reasonable targets, and are a compromise between currently achievable practice, and the optimal lung cancer pathway targets detailed in Appendix 6.

8.3 National Optimal Lung Cancer Pathway (NOLCP)

A national optimal lung cancer pathway has been developed to meet the waiting time targets set out in the Independent Cancer Taskforce report. It aims to reduce delays at all stages of cancer investigations, with the potential to shorten the time to diagnosis by 2-4 months. The target specified in the pathway is for the majority of patients to be diagnosed within 14 days and treated within 28.

Specifically, the pathway aims to reduce delay from CXR to CT to less than 24 hours, to avoid emergency admission, and to allow rapid progress to treatment. For most trusts, this will require significant changes particularly in radiology, with hot reporting of all CXRs and subsequent CTs, and access to daily lung cancer clinics.

The NOLCP is detailed in Appendix 6. The triage process may be led by either primary or secondary care as detailed. This pathway represents a significant challenge for many MDTs, and particularly for radiology departments, and engagement from management, CCGs and STPs is essential to facilitate implementation.
Figure 1: Overview Lung Cancer Pathway. This overview of the diagnostic pathway is explored in more detail in the ‘Early Stage’, ‘Mediastinal’ and ‘Metastatic’ pathways over the following pages. The timings stipulated in the column on the right represent a local consensus opinion of reasonable targets, and are a compromise between currently achievable practice, and the optimal lung cancer pathway targets detailed in Appendix 6.
Figure 2: Early Stage Disease. This group of patients have potentially radically-treatable disease on their initial staging CT scan, and investigations are focussed on confirming staging and histology while assessing patient fitness for surgery or radical oncological therapy. Those patients that are potentially upstaged by PET-CT move onto the ‘Mediastinal’ or ‘Metastatic’ pathways.
Figure 3: Mediastinal Pathway. This represents the most heterogenous and challenging group of lung cancer patients, in whom disease may be borderline for radical treatment and where clear evidence for optimal treatment is lacking. Careful assessment of disease extent and burden, patient fitness and wishes is particularly important in this group, and multiple staging investigations may be required. Clinical review by more than one treating specialist may be appropriate to reach an appropriate management decision, but unnecessary delays must be avoided to minimise the risk of disease progression.
Figure 4: Metastatic pathway. In this group of patients, the focus is on confirming or refuting equivocal metastatic disease, and on identifying the subgroup of patients who may benefit from radical treatment to both primary and oligometastatic disease.
9. Pathology & Genetics

With diagnostic histology and cytology specimens, pathologists need to consider the preservation of tissue for molecular tests and balance this against the need for other ancillary investigations used in diagnosis. Unnecessary levels and immunohistochemistry (IHC) should be avoided.

In order to achieve cancer waiting time targets, initial pathology results should be available within 72 hours. IHC results may require further time (48 hours). Additional time may be required for genetic/molecular testing, though this should ideally take no longer than 7 days.

The Royal College of Pathologists (RCPath) stipulates reporting guidelines and a minimum dataset for lung cancer specimens, detailed in the References section.

**Diagnostic biopsy specimens for histology**

Biopsy material may include bronchial biopsies, CT-guided transthoracic biopsies and lymph node biopsies.

If the biopsy is positive and shows morphological evidence of adenocarcinoma (ADC) or squamous cell carcinoma (SQCC), then IHC need not be undertaken unless there is a question regarding the primary site. For this reason it is vital for clinical teams to clearly document previous or concurrent malignancies on biopsy request forms.

If the tumour is a non-small cell lung cancer (NSCLC) with no morphological evidence of ADC or SQCC, a panel of no more than two ADC-specific (e.g. TTF-1) and SQCC-specific (e.g. p63 and CK5/6) markers should be used. Classification should be undertaken using the WHO classification for resections and the updated biopsy classification. The rate of NSCLC not otherwise specified (NSCLC-NOS) should be no more than 15%.

If the tumour looks like small cell carcinoma, this can be confirmed by a panel of MNF116, CD56 and TTF-1.

If there is no evidence of tumour on initial sectioning, then further levels should be undertaken.

In advanced disease, following MDT discussion, relevant molecular testing (including for EGFR and ALK mutations and PD-L1 expression) should be done using remaining tissue in the block. If such MDT decisions cannot be reached in a timely fashion, consideration should be given to routine ‘reflex’ molecular testing of all non-squamous, non-small cell carcinomas.

**Diagnostic specimens for cytology**

Primary diagnosis may be made using traditional exfoliative samples (bronchial washings and brushings, bronchoalveolar lavage, pleural fluid) or targeted fine-needle aspiration
(FNA) specimens (lung FNA, transcarinal FNA, endobronchial ultrasound-guided FNA). Sputum cytology is rarely indicated and should be reserved for the investigation of patients who have centrally placed nodules or masses and are unable to tolerate, or unwilling to undergo, bronchoscopy or other invasive tests.

As for biopsies, particular effort should be given to determining differentiation of tumour subtype in non-small cell carcinoma, as well as distinguishing small cell carcinoma. Processing of material to cell block should be undertaken to allow immunocytochemistry and molecular tests.

10. MDT membership and function

The aim of the MDT is to ensure a coordinated approach to diagnosis, treatment and care. To facilitate this and to maximise the realised potential of the skills of the MDT, the MDT strive to maintain the characteristics set out in the NHS NCAT “The Characteristics of an Effective MDT” document (Feb 2010). 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:

- Designated respiratory physician(s)
- Designated thoracic surgeon(s)
- Clinical oncologist
- Medical oncologist (where the responsibility of chemotherapy is not undertaken by the clinical oncologist core member)
- Thoracic radiologist with an interest in lung cancer
- Histopathologist
- Lung cancer nurse specialist
- A core member of the specialist palliative care team
- MDT co-ordinator/secretary
- An individual responsible for data collection and audit

During the meeting, the staging of each case and treatment plan should be agreed.

Performance status and stage should be recorded along with data required for the National Lung Cancer Audit following discussion with the team, usually by the MDT coordinator.

Individual Trusts should have policies in place to record MDT discussions and treatment plans; an example of good practice is a proforma that can be completed during the MDT discussion, with a brief explanation of key reasoning, which can be filed in the patient’s
casenotes. If time in the meeting does not permit this, letters should be dictated for each patient to document and communicate this information.

Clinicians should 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.

Lung cancer services are required to submit data to nationally-mandated datasets for patients diagnosed with lung cancer (see section 14).

11. Treatment

Treatment for lung cancer may be curative (radical), non-curative (palliative), or symptomatic (best supportive care). The national ’25 by 25’ initiative aims for 25% of lung cancer patients to be treated surgically by 2025, which is a significant challenge and will require an increase in early diagnostics and surgical/non-surgical oncology capacity.

Selection of treatment options depends on histology, disease stage and tumour anatomy, and on patient fitness, comorbidities and wishes.

Surgery is the most common curative treatment, and may be combined with adjuvant chemotherapy or radiotherapy. Radiotherapy or chemo-radiotherapy may also be offered with curative intent.

There are two aspects to deciding whether disease can be treated curatively. The first is whether the tumour can be cleared using surgery or radiotherapy (with or without other modalities) with a high chance of effecting a cure and without causing unacceptable toxicity. The second is the patient’s fitness to undergo such treatment, and whether the risks of morbidity or mortality are acceptable to both the treating clinicians and the patient.

Where possible patients with early stage (T1-3 N0) NSCLC should first be considered for surgery as this gives the highest chance of cure, but if either the disease is unresectable or the patient is medically inoperable, radiotherapy (either alone or with synchronous or concurrent chemotherapy) may still offer cure for these patients.
The decision for referral for clinical oncology management should be identified at MDT meetings. A clinical oncologist and thoracic surgeon should be present at the MDT when treatment options are discussed for such patients. Borderline patients may need dual referral to be assessed for surgery and radiotherapy before a final management plan is agreed with the patient. All patients potentially suitable for multimodality treatment (surgery, radiotherapy and chemotherapy in any combination) should also be assessed by a thoracic oncologist and by a thoracic surgeon.

The mainstay of palliative-intent anti-cancer treatment is chemotherapy (including TKI therapy and immunotherapy), though palliative radiotherapy and palliative surgery may also play a role.

11.1 Radical treatment: Surgery

For patients with non-small cell lung cancer (NSCLC), surgical resection is the intervention most likely to result in long-term cure, though there is significant variation in resection rates between MDTs. It is therefore essential that a thoracic surgeon attends every lung cancer MDT meeting and that all patients with early-stage disease are considered for resection.

Lobectomy with lymph node sampling is the gold standard and most common resection for lung cancer. Some patients will require a bilobectomy or pneumonectomy, which carries a higher risk of mortality and post-operative morbidity. Parenchymal-sparing procedures, such as anatomical segmentectomies or broncho-angioplastic procedures can be considered in patients with borderline lung function for a lobectomy, though non-surgical options may also be considered in such cases. Video-assisted (VATS) surgery should be considered wherever possible.

Careful fitness testing is important in selecting appropriate patients for surgical resection. Diagnostic work-up and referral checklist are detailed below:
Patients with any of the following physiological parameters will be listed for the High Risk MDT (these patients should all have a CPEX/CPET prior to discussion):

- PS ≥2
- Age ≥80yrs
- Abnormal echocardiogram: moderate LV/RV dysfunction or moderate valve disease
- ppo-FEV1 ≤40%
- ppo-DLCO ≤40%
- BMI <20
- Shuttle walk <400m OR Stair climbing test <2 flights
- Possibility of pneumonectomy required

Following surgery, pathological stage should be reviewed and the need for adjuvant treatments assessed on the basis of the final pathological staging. Careful consideration should be given to balancing potential benefits and toxicities.
11.2 Radical treatment: non-surgical oncology

Radiotherapy is provided regionally by Leeds Teaching Hospitals at SJUH.

Patients with stage I–III NSCLC who are not suitable for surgery should therefore be offered assessment by a clinical oncologist specialising in thoracic oncology for radiotherapy with curative intent.

Patients can be referred to clinical oncology for consideration of Stereotactic Ablative Radiotherapy (SABR), radical radiotherapy or combination chemoradiotherapy, all of which may be given with curative intent. Patients with advanced disease may also be referred for palliative intent radiotherapy (see below).

As treatment options change frequently, with availability of new evidence and treatments, this guideline does not address specific radiotherapy regimes. Non-surgical lung cancer treatment guidelines can be found at the following sites:

https://www.esmo.org/Guidelines/Lung-and-Chest-Tumours

https://www.nccn.org/professionals/physician_gls/default.aspx

11.3 Palliative treatment

Management of metastatic non-small cell lung cancer

Most patients have advanced stage disease at time of diagnosis. The overall goals of palliative treatments are to improve symptoms, preserve or improve quality of life and prolong survival.

- Palliative chemotherapy

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.

Systemic therapies should be delivered in accordance with NICE clinical guidelines and therapies available via the Cancer Drugs Fund.

Choice of systemic agent(s) should be guided by performance status and comorbidities, histological subtype, and the presence of a sensitising mutation in genes with approved therapeutic agents

As treatment options change frequently, with availability of new evidence and treatments, this guideline does not address specific radiotherapy regimes. Non-surgical lung cancer treatment guidelines can be found at the following sites:
• **Palliative radiotherapy**

*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.

*Painful bone metastases:*
Consider referral for prophylactic pinning of weight-bearing bones

*Brain metastases*
Brain metastases confirmed on MRI scan in patients with disease controlled at other sites should be considered for a neurosurgical opinion or for stereotactic radiosurgery (‘gamma knife’). The number of brain metastases that can be treated varies depending on the size and site of metastases and specialist opinion should be sought in patients with fewer than 5 lesions on MRI, providing that none are greater than 3cm in maximum diameter.

*Spinal cord compression*
Patients with suspected spinal cord compression should have an urgent whole spine MRI scan with view to referral to the local Metastatic Spinal Cord Compression pathway (MSCC).

Trusts should have a point of contact for MSCC with a coordinator who will help with risk assessment and liaise with medical teams regarding need for admission versus outpatient management.

**Management of Small Cell Lung Cancer (SCLC)**

All patients should be discussed in MDT and referred to medical oncology with a view to treatment in line with local oncology guidelines, within 7 days of pathological diagnosis.

Surgery for SCLC is not usually possible however may be considered in histologically proven T1–3, N0 SCLC (the merits of each case should be discussed at the MDT), as per BTS guidelines 2010.

In general, patients with limited stage SCLC should be treated with a combination of chemotherapy and radiotherapy. Clinical trials have reported better survival in patients randomised to concurrent chemo-radiotherapy compared with sequential chemo-radiotherapy.
Patients with extensive stage disease (T0–4, N0–3, M1; or M0 medically unsuitable for radical therapy) should be considered for treatment with platinum-based chemotherapy. Unlike NSCLC, poor performance status is not a contraindication to chemotherapy in this context, and dose-attenuated chemotherapy should be considered.

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 six months or more from last dose of chemotherapy).

11.4 Specialist Palliative and End of Life Care

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’.

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.

Close liaison with the palliative care team at MDT or otherwise and referral to local palliative care guidelines is recommended. Communication with primary care is essential to ensure holistic and timely management of symptomatic deterioration.

12. Survivorship & Follow-up

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.

Patients with lung cancer should be offered a specialist follow-up appointment within six weeks of completing initial treatment, and regular specialist follow-up thereafter, which can include protocol-led clinical nurse specialist follow-up. Patients who have received curative intent treatment will be followed up either by the treating clinician or the respiratory team, depending on local policies. There is currently no peer-reviewed published evidence to guide follow-up after radical treatment currently, but most Trusts use a combination of clinical and radiological (CT or CXR) follow-up for a period of 18-24 months or longer. Holistic Needs Assessment (HNA) should be completed at the end of radical-intent
treatment, and offers an opportunity to identify and discuss patient concerns and provide support. Review and management of other chronic disease including COPD, and reinforcement of smoking cessation are important aspects of any survivorship programme.

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.

13. Communication

Communication with patients

Patients being investigated for suspected cancer should have the opportunity to make informed decisions about their care and treatment, taking into account individual needs and preferences. They should be supported in understanding the information needed to make these decisions, and cultural preferences should be considered at all stages. Good communication is central to this, whether face-to-face or by telephone or email contact with the lung cancer nurse specialist team. While bad news should be delivered in person as much as possible, some patients will prefer to hear even bad news by telephone if it may expedite investigations and treatment.

Patients should be managed by the same group of doctors and nurses throughout their pathway where possible, though investigations and management should not be delayed by absence of any individual clinician. They should be made aware they can bring a family member or friend to appointments, and this should be encouraged by primary care for the first appointment, particularly where bad news is expected.

Information should be delivered in a clear and understandable way, with the assistance of pictures and written information where appropriate. A Patient Consultation Record, with written details of consultations should be offered, and information should be made available in other languages where appropriate. Clinicians involved in the management of patients with lung cancer should complete training in advanced communications skills and should seek regular feedback.

End-of-life care discussions

Discussions about care at the end of life should be addressed sensitively and at an appropriate time. Leaving such discussions until terminal phases of illness should be avoided where possible.
Communication between health professionals

GPs should be informed by telephone or fax by the end of the next working day when a patient has a new diagnosis of lung cancer. Clear lines of communication are important both between primary and secondary care, and between members of the MDT, in order to optimise patient care and ensure it is delivered in a timely manner.

14. Audit & data requirements

Lung cancer services must submit data to a number of national datasets, and local service audit is also encouraged, including biopsy performance and outcomes. National datasets are listed below:

- **Cancer Outcomes and Services Dataset (COSD)**
  This is a mandatory dataset for all tumour types including lung cancer, and details can be found on the National Cancer Intelligence Network (NCIN) website: [www.ncin.org.uk/collecting_and_using_data/data_collection/cosd.aspx](http://www.ncin.org.uk/collecting_and_using_data/data_collection/cosd.aspx).

- **National Clinical Lung Cancer Audit (NCLA – previously LUCADA)**
  The LUCADA audit has existed since 2004, requiring Trusts to submit data for patients diagnosed with lung cancer. Details of the dataset can be found on the Health & Social Care Information Centre website at [www.hsic.gov.uk/lung](http://www.hsic.gov.uk/lung).

- **Systemic Anti-Cancer Therapy (SACT) chemotherapy dataset**
  Trusts that provide chemotherapy to patients are required to submit data to the SACT dataset – details can be found at [www.chemodataset.nhs.uk/home.aspx](http://www.chemodataset.nhs.uk/home.aspx).

- **National Radiotherapy Dataset (RTDS) 16**
  Trusts that provide radiotherapy to patients are required to submit data to the RTDS, details of which can be found at [www.canceruk.net/rtservices/rtds/](http://www.canceruk.net/rtservices/rtds/).

- **National Cancer Waiting Times Monitoring Data Set**
  Trusts are required to submit data to the Cancer Waiting Times (CWT) 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.
References


Independent Cancer Taskforce, Achieving World Class Lung Cancer Outcomes: Taking the Strategy Forward (May 2016)


National Institute for Health and Care Excellence (NICE) Clinical Guideline CG121 Lung Cancer: Diagnosis & Management (2011)


Union for International Cancer Control (UICC), TNM Classification of Malignant Tumours 8th edition (TNM 8) Wiley-Blackwell (December 2016)
Appendices

1. Staging – TNM 8
2. Core MDT team
3. Extended (non-core) specialists contributing to cancer team
4. Regional MDT contact details
5. Diagnostic pathways
6. NLCOP
7. Surgical fitness assessment
## Appendix 1: Staging – TNM 8

### T: Primary tumour

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Tx</td>
<td>Primary tumour cannot be assessed, or tumour proven by presence of malignant cells in sputum or bronchial washings but not visualized by imaging or bronchoscopy</td>
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<tr>
<td>T0</td>
<td>No evidence of primary tumour</td>
</tr>
<tr>
<td>Tis</td>
<td>Carcinoma in situ</td>
</tr>
<tr>
<td>T1</td>
<td>Tumour ≤3 cm in greatest dimension, surrounded by lung or visceral pleura, without bronchoscopic evidence of invasion more proximal than the lobar bronchus (i.e. not in the main bronchus)</td>
</tr>
<tr>
<td>T1a(mi)</td>
<td>Minimally invasive adenocarcinoma</td>
</tr>
<tr>
<td>T1a</td>
<td>Tumour ≤1 cm in greatest dimension</td>
</tr>
<tr>
<td>T1b</td>
<td>Tumour &gt;1 cm but ≤2 cm in greatest dimension</td>
</tr>
<tr>
<td>T1c</td>
<td>Tumour &gt;2 cm but ≤3 cm in greatest dimension</td>
</tr>
<tr>
<td>T2</td>
<td>Tumour &gt;3 cm but ≤5 cm or tumour with any of the following features: ▪ Involves main bronchus regardless of distance to the carina but without involving the carina ▪ Invades visceral pleura ▪ Associated with atelectasis or obstructive pneumonitis that extends to the hilar region, either involving part of the lung or the entire lung</td>
</tr>
<tr>
<td>T2a</td>
<td>Tumour &gt;3 cm but ≤4 cm in greatest dimension</td>
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<tr>
<td>T2b</td>
<td>Tumour &gt;4 cm but ≤5 cm in greatest dimension</td>
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<tr>
<td>T3</td>
<td>Tumour &gt;5 cm but ≤7 cm in greatest dimension or one that directly invades any of the following: chest wall (including superior sulcus tumors), phrenic nerve, parietal pericardium; or associated separate tumour nodule(s) in the same lobe as the primary</td>
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<tr>
<td>T4</td>
<td>Tumour &gt;7 cm in greatest dimension or one that invades any of the following: diaphragm, mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, oesophagus, vertebral body, carina; separate tumour nodule(s) in a different ipsilateral lobe to that of the primary</td>
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### N: Regional lymph node involvement

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td>Nx</td>
<td>Regional lymph nodes cannot be assessed</td>
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<tr>
<td>N0</td>
<td>No regional lymph node metastasis</td>
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<tr>
<td>N1</td>
<td>Metastasis in ipsilateral peribronchial and/or ipsilateral hilar lymph nodes and intrapulmonary nodes, including involvement by direct extension</td>
</tr>
<tr>
<td>N2</td>
<td>Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s)</td>
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<tr>
<td>N3</td>
<td>Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s)</td>
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### M: Distant metastasis

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td>M0</td>
<td>No distant metastasis</td>
</tr>
<tr>
<td>M1</td>
<td>Distant metastasis</td>
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<tr>
<td>M1a</td>
<td>Separate tumour nodule(s) in a contralateral lobe; tumour with pleural or pericardial nodule(s) or malignant pleural or pericardial effusion</td>
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<tr>
<td>M1b</td>
<td>Single extrathoracic metastasis in a single organ</td>
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<td>M1c</td>
<td>Multiple extrathoracic metastases in one or several organs</td>
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<td>Stage groupings</td>
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<td>IVB</td>
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Appendix 2: Core MDT team

- Designated respiratory physician(s)
- Designated thoracic surgeon(s)
- Clinical oncologist
- Medical oncologist (where the responsibility for chemotherapy is not undertaken by the clinical oncologist core member)
- Thoracic radiologist with an interest in lung cancer
- Histopathologist
- Lung Cancer Nurse Specialist(s)
- A core member of the specialist palliative care team
- MDT co-ordinator/secretary
- An individual responsible for data collection and audit
- An NHS-employed member of the core or extended team should be nominated as having specific responsibility for users’ issues and information for patients and carers
- A member of the core team nominated as the person responsible for ensuring recruitment into clinical trials and other well designed studies is integrated into the function of the MDT
Appendix 3: Extended (non-core) specialists in the cancer team

<table>
<thead>
<tr>
<th>Dietitian</th>
<th>All lung cancer patients with &gt;10% pre-illness unintentional weight loss in previous 3 months should be offered referral to a State Registered Dietitian for assessment and advice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational Therapy (OT)</td>
<td>On receipt of referral, the OT should ensure that a full assessment of the patient’s occupational performance is carried out within 3 working days. This should include reference to their physical, perceptual, cognitive and psychosocial needs. A referral received for a terminally-ill patient wishing to return home should be treated as a priority. The referral plan should be continually evaluated and documented in the patient’s medical notes. OTs should aim to undertake high priority assessment and provide necessary equipment to aid discharge within 24 hours of receipt of referral.</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>On receipt of referral, the physiotherapist will assess the patient according to their physical, functional and psychosocial needs. Patients should be assessed and optimised both pre- and post-operatively, including assessment for respiratory care, rehabilitation and safe discharge planning. Post-operative assessment should be carried out on the second day to assess mobility and post-operative in-patient referrals should be seen within one working day, with commencement of treatment within three working days of request.</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>There should be access to a comprehensive pharmacy service, co-ordinated by a nominated pharmacist offering expertise in oncology.</td>
</tr>
<tr>
<td>Chaplaincy &amp; bereavement services</td>
<td>There should be access to Chaplaincy services for patients, carers and health care workers. A spiritual needs assessment and care plan should be included in every patient’s notes or patient held records.</td>
</tr>
</tbody>
</table>
| Social services | All lung cancer patients should be offered referral for assessment by a Social Worker. On receipt of referral, an assessment will be undertaken of the patient, carer and family needs. Help can be offered with:  
  - Care in the community  
  - Emotional support  
  - Housing  
  - Financial support  
  - Residential or Nursing Home care  
  - Welfare, benefits & financial support  
  - Childcare |
| Support groups | A local support group should be established, where contact between support group members and patients concerning clinical matters must be made under the supervision of the lung cancer nurse specialists. |
## Appendix 4: Regional MDT contact details

<table>
<thead>
<tr>
<th>Hospital Trust</th>
<th>MDT location</th>
<th>MDT clinical lead</th>
<th>MDT coordinator</th>
<th>Contact number/email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airedale NHS Foundation Trust</td>
<td>Airedale Hospital</td>
<td>Dr Justin Tuggey</td>
<td>Lisa Norton</td>
<td><a href="mailto:Lisa.norton@anhst.nhs.uk">Lisa.norton@anhst.nhs.uk</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>01535 292978</td>
</tr>
<tr>
<td>Bradford Teaching Hospitals NHS Foundation Trust</td>
<td>Bradford Royal Infirmary</td>
<td>Dr Leanne Cheyne</td>
<td>Jas Kaur</td>
<td>01274383585</td>
</tr>
<tr>
<td>Calderdale &amp; Huddersfield NHS Foundation Trust</td>
<td>Halifax Hospital</td>
<td>Dr Rehan Naseer</td>
<td>Zoe Smithurst (to May 2019)</td>
<td><a href="mailto:PPCTeam@cht.nhs.net">PPCTeam@cht.nhs.net</a></td>
</tr>
<tr>
<td></td>
<td>Huddersfield Hospital</td>
<td></td>
<td>Nicola Ward (from May 2019)</td>
<td>01484 355498</td>
</tr>
<tr>
<td>Harrogate Hospitals NHS Foundation Trust</td>
<td>Harrogate Hospital</td>
<td>Dr Claire Taylor</td>
<td>Rose Irvine</td>
<td>01423 553032</td>
</tr>
<tr>
<td>Leeds Teaching Hospitals NHS Trust</td>
<td>St James University Hospital</td>
<td>Dr Kirsty Rodger</td>
<td>Cassy Billington</td>
<td><a href="mailto:leedsth-tr.LungMDT@nhs.net">leedsth-tr.LungMDT@nhs.net</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0113 2064685/64685</td>
</tr>
<tr>
<td>Mid-Yorkshire NHS Trust</td>
<td>Pinderfields</td>
<td>Dr Parry Blaxill</td>
<td>Adele Varley</td>
<td><a href="mailto:Lung.mdt@midyorks.nhs.uk">Lung.mdt@midyorks.nhs.uk</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>01924 543541</td>
</tr>
<tr>
<td>York Teaching Hospitals NHS Trust</td>
<td>York</td>
<td>Dr Alison Gill &amp; Dr Nicola Haley (shared lead)</td>
<td>Amanda Bardy</td>
<td>01904 7721119</td>
</tr>
</tbody>
</table>
Appendix 5: Diagnostic pathways

Overview Lung Cancer Pathway (2017)

1. **2WW referral or abnormal CXR (radiology alert recommended)**
   - Time (days)
     - 0
     - 0-5
     - 1-7

2. **Review of CT (diagnostic MDT or daily review of reports by chest team)**
   - Tests planned e.g. PET-CT, EBUS, bronchoscopy, CT biopsy, MRI

   - **No malignancy**
     - See in clinic or may be discharged (local policies)
   - **Likely cancer diagnosis**
     - Diagnostic tests required
   - **CT surveillance**
     - See in clinic and follow-up according to protocol

3. **Outpatient appointment (if required)**
   - CT result explained
   - Tests organised as per diagnostic MDT and patient wishes
   - Holistic needs and fitness assessment
   - Time (days)
     - 2-10

4. **Main MDT**
   - Discuss test results and make provisional management plan (further investigations if required)
   - Time (days)
     - 8-20

5. **Outpatient appointment (if needed to discuss results and MDT outcome)**
   - Direct referral to speciality for planning of treatment may be appropriate if patient already aware of diagnosis
   - Time (days)
     - 15-25

6. **Clinical oncology**, **Medical oncology**, **Surgery**, **BSC/Specialist palliative care**
   - Time (days)
     - 26-38

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Yorkshire Lung Cancer Group pathway – Overview (March 2017)

Review date: March 2020

Valid on the date of publication
Mediastinal Pathway (2017)

Abnormal CXR/CT or 2WW referral
CT shows Tx N2/3 (mediastinal) M0 disease

Review CT (diagnostic MDT if possible)
Assess likely best test to confirm staging and gain tissue diagnosis

Outpatient appointment (with CNS)
- Fine needle aspiration biopsy assessment – establish fitness for treatment
- Arrange diagnostic and staging tests in agreement with patient
- Give information about investigations and potential treatment options

If neck nodes present > 1 cm on CT and/or palpable consider USS/FNA neck node
- If disease and patient potentially radically treatable arrange PET-CT scan & CT/ MRI brain
- Consider shuttle wall test, echo. OPEX, other tests as indicated
- Book EBUS to take place as soon as possible after PET result available

EBUS for mediastinal staging if nodes FOG and/or > 1 cm
EBUS for focus of best biopsy target or isolated central tumour amenable to EBUS sampling

IF PET-CT shows metastatic disease or patient unfit for EBUS or radical treatment, biopsy primary or metastatic lesion (with immunohistochemistry and genmolecular testing where indicated) as in metastatic pathway

Main MDT review with treating clinicians

N3 disease proven
- Unsuitable for radical treatment
- OP appointment if needed

EDUS negative for malignancy
- Assume true negative
  - Biopsy of primary lesion if accessible before enrolment for radical treatment
- Assume false negative
  - Re-eval EBUS or refer for medastinoscopy

Patient suitable for active anticancer treatment?

No
- ESC or specialist palliative care

Yes
- OP appointment if needed

Patient and disease suitable for surgery/radical treatment?

No
- Refer for palliative oncology treatment

Yes
- Refer for radical treatment

*If patient is ever of cancer diagnosis and likely management plan, further outpatient appointments may not be necessary, and referral directly to treating clinician may be appropriate to expedite treatment

Yorkshire Lung Cancer Group pathways – Mediastinal Pathway (March 2017)  Review date: March 2020

Valid on the date of publication
Appendix 6: National optimal lung cancer pathway (NOLCP)

National Optimal Lung Cancer Pathway
For suspected and confirmed lung cancer: Referral to treatment
UPDATE 2017 Version 2.0

Maximum times

High clinical suspicion?
- Yes
- No

Urgent or routine CXR

CT suspicious of lung cancer? (reported before patient leaves department or within 24h)
- Yes
- No

CT within 24h if clinically indicated; inpatients seen within 48h by acute oncology, respiratory and/or supportive/palliative services

CT same day / within 72h

CT abnormal?
- Yes
- No

TRIAGE (*1,2) - by radiology or respiratory medicine according to local protocol
Lung cancer suspected?

Direct biopsy option (*3)
- Yes
- No

Fast track lung cancer clinic. Meet LCNS.
Diagnostic process plan / diagnostic planning meeting prior to clinic
Treatment of comorbidity and palliation / treatment of symptoms

Suitable for potentially curative treatment? #
- Yes
- No

Curative Intent Management pathway (*4)
Test bundle requested at first OPA
including at least: PET-CT, spirometry and as required: detailed lung function and cardiac assessment / ICHD.
Meet with LCNS and receive information.

Further investigation(s) indistinct?
- Yes
- No

Will pathological diagnosis influence treatment and is potential treatment appropriate to patient’s wishes?

Investigations to yield maximum diagnostic AND staging information with least harm. Results available within 3 days for subtype and 10 days for molecular markers.

Clinical diagnosis or patient preference means no further investigations required.

Full MDT discussion of treatment options

Further investigation(s) required?
- Yes
- No

Further discussion needed?
- Yes
- No

Follow-up Lung Cancer Clinic
OPA present

OPA with treating specialist (within 3 working days)

Further investigation(s)?
- Yes
- No

First Treatment

Specialist supportive / palliative care +
Other palliative treatments
Chemotherapy
Radiotherapy
Surgery

Maximum times

Day 3-6

Day 0-3

Day 1-6

Day 21

Day 28

Day 33

Day 42

Day 49!

Throughput pathway - consider every 6 weeks after referral, offer supportive, palliative care, e.g. by LCNS. GP specialists in palliative care encourage ongoing, continued support.

*Refer to separate numbered pathway detail
# Low threshold for curative intent pathway; may discuss with wider MDT if unsure
+ See also all diagnosis and staging tests may be in a tertiary centre
* All patients with stage IV cancer should be routinely offered an assessment
$ Reflects the aim for reduced time to treatment: the national target remains 62 days

Valid on the date of publication
Triage system for referrals to the lung cancer service: secondary care leads the management process

Triage refers to the process of selecting the appropriate route based on clinical data.

This pathway places the responsibility for managing all patients referred for suspected lung cancer within secondary care. It ensures patients with other conditions that may require secondary care are given appointments and patients not requiring secondary care are directed back to primary care.

**TRIAGE**
Respiratory physician ± radiologist triages with CT and clinical features
Lung cancer likely?

- **Fast track lung cancer clinic.**
  Meet LCNS.
  Diagnostic process plan / diagnostic planning meeting prior to clinic.
  Treatment of co-morbidity and palliation / treatment of symptoms.

- **Non lung cancer pathway**
  Respiratory condition requiring urgent appointment including other cancer?
    - Yes
      - Urgent respiratory clinic or other fast track cancer referral
        - Urgent communication with GP or direct admission depending on condition found or suspected
    - No
      - Urgent non-respiratory condition?
        - Yes
          - Write to GP and patient
        - No
          - Ongoing symptoms / need for non-urgent respiratory OPA?
            - Yes
              - Non-urgent respiratory OPA including management of pulmonary nodules
            - No
              - GP meets/communicates with patient. Still requires respiratory OPA?
                - Yes
                  - GP manages patient
                - No

Recommendations for the management of pulmonary nodule can be found in the British Thoracic Society guidelines on the investigation and management of pulmonary nodules.
Pathway Detail 2
Triage system for referrals to the lung cancer service: primary care leads the management process

Triage refers to the process of selecting the appropriate route based on clinical data.

This pathway places the responsibility for managing all patients referred for suspected lung cancer within secondary care. It ensures patients with other conditions that may require secondary care are given appointments and patients not requiring secondary care are directed back to primary care.

Recommendations for the management of pulmonary nodules can be found in the British Thoracic Society guidelines on the investigation and management of pulmonary nodules.
Pathway Detail 3
Direct to biopsy variation

This pathway allows for early diagnostic biopsy where other tests are not required for staging and treatment. Such patients include those that have obvious advanced disease that is not suitable for treatment with curative intent. Patients potentially suitable for curative intent generally require a PET-CT to clarify diagnosis (for small pulmonary nodules) staging and the most appropriate first diagnostic and staging investigation. Direct biopsy investigations include neck ultrasound guided biopsy, percutaneous lung biopsy, endobronchial ultrasound needle biopsy, pleural aspiration and pleural biopsy. The direct biopsy pathway has the potential to provide a rapid diagnosis for some patients where detailed staging and fitness investigations are not needed to guide management.

Day 0-3

Triage
By radiology or respiratory medicine according to local protocol
Lung Cancer Likely?

Yes
No

Manage

Suitable for potentially curative treatment?

Yes
No

Will pathological diagnosis influence treatment and is potential treatment appropriate to patient’s wishes?

Yes
No

Staging investigation not required to guide management
Clinical diagnosis or patient preference means no biopsy required.

Day 1-5

Fast track lung cancer clinic. Meet LCNS.
Diagnostic process plan / diagnostic planning meeting prior to clinic
Treatment of co-morbidity and palliation / treatment of symptoms

National Optimal Pathway

Valid on the date of publication
Pathway detail 4
National Optimum Curative Intent Management Pathway

Patients who are potentially suitable for curative treatment usually require multiple investigations to accurately assess their diagnosis, stage, and fitness. The capacity to provide rapid access to these investigations may be limited and so the logistics of scheduling needs to be optimised to prevent long waiting times. This pathway fast tracks these patients by requesting tests concurrently, supported by pre-planned availability of urgent test appointments e.g. lung biopsy, bronchoscopy, endobronchial ultrasound, mediastinoscopy, ECHO, and complex lung function. Reference should be made to the British Thoracic Society guidelines for the radical management of lung cancer and the NICE guidelines for the investigation and management of suspected lung cancer. To prevent delays in treatment, consider early notification of thoracic surgeons or clinical oncology to help with scheduling.

Fast track lung cancer clinic
± diagnostic planning meeting / Diagnostic MDT
Meet lung cancer nurse specialist

Stage: Potentially T1-3 N0-2 M0 (N2 non-bulky; i.e. <3cm)
Or locally advanced; potential for radical RT?
May include selected patients with oligometastatic disease

Yes

Potentially fit enough for treatment with curative intent and willing to consider this?
(Ensure low threshold for proceeding with work up for curative treatment)

Yes

Simultaneous fast track:
Patients with borderline fitness add:
- Preoperative rehabilitation
- Shuttle walk test / CPEX / ECHO
- Perfusion scan if required
- Early cardiology assessment for cardiac co-morbidity

All patients:
- Medical optimisation (incl. smoking cessation)
- PET-CT (within 5 days)
- Diagnostic and staging tests
- Spirometry ±LCO
- Complete all tests within 14 days
- Alert surgeons / clinical oncology

Usual diagnosis and staging pathway

Full MDT discussion of treatment options or further investigation

Further investigation(s)*

Yes

Further discussion required*

Follow-up Lung Cancer Clinic
Cancer confirmed and treatment options discussed. Research trial considered. LCNS present

OEA with treating specialist
(within 3 days)

Further investigation(s)*

Yes

First Treatment

No

Valid on the date of publication

*There is no agreed definition of borderline fitness. NICE QS 17 (Lung Cancer) defines this as a level of fitness that could lead to a greater than average morbidity or mortality from surgery. However, modern radiotherapy techniques mean that assessment for curative treatment can be applied at lower levels of fitness than defined in QS17.
Appendix 7: Surgical fitness assessment

Diagnostic work-up

- Spirometry and diffusion capacity in all patients
- Shuttle walk/stair climb in all patients
- Echocardiogram if IHD, abnormal ECG or suspected pneumonectomy
- PET-CT in all patients
- Brain imaging (CT/MRI) if N ≥2 or T ≥3 disease (agreed minimum requirement)
- Staging EBUS if any enlarged or FDG-avid hilar/mediastinal nodes
- Pathological confirmation of lung cancer where amenable/appropriate

Referral checklist

- Staging CT (thorax, upper abdomen +/- supraclavicular fossa)
- PET-CT
- Staging EBUS report and pathology results – if applicable
- Image-guided lung biopsy report and pathology results – if applicable
- Lung function (spirometry and diffusion capacity)
- Basic functional assessment (described in referral letter)
- Echocardiogram report – if applicable
- Routine blood tests – FBC, U&Es, LFTs
- Referral letter – including performance status, BMI etc

Patients with any of the following physiological parameters will be listed for the High Risk Thoracic Surgical MDT:

- PS ≥2
- Age ≥80yrs
- Abnormal echocardiogram: moderate LV/RV dysfunction or moderate valve disease
- ppo-FEV1 ≤40%
- ppo-DLCO ≤40%
- BMI <20
- Shuttle walk <400m OR Stair climbing test <2 flights
- Possibility of pneumonectomy required