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1. Introduction

This clinical guideline has been developed and authorized by the London Cancer Lung Cancer Pathway Board for use across primary care and all hospital trusts in the integrated cancer system London Cancer.

This guideline is relevant to all healthcare professionals within London Cancer who come into contact with patients with lung cancer and their carers. It is also expected that the guideline will be of value to those involved in clinical governance in both primary and secondary care to help ensure that arrangements are in place to deliver appropriate standard of care.

There are more than 39,000 new cases of lung cancer in the UK each year and more than 35,000 people die from the condition; more than that for breast cancer and colorectal cancer combined.

Nearly 90% of lung cancers are caused by smoking. Now that fewer men smoke, lung cancer deaths in men have decreased by more than a quarter in the UK (a 27% reduction between 1971 and 2006). However, the number of women who smoke has risen and lung cancer is now the leading cause of cancer death in this group.

Only about 5.5% of lung cancers are currently cured and although the rate is rising, the rate of improvement has been slower than for other common cancers. Outcomes in the UK are worse than those in some European countries and North America. There is evidence that outcomes differ within the UK, which among other factors may be explained by variations in the standard of care.

This guideline details principle recommendations for the diagnosis and treatment of non-small-cell (NSCLC) and small-cell lung cancer (SCLC). However, there are 55 published lung cancer guidelines and where possible sections from the NICE guidance have been taken or paraphrased to ensure a logical consistency within London Cancer is maintained.


2. Scope of guidelines

All Trusts within London Cancer are expected to follow this guideline. The Trusts within London Cancer are as follows:

- **Barking, Havering and Redbridge NHS Trust**
  Queens Hospital Romford
  King George Hospital Ilford

- **Barnet and Chase Farm Hospitals NHS Trust**

- **Barts Health NHS Trust**
  Newham General Hospital
  The Royal London Hospital
This guideline is relevant to:
- Adults (18 years and older) with newly diagnosed non-small-cell lung cancer (NSCLC)
- Adults with newly diagnosed small-cell lung cancer (SCLC)
- Adults with relapsed NSCLC
- Adults with relapsed SCLC

This guideline does not cover:
- Adults with mesothelioma
- Adults with lung metastases arising from primary cancers originating outside the lung
- Children (younger than 18) with lung cancer.
- Rare lung tumours (for example, pulmonary blastoma)
- Benign lung tumours (for example, bronchial adenoma)
- Carcinoid (typical or atypical)

### 3. Access to services and referral

Symptoms and signs of lung cancer can be difficult to distinguish from those of other diseases and a referral or request for chest X-ray should happen within three weeks of presentation of symptoms (see box on page 7).

#### 3.1. Chest radiography and GP presentation

GPs should have access to chest x-rays 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.

Patients should be referred to secondary care using the *London Cancer* two-week-wait form, accompanied by a chest x-ray report.

The form is available on the *London Cancer* website here: [http://www.londoncancer.org/media/78638/london-cancer-lung-2ww-form.pdf](http://www.londoncancer.org/media/78638/london-cancer-lung-2ww-form.pdf)
Where a chest X-ray has been requested in primary or secondary care and is incidentally suggestive of lung cancer, a second copy of the radiologist’s report should be sent to a designated member of the lung cancer MDT, usually the chest physician. The MDT should have a mechanism in place to follow up these reports to enable the patient’s GP to have a management plan in place.

3.2. Urgent 2-week-wait referral

If a chest X-ray or chest computed tomography (CT) scan suggests lung cancer including pleural effusion and slowly resolving consolidation), patients should be offered an urgent referral to a member of the lung cancer multidisciplinary team (MDT), usually a chest physician.

If the chest X-ray is normal but there is a high suspicion of lung cancer, patients should be offered urgent referral to a member of the lung cancer MDT, usually the chest physician.

3.3. Urgent & emergency referral

Consider referring patients for an urgent referral to a member of the lung cancer MDT, usually the chest physician or emergency services if necessary while awaiting the result of a chest X-ray, if either of the following are present:

- Smokers or ex-smokers older than 40 years with persistent haemoptysis should be offered an urgent referral to a chest physician
- superior vena cava obstruction (swelling of the face/neck with fixed elevation of jugular venous pressure)
- stridor

3.4. Secondary care referrals and admissions to the emergency department
All patients with suspected lung cancer should be referred to the lung cancer team as an inpatient or within 2 weeks as an outpatient.

Other specialist teams who suspect a patient may have lung cancer that they have seen in outpatients or have inpatients under their care should refer directly to the lung cancer team within their trusts (usually the respiratory physicians) and ensure such patients are discussed at the lung MDT meeting. Ward referrals should be seen within 48 hours by the respiratory consultants or specialist registrar.

4. Communication

4.1. Communication with patients

The patient will be seen whenever possible by the same doctors and lung cancer specialist nurse throughout their diagnostic pathway. If the patient is going to be given a diagnosis of lung cancer, a relative, partner or friend is invited together with the lung cancer nurse specialist to break bad news. The patient can be introduced to future carers at this point, e.g. surgeon, radiotherapist, oncologist, and palliative care nurse if they are ready for this.

Find out what the patient knows about their condition without assuming a level of knowledge.

Offer accurate and easy-to-understand information to patients and their carers. Explain the tests and treatment options, including potential survival benefits, side effects and effect on symptoms.

Provide patients with the opportunity to discuss tests and treatment options in a private environment, with the support of carers, and time to make an informed choice.

Patient information is given verbally, with written supplements offered. Where a patient does not speak or understand English, a Patient Advocate who can interpret is booked to attend the consultation. Key written information should be available in alternative languages.

Consider tailor-made decision aids to help patients to:

- understand the probable outcomes of treatment options
- consider the personal value they place on benefits versus harms of treatment options
- feel supported in decision-making
- move through the steps towards making a decision
- take part in decisions about their healthcare.

Offer patients a record of all discussions that have taken place with them and a copy of any correspondence with other healthcare professionals. Ensure all communications are worded in such a way to assist understanding.
Avoid giving patients unexpected bad news by letter. Only give unexpected bad news by phone in exceptional circumstances.

4.2. End of life care discussion

Offer to discuss end-of-life care with the patient sensitively and when appropriate. Wherever possible, avoid leaving this discussion until the terminal stages of the illness.

Respect the patient's choice if they do not wish to confront future issues.

Document discussions with the patient about end-of-life care; in particular:
- specific concerns of the patient
- their understanding of their illness and its prognosis
- important values or personal goals for care
- their preferences for the types of care or treatment that may be beneficial in the future and their availability.

4.3. Communication between healthcare professionals

Share information between healthcare professionals about:
- any problems the patient has
- the management plan
- what the patient has been told
- what the patient has understood (where possible)
- the involvement of other agencies
- any advance decision made by the patient

The GP is informed by telephone or fax by the end of the next working day when a patient is given a diagnosis of lung cancer.

5. Diagnosis and staging of lung cancer

5.1. General approach

Determining the diagnosis and stage of lung cancer is important to enable patients to be offered the best possible treatment but the process can be complex. The fitness of the patient needs to be considered which itself may influence both diagnostic and treatment decisions and may require a change to the diagnostic and staging pathway.

It is axiomatic that minimizing the number of individual steps in the diagnosis and staging pathway and completing them quickly will reduce delays. Investigations that provide both diagnostic and staging information will reduce the number of steps required. The risks of tests need to be considered, and be proportionate to the potential benefits.
Where appropriate, pathways need to be flexible enough to allow management of patients to proceed with minimal diagnostic and staging information (e.g. where a patient would clearly not benefit from anything more than active supportive care or where a patient is suitable for surgical resection without a prior pathological diagnosis).

The informed decision of the patient is of over-riding importance throughout.

The challenge is to design a pathway that is both accurate and flexible enough to allow patients to choose the most appropriate treatment for them without delay.

The 7th edition of the UICC TNM classification of lung cancer should be applied in the staging of non-small cell and small cell lung cancer. However, in small cell the TNM system does not always map and the Veterans administration system of ‘limited’ and ‘extensive’ stage classification that has been used historically in many clinical trials.

Appendix 1 shows the TNM staging classification

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.

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. 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.

Consideration should be given to stopping clopidogrel and/or aspirin 7 days prior to the procedure.

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

Newer drug therapies for non-small cell lung cancer work best if they are targeted on the basis of historical sub-type and/or predictive markers. Tissue samples of sufficient size and quality are therefore required to enable pathologists to classify non-small cell lung cancer into squamous cell carcinoma or adenocarcinoma wherever possible. In addition, further tests, requiring additional tissue or cells, may also be needed to detect specific markers that predict whether targeted treatments are likely to be effective, for example epidermal growth factor receptor mutations. As more targeted therapies become available it is likely that further tests will need to be performed to detect the relevant predictive markers.
5.2. Routine diagnostics and staging for lung cancer

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Indications and notes</th>
</tr>
</thead>
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| 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  
CT should be requested by the MDT and carried out so that the result is available for the first appointment. |
| 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. |
| 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  
2. Pre-thoracotomy assessment/curative treatment  
3. Candidates for radical (non-surgical) therapy  
4. Unknown primary, probably lung                                                                  |
| Bone scan/MRI               | Symptoms of bone metastases, or neurological signs and symptoms suggestive of spinal cord or nerve root compression                                  |
| CT or US guided biopsy      | Targeting pleural, supraclavicular nodes and other distant sites. 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. |
| Blood tests                 | 1. urea, electrolytes and creatinine  
2. liver function with gamma-GT  
3. bone profile  
4. FBC and clotting screen.  
The patient should also have an electrocardiogram (ECG) if there is a cardiac history. |
| EUS / EBUS                  | Endobronchial ultrasound (EBUS) guided transbronchial needle aspiration (EBUS/TBNA) of enlarged mediastinal lymph nodes for diagnostic/staging purposes. EBUS-TBNA is indicated for biopsy of paratracheal and peribronchial intraparenchymal lung lesions and should be accessible to all MDTs for diagnosis. |
| Mediastinoscopy             | Performed where suspicion of mediastinal nodal disease remains despite negative FNA result.                                                          |
5.3. Staging for Non-small cell lung cancer

**General approach**

Patients with lung cancer suitable for radical treatment or chemotherapy, or need radiotherapy or ablative treatment for relief of symptoms, should be treated without undue delay, according to the Welsh Assembly Government and Department of Health recommendations (within 31 days of the decision to treat and within 62 days of their urgent referral).

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.

Patients with known or suspected lung cancer should be offered a contrast-enhanced chest CT scan to further the diagnosis and stage the disease. The scan should the liver and adrenals.

CT should be performed before any other sampling or bronchoscopic procedure.

In the assessment of mediastinal and chest wall invasion:

- CT alone may not be reliable
- other techniques such as ultrasound should be considered where there is doubt
- surgical assessment may be necessary if there are no contraindications to resection.

Ensure all patients potentially suitable for treatment with curative intent are offered PET-CT before treatment.

Every cancer network should have a system of rapid access to PET-CT scanning for eligible patients.

Magnetic resonance imaging (MRI) should not routinely be performed to assess the stage of the primary tumour (T-stage) in NSCLC.

MRI should be performed, where necessary to assess the extent of disease, for patients with superior sulcus tumours.

Patients should be offered EBUS-guided TBNA for biopsy for diagnosis and staging the mediastinum including peribronchial intraparenchymal lung lesions as the first test after CT scanning.

If patients with suspected lung cancer have an accessible pleural effusion, thoracocentesis is recommended under ultrasound guidance. If this is negative then image guided pleural biopsy is the next step.
Ensure adequate samples are taken without unacceptable risk to the patient to permit pathological diagnosis including tumour subtyping and measurement of predictive markers.

There should be access to molecular testing by an accredited laboratory for gene mutations (e.g. epidermal growth factor receptor (EGFR) and ALK-1), with results being entered into the pathology record for the tested specimen. Pathologists should therefore handle samples sent for suspected lung cancer judiciously and endeavor 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).

**Peripheral primary tumour**
Offer CT- or ultrasound-guided transthoracic needle biopsy to patients with peripheral lung lesions when treatment can be planned on the basis of this test.

Biopsy any enlarged mediastinal nodes (≥ 10 mm maximum short axis on CT) or other lesions in preference to the primary lesion if determination of stage affects treatment.

In patients with a solid indeterminate nodule with high suspicion for malignancy that is intensely metabolically active on PET with no other disease; surgical resection should be considered with pathological diagnosis being made after removal.

For patients with a stage IA tumour with negative CT & PET for nodal involvement, invasive preoperative evaluation of the mediastinum is not necessary.

In patients who have a peripheral nodule suspicious of lung cancer, and a tissue diagnosis is not possible due to patient factors radial EBUS can be a useful adjunct to bronchoscopic sampling.

**Central primary tumour**
Offer fibreoptic bronchoscopy to patients with central lesions on CT where nodal staging does not influence treatment. Enlarged lymph nodes (≥ 10 mm maximum short axis on CT) may be simultaneously sampled with EBUS and TBNA if required for diagnosis.

** mediastinal Staging**
Offer PET-CT as the preferred first test after CT showing a low probability of mediastinal malignancy (lymph nodes 10 mm maximum short axis on CT) for patients who are potentially suitable for treatment with curative intent.

Offer PET CT and EBUS-guided TBNA, or EUS-guided FNA as the first test for patients with an intermediate probability of mediastinal malignancy (lymph nodes between 10 and 20 mm maximum short axis on CT) that are potentially suitable for treatment with curative intent. PET CT should ideally be undertaken prior to EBUS; however this should not delay the patient’s pathway if EBUS is readily available.
Offer neck ultrasound with sampling of visible lymph nodes to patients with a high probability of mediastinal malignancy (lymph nodes >20 mm maximum short axis on CT). If neck ultrasound is negative, follow with EBUS-guided TBNA or EUS-guided FNA.

Offer neck ultrasound with biopsy of visible lymph nodes to patients that have neck nodes detected by initial CT. If negative, follow with EBUS-guided TBNA or EBUS-guided TBNA or EUS-guided FNA.

Evaluate PET-CT-positive mediastinal nodes by 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 combined EBUS and EUS for initial staging of the mediastinum as an alternative to surgical staging.

Confirm negative results obtained by EBUS-guided TBNA and/or EUS-guided FNA using surgical staging if clinical suspicion of mediastinal malignancy is high.

The local test performance of EBUS-TBNA should be the subject of audit to ensure a high level standard and quality is maintained.

**Extrathoracic Staging**

Confirm the presence of isolated distant metastases/synchronous tumours by biopsy or further imaging (for example, MRI or PET-CT) in patients being considered for treatment with curative intent.

Consider MRI or CT of the head in patients selected for treatment with curative intent, especially in stage III disease.

Offer patients with features suggestive of intracranial pathology, CT of the head with contrast followed by MRI if normal, or MRI as an initial test.

A plain radiograph should be performed in the first instance for patients with localized signs or symptoms of bone metastasis. If the results are negative or inconclusive, either a bone scan or an MRI scan should be offered.

Avoid bone scintigraphy when PET-CT has not shown bone metastases.

See Appendix 2 for the NICE Diagnostic and Staging pathway algorithms.

6. **The multi-disciplinary team (MDT)**

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

The diagnosis is usually made with a histological and cytological confirmation, 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.

6.2. Data requirements of lung cancer services

Trust must submit data to the following nationally mandated datasets for lung cancer services:

**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](http://www.ncin.org.uk/collecting_and_using_data/data_collection/cosd.aspx).

**National Audits – National Clinical Lung Cancer Audit (LUCADA)**
The LUCADA audit has existed since 2004, requiring 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 [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 of the audit and the dataset requirements are available at the dataset homepage: [www.chemodataset.nhs.uk/home.aspx](http://www.chemodataset.nhs.uk/home.aspx)

**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/](http://www.canceruk.net/rtservices/rtds/)

**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.


**Local data requirements**

Data to be submitted to London Cancer on request for system wide review and audit.

### 6.3. The role of the CNS / Key worker

Every patient should have an assigned key worker throughout their pathway of care. The key-worker is a named clinician from the core membership of the lung cancer MDT, and in the majority of cases this is the Clinical Nurse Specialist.

However, the key-worker may be differing persons at various stages of the care trajectory. For example: a member of the chemotherapy team whilst undergoing chemotherapy, a patient entered into a clinical trial may have the research nurse as the key worker.

The name of the key worker will be written on each and every MDT proforma. All patients will be made aware of who their key-worker is and have the right to ask for another named clinician.

The key-worker will provide written contact details including a telephone number for all the patients for whom they act as the key-worker.

The key worker may not be any person other than a health care professional.

### 7. Smoking cessation in lung cancer

More than 80% of deaths from lung cancer are attributable to smoking. Measures to help patients stop smoking should be undertaken. This has an additional benefit where preoperative smoking cessation reduces the risk of complications from surgery.

London Cancer will follow the NICE Guidelines 2011, for smoking cessation in lung cancer:
• Inform patients that smoking increases the risk of pulmonary complications after lung cancer surgery.
• Advise patients to stop smoking as soon as the diagnosis of lung cancer is suspected and tell them why this is important.
• Offer nicotine replacement therapy and other therapies to help patients to stop smoking in line with Smoking cessation services (NICE public health guidance 10) and Varenicline for smoking cessation (NICE technology appraisal guidance 123).
• Do not postpone surgery for lung cancer to allow patients to stop smoking.

8. Treatment for lung cancer with curative intent

8.1. Introduction

Surgery is the most common treatment given with curative intent. Others include radiotherapy, combined chemoradiotherapy and adjuvant chemotherapy.

There are many factors for the patient and healthcare professionals to consider when deciding if treatment with curative intent is appropriate. The most important factors are the likelihood of treatment achieving a cure and the fitness of the patient. The former is essentially about either the ability to clear the cancer surgically, with or without other modalities, or the ability to treat all the cancer with radiotherapy with curative intent. The latter has two components – the extent of risk to the patient in terms of mortality and the degree of morbidity (principally post-operative dyspnea and quality of life). A patient whose fitness is borderline may not be able to tolerate a more extensive resection needed to achieve cure. Ultimately decisions about treatment are made by the patient following an informed discussion. Issues can be complex, especially in borderline situations.

8.2. Assessment for curative treatment options

Perioperative mortality
When evaluating surgery as an option for patients with NSCLC, consider using a global risk score such as Thoracoscore to estimate the risk of death. Ensure the patient is aware of the risk before giving consent for surgery.

Cardiovascular function
Avoid surgery within 30 days of myocardial infarction.

Seek a cardiology review in patients with an active cardiac condition, or three or more risk factors, or poor cardiac functional capacity.

Offer surgery without further investigations to patients with two or fewer risk factors and good cardiac functional capacity.
Optimise any primary cardiac treatment and begin secondary prophylaxis for coronary disease as soon as possible.

Continue anti-ischaemic treatment in the perioperative period, including aspirin, statins and beta-blockers.

If a patient has a coronary stent, discuss perioperative anti-platelet treatment with a cardiologist.

Consider revascularisation (percutaneous intervention or coronary artery bypass grafting) before surgery for patients with chronic stable angina and conventional indications for revascularisation.

**Lung function**
Perform spirometry in all patients being considered for treatment with curative intent. Measure TLCO if breathlessness is disproportionate or there is other lung pathology (for example, lung fibrosis).

Offer patients surgery if they have an FEV1 and TLCO within normal limits and good exercise tolerance.

Offer patients with predicted postoperative FEV1 or TLCO below the recommended limit of 30% the option of undergoing surgery if they accept the risks of dyspnoea and associated complications.

Values of expected FEV1 and TLCO of >60% post operatively are markers for a lower risk of perioperative death and those less that <30% indicate an increased risk of perioperative death and cardiac complications after surgery.

When considering surgery perform a segment count to predict postoperative lung function. In patients with a post procedure FEV1 & TLCO of >60% predicted, no further tests are required unless there is discordant breathlessness.

Consider using shuttle walk testing (using a distance walked of more than 400 m as a cut-off for good function) to assess fitness of patients with moderate to high risk of postoperative dyspnoea. Consider this test when post-operative predicted FEV1 and TLCO are <60%.

If a patient is able to walk <25 shuttles or <400m consider formal performance testing with CPEX.

Consider cardiopulmonary exercise testing to measure VO2 max and assess lung function in patients with moderate to high risk of postoperative dyspnoea, using more than 15 ml/kg/minute as a cut-off for good function.

**Assessment before radiotherapy with curative intent**
A clinical oncologist specialising in thoracic oncology should determine suitability for radiotherapy with curative intent, taking into account performance status and comorbidities. See radiotherapy treatment for lung cancer (section 9).

### 8.3. Surgery

#### 8.3.1. Surgical techniques

The most common procedure performed for lung cancer in the UK is lobectomy (69%) in 2011. Video assisted thoracic surgery (VATS) accounts for only 2% of these lobectomies. Lobectomy has a lower mortality than pneumonectomy (2.4% vs. 6.2%). Segment counting is employed to predict post-operative lung function and therefore the risk of post-operative dyspnoea. This can determine whether or not surgery is offered. Perfusion scans can be used, particularly where pneumonectomy is contemplated. Sub-lobar and broncho-angioplastik resections allow fewer segments to be removed and therefore can extend the boundaries of surgery.

Careful pre-operative assessment should keep the open and closed and thoracotomy rate to below 5%, but in the UK it currently stands at 12%. PET scans and also VATs assessment may assist with this. Patients with pleural effusions which contain positive cytology should be deemed inoperable, but a full assessment of such an effusion by VATs may obtain better samples for analysis and fuller nodal assessment stations 8 and 9, as well as an assessment of pleural disease.

**Lobectomy**

Lobectomy is indicated for carcinoma if the growth is relatively peripheral and confined to one lobe (or two in the case of middle and lower right. Mortality rates for lobectomy are currently 2.5%.

**Standard Pneumonectomy**

The following indicate that a tumour is inoperable:

- Inability to separate the tumour for the aorta or SVC.
- Inability to separate the tumour from the lower end of the trachea.
- Spread of growth along the pulmonary veins and to the left atrium so that the vein cannot be divided.
- Inability to separate the tumour from the vertebral bodies.
- Tumour involving the oesophageal mucosa.

Pneumonectomy should include removal of carinal, paratracheal, pretracheal and paroesophageal lymph nodes if they appear to be involved. Mortality for pneumonectomy is around 8%, but is much higher in those over 80, when a more limited resection could be considered.

**Extended (intrapericardial) Resection**

This involves the opening of the whole pericardium around the lung root with division of the pulmonary vessels within the mediastinum. It may be considered for very central tumours or those with mediastinal extension without N2 disease.
**Sub-lobar resections**

Sub-lobar resections comprise wedge resections and segmental resections. Wedge resection involves resection of the tumour with a surrounding margin of normal lung tissue, and does not follow anatomical boundaries, whereas segmental resection involves the division of vessels and bronchi to a distinct anatomical segment(s). Segmental resection removes draining lymphatics and veins and intuitively might be expected to result in lower recurrence rates, although there is no evidence for this. Segmental resection may not always be technically feasible, and is best suited to the left upper lobe (lingula, apicoposterior and anterior segments) and the apical segment of both lower lobes.

**Broncho-angioplastic resections**

Bronchoplastic resections involve removing a portion of either the main bronchus or bronchus intermedius with a complete ring of airway followed by the re-anastomosis of proximal and distal airway. Angioplastic resections involve removing part of the main pulmonary artery followed by end-to-end anastomosis or reconstruction.

**Lung volume reduction surgery (LVRS)**

In patients who have a lung cancer within an area of severe emphysema, case series have shown that surgical resection is possible with improvement in quality of life. However, there are no randomised trials and outcome measures are not as rigorous as for the trials of lung volume reduction in emphysema. Patient selection for this approach needs to be individualised, bearing in mind the separate, but overlapping indications for LVRS and cancer surgery.

**Intraoperative nodal sampling**

There is considerable variation in the practice of lymph node sampling from lobe specific sampling to systematic nodal dissection.

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8.3.2. **Non-small cell lung cancer staging and radical treatment**

The 7th edition of the TNM Classification of Malignant Tumours is used. 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 bronchoalveolar carcinoma.

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

8.3.3. **NICE guidance for surgery with curative intent for non-small cell lung cancer**

Offer patients with NSCLC who are medically fit and suitable for treatment with curative intent, lobectomy (either open or thoracoscopic) as the treatment of first choice.

For patients with borderline fitness and smaller tumours (T1a–b, N0, M0), consider lung parenchymal-sparing operations (segmentectomy or wedge resection) if a complete resection can be achieved.

Borderline fitness patients have their respiratory function optimised medically and consideration of pre- and post-surgical pulmonary rehabilitation, but with consideration of avoiding unnecessary delays to treatment.

Offer more extensive surgery (bronchoangioplastic surgery, bi-lobectomy, Pneumonectomy) only when needed to obtain clear margins.

Perform hila and mediastinal lymph node sampling or en bloc resection for all patients undergoing surgery with curative intent.

For patients with T3 NSCLC with chest wall involvement who are undergoing surgery, complete resection of the tumour should be the aim by either extra pleural or en bloc chest wall resection.

8.3.4. **Pre-operative chemotherapy**

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

Offer postoperative chemotherapy to patients with good performance status (WHO 0 or 1) and T1–3 N1–2 M0 NSCLC.

Consider postoperative chemotherapy in patients with good performance status (WHO 0 or 1) and T2–3 N0 M0 NSCLC with tumours greater than 4 cm in diameter.

Offer a cisplatin-based combination chemotherapy regimen for adjuvant chemotherapy.

For patients with NSCLC who are suitable for surgery, do not offer neoadjuvant chemotherapy outside a clinical trial.
Ensure eligible patients have the benefit of detailed discussion of the risks and benefits of adjuvant chemotherapy.

Treat Pancoast tumours in the same way as other types of NSCLC. Offer multimodality therapy according to resectability, stage of the tumour and performance status of the patient.

8.3.5. 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.

8.3.6. 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.

8.3.7. 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.

8.3.8. 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. The caveat to this would be the finding of dysplasia or carcinoma in-situ at the endobronchial resection margin on pathology. These patients should be referred for autofluorescence bronchoscopy and surveillance.

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 regime
- 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.
9. Radiotherapy treatment for lung cancer

9.1. Radiotherapy with curative intent for non-small cell lung cancer

Radical radiotherapy is indicated for patients with stage I, II or III NSCLC who have good performance status (WHO 0, 1) and whose disease can be encompassed in a radiotherapy treatment volume without undue risk of normal tissue damage.

All patients should undergo pulmonary function tests (including lung volumes and transfer factor) before having radical radiotherapy for NSCLC.

Patients who have poor lung function but are otherwise suitable for radical radiotherapy should still be offered radiotherapy, provided the volume of irradiated lung is small.

Patients with stage I or II NSCLC who are medically inoperable but suitable for radical radiotherapy should be offered the CHART regimen.

Patients receiving radiotherapy with curative intent should be part of a national quality assurance programme.

Patients with stages IIIA or IIIB NSCLC who are eligible for radical radiotherapy and who cannot tolerate or do not wish to have chemoradiotherapy should be offered the CHART regimen.

If CHART is not available, conventionally fractionated radiotherapy to a dose of 64–66 Gy in 32–33 fractions over 61/2 weeks or 55 Gy in 20 fractions over 4 weeks should be offered.

Offer patients with stage I–III NSCLC who are not suitable for surgery an assessment by a clinical oncologist specialising in thoracic oncology for radiotherapy with curative intent.

Consider chemoradiotherapy for patients with stage II or III NSCLC who are not suitable for surgery. Balance potential benefit in survival with the risk of additional toxicities.

Ensure all patients potentially suitable for multimodality treatment (surgery, radiotherapy and chemotherapy in any combination) are assessed by a thoracic oncologist and by a thoracic surgeon.
### 9.2. Decision Tree

**Decision Tree: NSCLC, March 2013 (Adapted from Malthus Project)**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Condition</th>
<th>Treatment Options</th>
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<tbody>
<tr>
<td>Stage I</td>
<td>Surgery</td>
<td>Complete resection</td>
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<tr>
<td></td>
<td></td>
<td>Positive margins</td>
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<td></td>
<td>No surgery - medically inoperable</td>
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<tr>
<td>Stage II</td>
<td>Surgery</td>
<td>Complete resection</td>
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<tr>
<td></td>
<td></td>
<td>Positive margins</td>
</tr>
<tr>
<td></td>
<td>No surgery - medically inoperable</td>
<td>Radical radiotherapy</td>
</tr>
<tr>
<td>Stage IIIA</td>
<td>Surgery [non bulky nodal disease]</td>
<td>N0-1</td>
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<tr>
<td></td>
<td></td>
<td>Positive margin, ≥N2</td>
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<tr>
<td></td>
<td>No surgery</td>
<td>Definitive radical radiotherapy</td>
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<tr>
<td></td>
<td></td>
<td>Concurrent chemo-radiotherapy</td>
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<tr>
<td></td>
<td></td>
<td>Palliative radiotherapy</td>
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<tr>
<td>Stage IIIB</td>
<td>Good performance status</td>
<td>Radiotherapy or sequential chemo-radiation</td>
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<tr>
<td></td>
<td></td>
<td>High dose palliative radiotherapy</td>
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<tr>
<td></td>
<td>Poor Performance Status</td>
<td>Palliative chemotherapy</td>
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<tr>
<td></td>
<td></td>
<td>Palliative radiotherapy</td>
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<tr>
<td>Stage IV</td>
<td>Focal symptoms</td>
<td>Palliative chemotherapy / biological treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Palliative radiotherapy</td>
</tr>
<tr>
<td></td>
<td>No focal symptoms</td>
<td>No radiotherapy</td>
</tr>
</tbody>
</table>
9.3. Timing of radiotherapy
Radiotherapy to start 4 weeks from time of decision to treat. Squamous Cell lung cancer falls into Category 1 patients. All other subtypes fall into Category 2.

9.4. Information for patients
Thoracic radiotherapy information leaflets to be given to patient in lung clinic

9.5. Trials

**IDEAL-CRT:**
Isotoxic Dose Escalation and Acceleration in Lung Cancer ChemoRadiotherapy: A phase I/II trial of concurrent chemoradiation with dose-escalated radiotherapy in patients with cisplatin and vinorelbine on Days 1 and 8 (vin only), and days 29 and 36 (vin only). 63 Gy in 30 Fractions minimum before dose escalation depending on toxicity. Histologically confirmed NSCLC: Stages II, IIIA and IIIB

**I-Start:**
IsoToxic Accelerated RadioTherapy in locally advanced non-small cell lung cancer. Histologically or cytologically confirmed stage II – IIIB NSCLC. Phase I will establish the maximum tolerated dose (MTD) that may be safely delivered to the oesophagus in patients where the oesophagus lies within the radiotherapy high dose region. This will be the recommended phase II dose. Phase II will establish whether this novel radiotherapy regimen is tolerable, safe and sufficiently active in all eligible patients to justify its inclusion as an experimental arm in future randomised phase III trials.

9.6. Radiotherapy treatment planning for external beam: radical with curative intent

9.6.1. Essential Investigations and Information Required

- Radiotherapy referral form indicating intent
- Healthcare records including copy of MDT decision
- Cytology/histology report including EBUS if available.
- Adequate respiratory function: FEV1 > 0.8 – 1.0 litre or > 40% predicted, DLCO > 40% predicted
- Bronchoscopy report and pulmonary function tests
- Staging CXR/CT chest/abdomen, PET if performed- imaging and reports
- Chemotherapy investigations if appropriate including FBC, U+E, LFTs, EDTA
- Consent
9.6.2. Positioning / immobilisation

- Patients should be supine with arms above head
- Immobilisation using chest board and fixed arm position
- The patient should be breathing normally

9.6.3. Image acquisition

- Where possible 4D CT scanning should take place to identify the complete tumour movement during respiration.
- A planning CT scan should be performed in the treatment position, whilst the patient undertakes a normal respiration, using 2 - 3 mm slices through the entire target volume and 5 cm margins in the superior/inferior direction.
- The whole lung (apex to diaphragm) should be covered using at least 2 cm slices to allow dose-volume histograms to be calculated.
- For all cases suitable for radical radiotherapy, every effort should be made to obtain PET/CT scan to enable the clinician to delineate between tumour and collapsed lung/consolidation and positive lymph nodes.
- Further information may be available from EBUS.
- Intravenous contrast should be used, when patient renal function permits and where central disease should be distinguished from vasculature.
- Where uncertainty exists in delineating gross tumour volume (GTV) attempts should be made to discuss all images with diagnostic radiologist and experienced lung clinical oncologist to define extent of active tumour and possible involved lymph nodes either at lung MDT or at specific meeting with radiologist and clinical oncologist.

9.6.4. Volume delineation and nomenclature

- Gross Tumour Volume (GTV) is defined as the primary tumour and positive lymph node(s).
- Peripheral tumours: Use Lung Window settings and outline tumour to include spicules as CTV. Enlarge to PTV by 1.5 cm superior / inferiorly and by 1.0 cm laterally.
- For central and mediastinal tumours / nodes : use mediastinal window settings for GTV. Add 0.5 cm in all directions for CTV then enlarge accordingly 1.5 cm superior / inferiorly and 1.0 cm laterally.
- Majority of lung tumours in the lower lobes in proximity to the diaphragm may show greater excursion during respiration than tumours located in the upper lobes.
- When available, 4D CT scanning will demonstrate the full excursion of tumour during normal respiration and will help reduce margins.
- Internal Target Volume is delineated for 4D CT scanning : see below
- Prophylactic nodal irradiation should not be employed.
9.6.5. Diagram illustrating 4D–CT derived treatment margins.

9.6.6. Organs at Risk

- The spinal cord, lungs, heart and oesophagus should be outlined.
- The oesophagus should be contoured using mediastinal windowing to include all layers out to the fatty adventitia. It should be contoured from 4 cm above and below the PTV. Not more than 12 cm of oesophagus (any part of the circumference) should lie within the 95% isodose.
- The spinal cord position must be identified throughout the PTV. Maximum radiation dose to 10 cm spinal cord should not exceed 44 Gy in 2 Gy per fraction or 36 Gy in 2.75 Gy fraction size.
- Every effort should be made to exclude normal lung tissue. Less than 30-35% of ‘normal’ lung (i.e. whole lung excluding Gross Tumour Volume) should receive a radiation dose of ≥ 20 Gy i.e. V20 < 35% but <30% preferable.
- The heart should be contoured along with the pericardial sac. The pericardium will act as the boundary axially from the superior to the inferior border. The superior aspect will begin at the level where the pulmonary trunk and pulmonary arteries are first seen as separate structures. The inferior aspect will be from the inferior wall of the left ventricle which it is indistinguishable from the liver. The heart can receive the total dose (TD) to < 30% of its volume. For > 50% of cardiac volume, dose < 50% of TD is recommended.
- Patients with tumours in the upper lobes, should have their brachial plexus contoured. No more than 0.1 cm³ of the brachial plexus, should receive more than 55 Gy in 20 fractions.
9.6.7. Planning technique / Treatment dose

- 3D planning using CT data +/- PET scan should be available.
- It is recommended that 4D CT planning is preferable where available.
- Use of 3D conformal radiotherapy is required unless 4D planning is employed. Beams eye views may be useful in the design of individual shielding.
- 4D planning may be used for suitable tumours if the participating centre is able to do.
- Isodose distribution must be provided at the central plane. Dose volume histograms (DVH) for the PTV and normal lung will be calculated in order to obtain full knowledge of the 3D dose distribution.

Dose: Either is acceptable

- 55 Gy in 20 F using 6MV photons over 4 weeks in a single phase
- 64-66 Gy in 32-33 F using 6MV photons over 6 ½ weeks in a single phase
- Two phases may be considered for large PTV: ie Phase I: 44 Gy, Phase II: 20 Gy using 2 Gy F

9.6.8. Treatment verification

- The volume to be treated should be verified according to local practice. It is recommended that treatment verifications should be taken for the first three fractions, then weekly to correct any systematic errors.


- Weekly review by On-Treatment Review Specialist for assessment of toxicity.
- For 20 fraction schedules (55Gy in 20f): if delay occurs, compensation should be made by treating on a weekend day. If weekend treatment is not possible, then missed treatments should be added to the end of the treatment schedule. Twice daily treatments should not be used.

Thoracic radiation specific toxicities

Acute radiation oesophagitis: management
- Ensure that the patient maintains adequate fluid intake
- Access to dietitian
- Ant-acid mucilage ie Oxetacaine or similar
- Simple analgesics, escalating strength as necessary
- Proton pump inhibitors
- Treat for oesophageal candidiasis

Radiation induced pneumonitis: management
- Collaborate with chest physician
- Patients should not be smoking
- Early treatment with corticosteroids ie prednisolone 40 mg daily, or equivalent, for 2-4 weeks then reduce.

Follow up: Management suggested
- 4 - 6 weeks clinic post completion of radiotherapy to assess toxicity
- Repeat CT scan at 3 months to assess response
- Repeat spirometry considered if patient has deterioration in lung function
- Further long term follow up clinic schedule according to local policy

9.7. Stereotactic Ablative Radiotherapy or Stereotactic Body Radiotherapy

Stereotactic Ablative Radiotherapy (SABR) or Stereotactic Body Radiotherapy (SBRT) should only be performed in specialist centres with dedicated MDT and team with experience of > 25 cases /year. Dose schedule to be determined as per national SBRT group. [See SABR UK Consortium Version 4.0 January 2013]

9.7.1. Inclusion Criteria for treatment
- MDT diagnosis of NSCLC based on findings of positive histology, positive PET scan or growth on serial CT scan
- Clinical stages of T1 N0 M0 or T2 (≤5cm) N0 M0 or T3 (≤5cm) N0 M0
- radiologically N2 (CT or PET), patients only eligible if possible nodal disease is subsequently confirmed as histologically negative with mediastinoscopy or endoscopic bronchial or oesophageal ultra-sound biopsy
- Not suitable for surgery because of medical co-morbidity, lesion is technically inoperable or patient declines surgery after surgical assessment (or option of assessment)
- WHO performance status 0-2
- Peripheral lesions outside a 2cm radius of main airways and proximal bronchial tree. This is defined as 2cm from the bifurcation of the second order bronchus e.g. where the right

9.7.2. Exclusion Criteria for treatment
- NSCLC patients with T2 or T3 primary tumours > 5cm
- T3 primary NSCLC tumours involving the mediastinal structures or central T3 primary tumours.
- Metastatic lung tumours
- Any tumour that is not clinically definable on the treatment planning CT scan e.g. surrounded by consolidation or atelectasis.
- If tumour has respiratory motion ≥ 1cm despite using techniques to reduce tumour motion, only proceed with treatment if target delineation is reliable and suggested normal tissue and tumour planning constraints can be achieved.
- Tumours within 2cm radius of main airways and proximal bronchial tree
• Previous radiotherapy within the planned treatment volume Presence of pulmonary fibrosis (unless the increased risk of SABR has been fully considered and the patient has been appropriately consented)
• Chemotherapy administered within 6 weeks prior to study entry or planned for < 6 weeks following SABR.

Diagram of exclusion zone: Tumour within red line considered too close to critical structures

9.7.3. Tumour Dose schedules

• 18 Gy x 3 fractions
• 12 Gy x 5 fraction
• 11 Gy x 5 fraction
• 2-4 days between each fraction

9.7.4. Positioning/immobilization

See External Beam Radiotherapy

9.7.5. Image acquisition

See External Beam Radiotherapy

9.7.6. Volume delineation and nomenclature

See External Beam Radiotherapy

9.7.7. Organs at Risk

See External Beam Radiotherapy
9.8. Cyberknife available at St Bartholomew’s Hospital and Mount Vernon Hospital

Accuray Cyberknife, as a specialist form of Stereotactic Ablative Body Radiotherapy (SABR), has been recommended by the National Cancer Action Team : National Radiotherapy Implementation Group Report 2011, as the “Standard of Care” for Stage I NSCLC:

Suitable for peripheral lung cancers less than 3 cm size. T1 N0 M0

All other stages : Recommended as a Clinical Trial

Referral to Barts Stereotactic MDT or Mount Vernon MDT

9.9. Chemo-Radiation for locally advanced NSCLC

- Good PS locally advanced stage IIB, IIIA, some IIIB, small volume PTV.

- Care should be taken to identify those patients who have stage III disease, with N2 or some N3 disease, who are of good performance status and have a small PTV that allows for radical external beam radiotherapy and for lung V20 to remain less than 35% (preferably less than 30%).

9.9.1. Radiotherapy Dose Schedules

- Dose: 55 Gy in 20 F over 4 weeks
- Or Dose : 64-66 Gy in 32-33 F over 6 ½ weeks.
- For those of excellent performance status, consider concurrent chemo-radiotherapy
- Lesser performance status, or co-morbidities, consider sequential chemo-radiotherapy

9.9.2. Concurrent Chemo- Radiation

Suggested schedule for 4 week RT : 55 Gy in 20 F with concurrent chemotherapy Cisplatin/Vinorelbine (adapted from SOCCAR trial)

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<tr>
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<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
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<td>RT #1</td>
<td>RT #2</td>
<td>RT #3</td>
<td>RT #4</td>
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<td>Vin</td>
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<td></td>
<td>Vin</td>
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RT # = Fraction of radiotherapy  
Vin = Vinorelbine iv 15mg/m², NB alternative : oral Vinorelbine 40mg/m²  
Cis = Cisplatin iv 20 mg/m²  
Radiotherapy to be delivered within 6 hours of chemotherapy.

After 4 week following last radiotherapy fraction, consider further 2 cycles Cisplatin iv 75mg/m² day 1, Vinorelbine iv 30mg/m² days 1,8 q=21 days. If patient is fit.

NB dose of oral vinorelbine = 40 mg/m² concurrent with radiation, but 60-80mg/m² when used sequentially with radiation.

Those patients who have lower performance status: consider sequential chemoradiation or radical radiation alone.

Suggested schedule for 6 1/2 week radiotherapy: 66 Gy in 33 F with concurrent chemotherapy.
<table>
<thead>
<tr>
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<th>RT #17</th>
<th>RT #18</th>
<th>RT #19</th>
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<td>RT #32</td>
<td>RT #33</td>
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RT # = Fraction of radiotherapy  
Vin = Vinorelbine 15 mg/m² iv  
Cis = Cisplatin 40 mg/m² iv

- After 4 week following last radiotherapy fraction, consider further 2 cycles  
  Cisplatin iv 80mg /m² day 1, Vinorelbine iv 25mg/m² days 1,8 q=21 days, if patient is fit.

### 9.10. Palliative Radiotherapy

#### 9.10.1. Indications

- The main purpose is to palliate symptoms, although in some patients of good performance status, higher doses of radiotherapy have been shown to result in a modest improvement in survival.

- In the case of patients with advanced disease, but who are not symptomatic, the use of radiotherapy is controversial. Several studies have shown no apparent benefit in survival in the use of immediate radiotherapy versus delayed radiotherapy and no difference in symptom control or quality of life. Therefore, in this group, there should be a discussion with the Clinical Oncologist regarding the options of using palliative radiotherapy upfront or withholding radiotherapy until symptoms arise.
9.10.2. 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.

Consideration should be given to the spinal cord dose with isodose intervention and cord shielding as appropriate.

9.10.3. Brain metastases

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.

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.

9.10.4. Spinal cord compression

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.

9.10.5. 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.

9.10.6. Essential Investigations and Information required

- Referral Form indicating diagnosis, stage and intent.
- Healthcare records including copy of MDT decision
- Cytology/ histology report including EBUS if available
- If histology not conclusive, MDT decision required stating clinical and/or radiological diagnosis of bronchogenic carcinoma
- Bronchoscopy report
- Staging CXR/CT chest/abdomen, PET if performed- imaging and reports
- Consent

9.10.7. Timing

- Within 2 weeks of referral

9.10.8. Position / Immobilisation
• Head Rest, Knee fix, Vacbag
• Supine
• The patient must be able to lie flat for a period of at least 20 minutes for accurate radiotherapy planning to take place

9.10.9. Image acquisition

• 3D conformal planning using CT data with IV contrast if requested
• Planning CT scan with 2.5mm helical slices
• Scan from thoracic inlet to 2.0cm below diaphragm (ensuring coverage of both lungs)

9.10.10. Volume Delineation

• GTV: Primary tumour and involved LNs
• CTV: GTV and margin to cover sub clinical disease
• PTV: CTV plus margin normally in the range of 1.5 cm

9.10.11. Planning Technique

• A parallel opposed field technique, using Megavoltage photons from linear accelerator.
• The field should include the primary tumour and ipsilateral nodal disease at the mediastinum and immediate drainage lymph nodes where practically possible with a margin for movement and set-up error.
• For those patients with better clinical performance status and locally advanced disease within the thorax (but no metastases outside the thorax), a higher palliative radiotherapy dose has been shown to result in a modest improvement in survival \(^1\). In poorer performance patients and those with distant metastases (stage IV), a single fraction or two fractions are sufficient for symptom control \(^2,3\).
• The rate of symptom control is approximately 55%-65% using external beam radiotherapy.

The following table may be used as a guideline to palliative radiotherapy dose schedules:

<table>
<thead>
<tr>
<th>Stage</th>
<th>WHO Clinical Performance Status (CPS)</th>
<th>Radiotherapy Dose Prescription</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locally advanced disease, not suitable for radical radiotherapy</td>
<td>0-1</td>
<td>36Gy in 12 #, maintaining cord tolerance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 Gy in 10 # over 2 wks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20Gy in 5 # over 1 wk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17Gy in 2 # over 8 days</td>
</tr>
</tbody>
</table>
9.10.12. Side effects of treatment and management

- **Immediate**: 6-12 hours: nausea, vomiting and chest discomfort occasionally seen, particularly after larger radiotherapy fractions. This may be alleviated with Paracetamol, Domperidone/Metoclopramide and Dexamethasone tablets 4mg bd x 1 day.

- **Intermediate**: 2–4 weeks: radiation induced oesophagitis: may be managed with medication such as Gaviscon, Sucralfate or simple analgesia such as soluble paracetamol. Occasionally, candidiasis may be responsible and treated using Fluconazole tabs 50mg x 7 days or equivalent.

- **Delayed**: 6–12 weeks or longer: radiation pneumonitis may be noted. This may be treated with a course of steroids for 4-6 weeks: Prednisolone 40mg OD x 2 weeks, then slowly reduce to zero.

9.11. Small Cell Lung Cancer

9.11.1. Definition of staging

- **Limited stage**: No universally accepted definition of this term is available. Limited-stage disease (LD) SCLC is confined to the hemithorax of origin, the mediastinum, or the supraclavicular nodes, which can be encompassed within a tolerable radiation therapy port.

- **Extensive-stage disease (ED)** SCLC has spread beyond the supraclavicular areas and is too widespread to be included within the definition of LD. Patients with distant metastases (M1) are always considered to have ED.

9.11.2. Timing of Thoracic Radical Radiotherapy (consolidation)

- Several metanalyses have indicated superior survival rates when radical radiotherapy is used early on, within 1st or 2nd chemotherapy cycles. Further analysis suggests that the overall duration of the radiotherapy (to be completed within 4 weeks) has advantage over longer duration radiotherapy.
• It is suggested that the radiotherapy planning CT scan is undertaken early, after 1st cycle of chemotherapy, thus delineation of tumour volume will be based on pre tumour reduction.

9.11.3. Tumour Dose Schedules

• 45 Gy in 30 Fractions twice daily (given concurrently with cisplatin/etoposide) over 3 weeks \(^5\) : considered standard in some USA / European centres. But further results awaited from CONVERT Study
• 55 Gy in 20 Fractions over 4 weeks: (Smaller Target Volume)
• 40.05 Gy in 15 Fractions over 3 weeks: (Larger Target Volume)

9.11.4. Radiotherapy Treatment Planning

See External Beam Radiotherapy

9.11.5. Positioning/immobilisation

See External Beam Radiotherapy

9.11.6. Image acquisition

See External Beam Radiotherapy

9.11.7. Volume delineation and nomenclature

See External Beam Radiotherapy

9.11.8. Organs at Risk

See External Beam Radiotherapy

9.11.9. Palliative Thoracic Radiotherapy for SCLC

Schedules are similar in technique and fractionation to those used in non-small cell lung cancer and may be considered in those patients who have had an excellent response to chemotherapy

9.11.10. Prophylactic cranial irradiation (PCI)

• PCI may improve three year survival from 15% to 20% in patients with limited disease and whom have had a complete response to induction chemotherapy, and an absolute reduction in brain metastases from about 60% to 30%.
• Various dose schedules have been studied (30Gy/10 F, 40 Gy/20 F, 24Gy/8 F, 25 Gy/10 F) and these have been reviewed \(^6\).
• There was also evidence of a dose response and more efficacy if PCI was carried out earlier after the start of chemotherapy
• Long term side effects may include impairment of cognitive function and this should be discussed with patient.
• A parallel pair technique is used with 6 MV photons and treatment dose is 25 Gy in 10 fractions to the mid plane. This should be no later than 3 weeks after the final dose of chemotherapy.
• PCI is also recommended for patients with Extensive Stage Small Cell, whose disease has responded well to first line chemotherapy.


10.1. Small cell lung cancer (SCLC)

10.1.1. Small cell lung cancer (SCLC) – staging

**Limited-stage.** Cancer is found only in one lung and the adjacent lymph nodes. Limited-stage small cell is similar to TNM stage I – IIIB non–small cell cancer.

**Extensive-stage.** Cancer has spread outside of the lung to other tissues in the chest or to other parts of the body (metastasized). Extensive stage small cell is similar to TNM stage IV non–small cell cancer.

10.1.2. Small cell lung cancer (SCLC) – summary of treatment

Patients with mixed SCLC/NSCLC cytology/histology should usually treated with SCLC regimens as this is the cell type that reduces outcome most.

<table>
<thead>
<tr>
<th>Current disease status</th>
<th>Treatment regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Previously untreated</td>
</tr>
<tr>
<td>B</td>
<td>Extensive disease or limited, but locally advanced disease or limited, but radical RT inappropriate.</td>
</tr>
<tr>
<td>C</td>
<td>Refractory or recurrent SCLC</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------</td>
</tr>
<tr>
<td></td>
<td>• Recurrent SCLC (within 3 months of previous treatment) or SCLC refractory to 1st line treatment.</td>
</tr>
<tr>
<td></td>
<td>• Recurrent SCLC (at least 3-6 months post initial treatment)</td>
</tr>
<tr>
<td></td>
<td>• Recurrent SCLC where retreatment with 1st line regimen or IPM is not considered appropriate</td>
</tr>
<tr>
<td></td>
<td>‘IPM’ Irinotecan, Cisplatin &amp; Mitomycin, 4- weekly. Irinotecan 70 mg/m² on course one, then assess. [D.A.Fennell Int J Cancer. 2007 Dec 1;121(11):2575-7]</td>
</tr>
<tr>
<td></td>
<td>May rechallenge with 1st line treatment if original treatment given at least 3-6 months previously and was well tolerated</td>
</tr>
<tr>
<td></td>
<td><strong>Consider relevant clinical trial</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>3rd Line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Any</td>
</tr>
<tr>
<td></td>
<td>3rd-line chemotherapy – or clinical trial</td>
</tr>
</tbody>
</table>

**All treatments**
- Histologically / cytologically-proven SCLC.
- Normal full blood count and adequate renal function.

**+ for all studies**
- Patient information and consent.
- Measurable / evaluable disease.
- See protocols for drug schedule and dose modification details.
- Lung cancer protocol file available on medical oncology wards.
10.1.3. **Radical Chemoradiotherapy**

**Cisplatin & Etoposide with twice daily radiotherapy**

| Treatment: | Day 1: Cisplatin 25mg/m² IV, Etoposide 100mg/m² IV  
Day 2: Cisplatin 25mg/m² IV, Etoposide 100mg/m² IV  
Day 3: Cisplatin 25mg/m² IV, Etoposide 100mg/m² IV  
Or: Cisplatin may also be given as 75mg/m² on day 1 (as per local advanced regime)  
To be repeated every 3 weeks to a maximum of 4 cycles. Disease response will be assessed both clinically and radiologically.  
Prophylactic antibiotics and GCSF support as per local Recommendations  
Concurrent twice daily radiotherapy: 45Gy in 30 BD fractions over 19 days, 5 consecutive days per week starting on day 1 cycle 2 of chemotherapy (i.e. day 22 of cycle 1). Chemotherapy is given in between BD dosing of radiotherapy. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up:</td>
<td>Patients will be seen 6 weeks after completion of treatment with subsequent follow up as per local policy. Monitoring investigations required at each visit: physical examination, chest x-ray and tests as indicated.</td>
</tr>
</tbody>
</table>

10.1.4. **‘CE’ in SCLC (non-trial)**

**Carboplatin and Etoposide for SCLC**

*First choice chemotherapy for all patients with SCLC and appropriate performance status and organ function (limited or extensive-stage SCLC).*

Patients should ALL have full thoracic, upper abdominal and head CT for symptomatic patients (or all patients planned for CRT) scan at baseline and after cycle 4 if responding.

If PR or CR, proceed to thoracic and head radiotherapy in limited-stage and selected extensive stage patients.
**Treatment:**

Day 1: Carboplatin AUC 5 (EDTA) or 6 (Cockcroft)  
*consider AUC 6/7 for limited-stage patients PS 0-1.*  
Etoposide 120mg/m² IV
Day 2: Etoposide 100mg PO, BD
Day 3: Etoposide 100mg PO, BD

To be repeated every 3 weeks to a maximum of 6 cycles (i.e. 6 months).  
Assessment to be made after 2, 4 and 6 cycles.  
Disease response will be assessed both clinically and radiologically.

Prophylactic antibiotics and GCSF support as per local recommendations

If life-threatening infection, reduce all doses by 20% on subsequent cycles.

**Follow-up:**

Patients will be seen 6 weeks after completion of treatment with subsequent follow up as per local policy. Monitoring investigations required at each visit: physical examination, chest x-ray and tests as indicated.

10.1.5. ‘PE’ in SCLC (non-trial)

**Cisplatin and Etoposide for SCLC**

First choice chemotherapy for selected patients with SCLC and performance status 0-1 and organ function (limited-stage SCLC). Patients with sensitivity or susceptibility to carboplatin side effects may occasionally be considered.

Patients should ALL have full thoracic, upper abdominal +/- head CT for symptomatic patients or patients on CRT at baseline. Clinical and radiological response should be assessed at each cycle.

If PR or CR, proceed to thoracic and head radiotherapy in limited-stage (sequential therapy) and selected extensive stage patients.
| Treatment: | Day 1: Cisplatin 60-75mg/m²  
Etoposide 120mg/m² IV  
Day 2: Etoposide 100mg PO, BD  
Day 3: Etoposide 100mg PO, BD  
To be repeated every 3 weeks to a maximum of 6 cycles (i.e. 6 months). Disease response will be assessed both clinically and radiologically.  
If life-threatening infection, reduce all doses by 20% on subsequent cycles.  
For good performance status patients with limited disease and good organ function, consider using Etoposide IV 120mg/m² IV on days 2 and 3 instead of oral. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up:</td>
<td>Patients will be seen 6 weeks after completion of treatment and subsequently according to local protocol. Monitoring investigations required at each visit: physical examination, chest x-ray and tests as indicated.</td>
</tr>
</tbody>
</table>
10.1.6. ‘IPM’ in SCLC (non-trial)

**Irinotecan, Cisplatin and Mitomycin (IPM) for refractory or recurrent SCLC**


IPM may be appropriate for patients with SCLC who have recurrent disease (within 3 months of previous treatment) or disease refractory to first-line treatment.

| Treatment: | Day 1: Irinotecan 70 mg/m$^2$, Cisplatin 40 mg/m$^2$, Mitomycin 6 mg/m$^2$. Day 15: Irinotecan 70 mg/m$^2$, Cisplatin 40 mg/m$^2$. Occasionally the Irinotecan dose can be 100 mg/m$^2$ at cycle one; the Irinotecan dose may also be increased to 100 mg/m$^2$ pending toxicity (discuss with consultant). To be repeated every 4 weeks to a maximum of 6 cycles (i.e. 6 months). Assessment to be made after 2 and 4 cycles. If progressive disease seen after 2 cycles patient will be withdrawn. If response seen at 4 cycles a further 2 may be given at discretion of treating physician (Mitomycin is omitted after 4 cycles completed). Disease response will be assessed both clinically and radiologically. If life-threatening infection, reduce all doses by 20% on subsequent cycles. |
| Follow-up: | Patients will be seen 6 weeks after completion of treatment then according to local follow up protocols. Monitoring investigations required at each visit: physical examination, chest x-ray and tests as indicated. |

10.1.7. ‘CAV’ in SCLC (non-trial)

**Cylophosphamide, Doxorubicin and Vincristine for refractory or recurrent SCLC**


CAV may be appropriate for patients with SCLC who have recurrent disease (within 3 months of previous treatment) or disease refractory to first-line treatment.
Treatment: Day 1: Cyclophosphamide 750 mg/m², Doxorubicin 50 mg/m², Vincristine 1.4 mg/m² (maximum dose 2mg).

To be repeated every 3 weeks to a maximum of 6 cycles. Assessment to be made after 2 and 4 cycles. If progressive disease seen after 2 cycles patient will be withdrawn. Disease response will be assessed both clinically and radiologically.

Follow-up: Patients will be seen 6 weeks after completion of treatment then according to local follow up protocols. Monitoring investigations required at each visit: physical examination, chest x-ray and tests as indicated.

10.1.8. Oral Topotecan in SCLC (NICE TA184)

Oral Topotecan is a NICE recommended option for people with relapsed small-cell lung cancer for whom:
- re-treatment with the first-line regimen is not considered appropriate and
- the combination of Cyclophosphamide, Doxorubicin and Vincristine (CAV) is contraindicated (for details of the contraindications to CAV see the summary of product characteristics for each of the component drugs).

Intravenous Topotecan is not recommended for people with relapsed small-cell lung cancer.

Treatment: Oral Topotecan 2.3 mg/m²/day for 5 consecutive days every 3 weeks. If well tolerated, treatment may continue until disease progression. It may be appropriate to start with 3 consecutive days’ therapy initially, increasing to the full 5 days subsequently.

Follow-up: Patients should be reviewed every 3 weeks, as this is palliative treatment. Patients’ symptoms should be recorded and evaluated for improvement. Imaging should be used (C X-ray or CT as relevant).

10.2. Non-small cell lung cancer (NSCLC) – summary of treatment

Notes:
- Non-small cell lung cancer encompasses adenocarcinoma (including bronchoalveolar), squamous-cell carcinoma and large-cell carcinoma.
- Patients with ‘thoracic-type’ adenocarcinomas of unknown primary origin (ACUP) may be considered for these regimens.
- Patients with bronchoalveolar-type lung cancers should be considered for EGFR-Tyrosine Kinase agents (e.g. Gefitinib (Iressa™) or Erlotinib (Tarceva™), pending availability, only if they harbour the EGFR mutation.
- Baseline tests required before initiation of chemotherapy: FBC, clotting, U&E, LFT
- Clinical examination and appropriate imaging should be done after each cycle of chemotherapy.
- CT scans should be carried out before chemotherapy and end of therapy, with CXR / CT imaging between as clinically indicated.

10.2.1. Testing for EGFR-K mutation and ALK
- Patients should be tested for EGFR-K (epidermal growth factor receptor kinase) mutation.
- EGFR-K Mutation negative patients should be tested to determine if anaplastic lymphoma kinase positive. (ALK+ve)

<table>
<thead>
<tr>
<th>Current disease status</th>
<th>Study / treatment regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Operable stages I and II</td>
<td>Surgery or radical radiotherapy should be considered pending clinical status of the patient</td>
</tr>
<tr>
<td>Post-operative adjuvant chemotherapy</td>
<td>Patients with postoperative stage II /III NSCLC (i.e. T1N1, T2N2, T3N0 – should be considered for adjuvant chemotherapy e.g. Cisplatin/Vinorelbine (discuss with consultant). Oral Vinorelbine can be used as alternative to IV depending on local practice.</td>
</tr>
<tr>
<td></td>
<td>Adjuvant radiotherapy may also be appropriate (discuss at MDT)</td>
</tr>
<tr>
<td></td>
<td><strong>Consider relevant clinical trial</strong></td>
</tr>
<tr>
<td>B Unresectable Stage IIIA with good</td>
<td>Sequential chemotherapy: Cisplatin/Gemcitabine (squamous) OR Cisplatin/Pemetrexed (non-squamous) as per NICE TA181 and thoracic radiotherapy OR concurrent Cisplatin/Vinorelbine chemotherapy with radiotherapy</td>
</tr>
<tr>
<td>performance status</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Consider relevant clinical trial</strong></td>
</tr>
<tr>
<td>C Advanced Disease (stages IIIB and IV)</td>
<td>First line: Pemetrexed/Cisplatin for adenocarcinoma or large cell histology only, as per NICE TA181 Sept 2009 OR Gemcitabine/Carboplatin (or</td>
</tr>
</tbody>
</table>
Gemcitabine/Cisplatin) OR Paclitaxel/Carboplatin may occasionally be considered if there is a clinical reason OR Docetaxel/Cisplatin or Carboplatin OR EGFR-K (epidermal growth factor receptor kinase) mutants only: Erlotinib as per NICE TA258 Gefitinib as per NICE TA192

Consider relevant clinical trial

Maintenance Pemetrexed: - Adenocarcinoma/Large cell histology only, if disease has not progressed immediately following a platinum containing combination regimen (not including Pemetrexed) as per NICE TA190 June 2010. - Adenocarcinoma/Large cell histology only, if disease has not progress immediately following Pemetrexed/Cisplatin via the CDF. Patients need approval before treatment
### D  Recurrent Locally-advanced or metastatic disease (any prior stage) i.e. Stage IIIB/IV

**Second line: (PS 0- good 2)**
- Erlotinib 150mg daily (PbR excluded)
- OR
- Docetaxel
- OR
- Crizotinib 500mg daily.
  - Via Cancer Drugs Fund if Anaplastic Lymphoma Kinase positive (ALK+ve) (see full criteria on page 14). Patients require approval before treatment.
  - OR
  - Pemetrexed/Cisplatin (adenocarcinoma/large cell histology only) via the CDF. Patients must have had no previous Pemetrexed treatment.
  - OR
  - IPM

Selected patients may be considered for ‘IPM’ (see SCLC section), especially good previous response to a platinum containing regimen and good disease free interval

Erlotinib 3\(^{rd}\) or 4\(^{th}\) Line (PbR exclusion) is available if the patient has had no previous TKI therapy.

**Consider relevant clinical trial**

### E  Other protocols/drugs

- Protocols including vinorelbine with or without cisplatin and gemcitabine with or without carboplatin, may be appropriate on occasion.

---

### 10.2.2. Adjuvant or Palliative Cisplatin/Vinorelbine

| Treatment: | Cisplatin 80mg/m\(^2\) IVI on day 1  
Vinorelbine 30mg/m\(^2\) IVI days 1 and 8  
Repeat every 21 days for 4 to 6 cycles  
For palliative patient assessment to be made after 2 and 4 cycles. If progressive disease seen after 2 cycles patient will be withdrawn.  
Disease response will be assessed both clinically and radiologically. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up:</td>
<td>As per local policy</td>
</tr>
</tbody>
</table>
10.2.3. **Palliative Gemcitabine/Carboplatin**

| Treatment:                                                                 | Gemcitabine 1250mg/m² IVI days 1 and 8  
Carboplatin  AUC5 (EDTA/24hrs collection) or AUC6 (calculated) Day 1  
Repeat every 21 days for up to 4 cycles (occasional 6 if incremental response demonstrated)  
For palliative treatment intent - patient assessment to be made after 2 cycles. If progressive disease seen after 2 cycles patient will be withdrawn. Disease response will be assessed both clinically and radiologically. |
| Follow-up:                                                                | As per local policy |

10.2.4. **Palliative Gemcitabine/Cisplatin**

| Treatment:                                                                 | Cisplatin 80mg/m² IVI day 1  
Gemcitabine 1250mg/m² IVI days 1 and 8  
Repeat every 21 days for up to 4 cycles (occasional 6 if incremental response demonstrated).  
For palliative treatment intent-patient assessment to be made after 2 cycles. If progressive disease seen after 2 cycles patient will be withdrawn. Disease response will be assessed both clinically and radiologically. |
| Follow-up:                                                                | As per local policy |

10.2.5. **Palliative Pemetrexed/Cisplatin**

| **Treatment:** | Pemetrexed 500mg/m² day 1  
Cisplatin 75mg/m² day 1  
Repeat every 21 days for 4 cycles (occasional 6 if incremental response demonstrated) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Please ensure that the patient is commenced on the following drugs prior to Pemetrexed dose:</td>
</tr>
<tr>
<td></td>
<td>1. Folic acid 400mcg-1200mcg tablets P.O. OD for the duration of treatment (start 7 days before Pemetrexed and until two months after the last dose of Pemetrexed)</td>
</tr>
<tr>
<td></td>
<td>2. Hyroxocobalamin 1000mcg IM every 9 weeks for the duration of treatment (start 7 days before Pemetrexed)</td>
</tr>
<tr>
<td></td>
<td>3. Dexamethasone 4mg tablets P.O. BD (morning and lunchtime) starting the day before chemotherapy for a total of 5 days</td>
</tr>
<tr>
<td><strong>Follow-up:</strong></td>
<td>As pre local policy</td>
</tr>
</tbody>
</table>

### 10.2.6. Concurrent Vinorelbine/Cisplatin and Radiotherapy

<table>
<thead>
<tr>
<th><strong>Treatment:</strong></th>
<th><strong>Concurrent Radiatiotherapy and Chemotherapy:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cisplatin 20mg/m² IVI on days 1 to 4</td>
</tr>
<tr>
<td></td>
<td>Vinorelbine 15mg/m² IVI days 1 &amp; 8</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td></td>
<td>Cisplatin 40mg/m² IVI on days 1 &amp; 8</td>
</tr>
<tr>
<td></td>
<td>Vinorelbine 15mg/m² IVI days 1 &amp; 8</td>
</tr>
<tr>
<td></td>
<td>Repeat every 21 days for 2 cycles</td>
</tr>
<tr>
<td><strong>Followed by:</strong></td>
<td>Cisplatin 80mg/m² IVI on day 1</td>
</tr>
<tr>
<td></td>
<td>Vinorelbine 25mg/m² IVI days 1 and 8</td>
</tr>
<tr>
<td></td>
<td>Repeat every 21 days</td>
</tr>
<tr>
<td></td>
<td>This regimen is scheduled for up to TWO cycles</td>
</tr>
<tr>
<td></td>
<td>Consider adjuvant chemotherapy to be given 4 weeks after the completion of chemoradiation if the patient is medically fit</td>
</tr>
<tr>
<td><strong>Follow-up:</strong></td>
<td>Six weeks following completion then as per local policy</td>
</tr>
</tbody>
</table>

49
10.2.7. Palliative Paclitaxel and Carboplatin - weekly regimen or 3 weekly regimen


<table>
<thead>
<tr>
<th>Treatment:</th>
<th>Weekly regimen:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carboplatin AUC2 IVI on days 1, 8 and 15</td>
</tr>
<tr>
<td></td>
<td>Paclitaxel 100mg/m2 IVI days 1, 8 and 15</td>
</tr>
<tr>
<td></td>
<td>(dose can be reduced to 75mg/m2 at consultants discretion</td>
</tr>
<tr>
<td></td>
<td>Repeat every 28 days for up to 6 cycles</td>
</tr>
<tr>
<td>3 weekly regimen:</td>
<td>Paclitaxel 175mg/m2 IVI on Day 1</td>
</tr>
<tr>
<td></td>
<td>Carboplatin AUC5 (EDTA/24hrs collection) or AUC6 (calculated) on Day 1</td>
</tr>
<tr>
<td></td>
<td>Repeat every 21 days for up to 6 cycles</td>
</tr>
<tr>
<td>Follow-up:</td>
<td>As per local policy</td>
</tr>
</tbody>
</table>

10.2.8. Palliative Docetaxel/Carboplatin

??Reference

<table>
<thead>
<tr>
<th>Treatment:</th>
<th>Docetaxel 75mg/m2 IVI day 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cisplatin 75mg/m2 IVI day 1</td>
</tr>
<tr>
<td></td>
<td>Repeat every 21 days for 4-6 cycles</td>
</tr>
<tr>
<td></td>
<td>Dexamethasone 8mg twice daily (morning and lunchtime) must be taken on the day before, the day of and the day after docetaxel.</td>
</tr>
<tr>
<td>Follow-up:</td>
<td>As per local policy</td>
</tr>
</tbody>
</table>

10.2.9. Palliative Docetaxel/Cisplatin

<table>
<thead>
<tr>
<th>Treatment:</th>
<th>Docetaxel 75mg/m2 IVI on day 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carboplatin AUC5 (EDTA/24hrs collection) or AUC6 (calculated) Day 1</td>
</tr>
<tr>
<td></td>
<td>Repeated every 21 days for 4-6 cycles</td>
</tr>
<tr>
<td></td>
<td>Dexamethasone 8mg twice daily (morning and lunchtime) must be taken on the day before, the day of and the day after docetaxel.</td>
</tr>
<tr>
<td>Follow-up:</td>
<td>As per local policy</td>
</tr>
</tbody>
</table>

10.2.10. Palliative Erlotinib for EGFR-K (epidermal growth factor receptor kinase) mutants

Rosell R, et al. Erlotinib versus chemotherapy (CT) in advanced non-small cell lung cancer (NSCLC) patients (p) with epidermal growth factor receptor (EGFR) mutations: interim results of the European erlotinib versus chemotherapy (EURTAC) phase III
randomized trial. The Lancet Oncology - 1 March 2012 (Vol. 13, Issue 3, Pages 239-246)


| Treatment: | Erlotinib 150mg once daily orally until disease progression or emergence of intolerable toxicities. |
| Follow-up: | Monthly until disease stabilisation or response established, then consider two monthly |

10.2.11. Palliative Gefitinib for EGFR-K (epidermal growth factor receptor kinase) mutants


| Treatment: | Gefitinib 250mg once daily orally until disease progression or emergence of intolerable toxicities. The IRESSA (gefitinib)- Single payment access (SPA) scheme- Registration Form needs to be completed by a doctor and pharmacist for every new patient prescribed gefitinib. |
| Follow-up: | Monthly until disease stabilisation or response established, then consider two monthly |

10.2.12. Palliative Maintenance Pemetrexed


| Treatment: | Pemetrexed 500mg/m2 IVI day 1 Repeat every 21 days until disease progression or intolerable toxicity |
| Please ensure that the patient is commenced on the following drugs prior to Pemetrexed dose: |
| 1- Folic acid 400mcg-1200mcg tablets P.O. OD for the duration of treatment (start 7 days before Pemetrexed and until two months after the last dose of Pemetrexed) |
| 2- Hyroxocobalamin 1000mcg IM every 9 weeks for the duration of treatment (start 7 days before Pemetrexed) |
| 3- Dexamethasone 4mg tablets orally twice daily (morning and lunchtime) starting the day before chemotherapy for a total of 3 days |
### 10.2.13. Palliative Docetaxel


<table>
<thead>
<tr>
<th>Treatment</th>
</tr>
</thead>
</table>
| Docetaxel 75mg/m² IVI on day 1  
Repeated every 21 days for up to 4 cycles  
Dexamethasone 8mg twice daily (morning and lunchtime) must be taken on the day before, the day of and the day after docetaxel. |

| Follow-up: |
| As per local policy |

### 10.2.14. Palliative Crizotinib for Anaplastic Lymphoma Kinase positive (ALK+ve) NSCLC


<table>
<thead>
<tr>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crizotinib 250mg twice daily orally until disease progression or emergence of intolerable toxicities.</td>
</tr>
</tbody>
</table>

| Follow-up: |
| Monthly on therapy |

### 10.2.15. Palliative Vinorelbine/Carboplatin

<table>
<thead>
<tr>
<th>Treatment</th>
</tr>
</thead>
</table>
| Vinorelbine 25mg/m2 IVI days 1 and 8  
Carboplatin AUC5 (EDTA/24hrs collection) or AUC6 (calculated) Day 1  
Repeat every 21 days for 4 to 6 cycles. |

| Follow-up: |
| As per local policy |

### 10.3. NICE Guidance and CDF Criteria

#### 10.3.1. TA181 Pemetrexed for the first line treatment of Non Small Cell Lung Cancer (Sept 2009)

Pemetrexed in combination with cisplatin is recommended as an option for the first-line treatment of patients with locally advanced or metastatic non-small-cell lung cancer (NSCLC) only if the histology of the tumour has been confirmed as adenocarcinoma or large-cell carcinoma.

People who are currently being treated with Pemetrexed for NSCLC but who do not meet the criteria [above] should have the option to continue their therapy until they and their clinicians consider it appropriate to stop.
10.3.2. TA190 Pemetrexed for the maintenance treatment of Non Small Cell Lung Cancer (June 2010)

Pemetrexed is recommended as an option for the maintenance treatment of people with locally advanced or metastatic non-small-cell lung cancer other than predominantly squamous cell histology if disease has not progressed immediately following platinum-based chemotherapy in combination with Gemcitabine, Paclitaxel or Docetaxel.

People who have received Pemetrexed in combination with cisplatin as first-line chemotherapy cannot receive Pemetrexed maintenance treatment.

10.3.3. TA192 Gefitinib for the first-line treatment of locally advanced or metastatic non-small-cell lung cancer (July 2010)

Gefitinib is recommended as an option for the first-line treatment of people with locally advanced or metastatic non-small-cell lung cancer (NSCLC) if:

- they test positive for the epidermal growth factor receptor tyrosine kinase (EGFR-TK) mutation
- the manufacturer provides gefitinib at the fixed price agreed under the patient access scheme.

10.3.4. TA258 Erlotinib for the first-line treatment of locally advanced or metastatic EGFR-TK Mutation-positive non-small cell lung cancer (June 2012)

Erlotinib is recommended as an option for the first-line treatment of people with locally advanced or metastatic non-small-cell lung cancer (NSCLC) if:

- they test positive for the epidermal growth factor receptor tyrosine kinase (EGFR-TK) mutation
- the manufacturer provides Erlotinib at the discounted price agreed under the patient access scheme (as revised in 2012).

10.3.5. TA162 Erlotinib for the treatment of Non Small Cell Lung Cancer (Nov 2008)

This guidance is now obsolete as Erlotinib is now available via an NHS England PbR exclusion in the 2nd, 3rd and 4th line setting for patients who have not had previous TKI therapy. No CDF application is required.

Erlotinib is recommended, within its licensed indication, as an alternative to Docetaxel as a second-line treatment option for patients with non-small-cell lung cancer (NSCLC) only on the basis that it is provided by the manufacturer at an overall
treatment cost (including administration, adverse events and monitoring costs) equal to that of Docetaxel.

The decision to use Erlotinib or Docetaxel (as outlined in section 1.1) should be made after a discussion between the responsible clinician and the individual about the potential benefits and adverse effects of each treatment.

Erlotinib is not recommended for the second-line treatment of locally advanced or metastatic NSCLC in patients for whom Docetaxel is unsuitable (that is, where there is intolerance of or contraindications to Docetaxel) or for third-line treatment after Docetaxel therapy.

People currently receiving treatment with Erlotinib, but for whom treatment would not be recommended according to section 1.3, should have the option to continue treatment until they and their clinicians consider it appropriate to stop.

10.3.6. TA227 Erlotinib monotherapy for maintenance treatment of Non-small cell lung cancer (June 2011)- Negative NICE Guidance

Erlotinib monotherapy is not recommended for maintenance treatment in people with locally advanced or metastatic non-small-cell lung cancer who have stable disease after platinum-based first-line chemotherapy.

10.3.7. Crizotinib CDF Criteria

All criteria below must be met:
- Application made by and first cycle of systemic anti-cancer therapy to be prescribed by a consultant specialist specifically trained and accredited in the use of systemic anti-cancer therapy
- ALK +ve advanced or metastatic non-small cell lung cancer
- 2nd or subsequent line treatment post 1st line combination chemotherapy

10.3.8. Pemetrexed For Non-Squamous NSCLC (2nd Line Treatment) CDF Criteria

All criteria below must be met:
- Advanced or metastatic non-squamous non-small cell lung cancer
- Used as 2nd line treatment
- No previous Pemetrexed treatment

10.3.9. Pemetrexed For Non-Squamous NSCLC (Maintenance Treatment) CDF Criteria

All criteria below must be met:
- Application made by and first cycle of systemic anti-cancer therapy to be prescribed by a consultant specialist specifically trained and accredited in the use of systemic anti-cancer therapy
- Non-squamous non-small cell lung cancer
- As maintenance therapy following 1st line chemotherapy with Cisplatin and Pemetrexed not progressing after 4 cycles of such chemotherapy
- PS 0 or 1 at time to commence maintenance pemetrexed
- Note: the evidence for the use of maintenance pemetrexed following induction chemotherapy with the combination of pemetrexed and carboplatin has not been established and is therefore not approved

See related appendices:
Appendix 3: Chemotherapy schedules of assessment
Appendix 4: Lung Protocols
Appendix 5: London Cancer lung oncologists

11. Palliative care

11.1. Common symptoms of lung cancer

Common symptoms of lung cancer include fatigue, loss of appetite, weight loss, breathlessness, cough, haemoptysis, hoarseness, chest pain, bone pain, spinal cord compression, brain metastases and superior vena caval obstruction. Thoracic symptoms have been subdivided into dyspnoea (breathlessness), including malignant pleural effusion, non-obstructive airway symptoms (cough, haemoptysis, hoarseness and chest pain) and superior vena caval obstruction. Neurological symptoms include those arising from brain metastases and spinal cord compression. The treatment of bone pain and pathological fractures is covered under a section on bone metastases. No specific evidence on the treatment of pain has been reviewed as this is a general symptom of cancer and not specific to lung cancer which is outside the scope of this chapter. Nevertheless, the management of pain is recognised by the GDG to be of particular importance and places great emphasis on the prompt evaluation and effective treatment of pain.

Many of these symptoms can be very debilitating and considerably reduce quality of life. Others are life-threatening conditions requiring immediate treatment. Some treatments with palliative intent, in addition to relieving symptoms and improving quality of life, may increase survival; this is particularly so when the underlying cause is life-threatening (e.g. superior vena caval obstruction, hypercalcaemia of malignancy). The GDG examined the various symptoms encountered and assessed the evidence of the effectiveness of interventions to improve symptoms. The symptoms’ underlying causal mechanisms and the stage and performance status of the patient also determine the treatment given.
11.2. **Summary of guidance on palliative care**

**Providing palliative care**
Supportive and palliative care of the patient should be provided by general and specialist palliative care providers in accordance with the NICE guidance.

**Improving supportive and palliative care for adults with cancer**
Patients who may benefit from specialist palliative care services should be identified and referred without delay.

**Palliative radiotherapy**
Patients who cannot be offered curative treatment, and are candidates for palliative radiotherapy, may either be observed until symptoms arise and then treated, or be treated with palliative radiotherapy immediately.

**Managing endobronchial obstruction**
When patients have large airway involvement, monitor (clinically and radiologically) for endobronchial obstruction to ensure treatment is offered early.

Offer external beam radiotherapy and/or endobronchial debulking or stenting to patients with impending endobronchial obstruction.

Every cancer network should ensure that patients have rapid access to a team capable of providing interventional endobronchial treatments.

**Other palliative treatments**
Pleural aspiration or drainage should be performed in an attempt to relieve the symptoms of a pleural effusion.

Patients who benefit symptomatically from aspiration or drainage of fluid should be offered talc pleurodesis for longer-term benefit.

Non-drug interventions based on psychosocial support, breathing control and coping strategies should be considered for patients with breathlessness.

Non-drug interventions for breathlessness should be delivered by a multidisciplinary group, coordinated by a professional with an interest in breathlessness and expertise in the techniques (for example, a nurse, physiotherapist or occupational therapist).

Although this support may be provided in a breathlessness clinic, patients should have access to it in all care settings.

Opioids, such as codeine or morphine, should be considered to reduce cough.

Patients with troublesome hoarseness due to recurrent laryngeal nerve palsy should be referred to an ear, nose and throat specialist for advice.
Patients who present with superior vena cava obstruction should be offered chemotherapy and radiotherapy according to the stage of disease and performance status.

Stent insertion should be considered for the immediate relief of severe symptoms of superior vena caval obstruction or following failure of earlier treatment.

**Managing brain metastases**
Offer dexamethasone to patients with symptomatic brain metastases and reduce to the minimum necessary maintenance dose for symptomatic response.

Consider palliative whole-brain radiotherapy for patients with symptomatic brain metastases with good performance status (WHO 0 or 1).

**Hypercalcaemia, bone pain and pathological fractures**
For patients with bone metastasis requiring palliation and for whom standard analgesic treatments are inadequate, single-fraction radiotherapy should be administered.

Managing other symptoms: weight loss, loss of appetite, difficulty swallowing, fatigue and depression

Other symptoms, including weight loss, loss of appetite, depression and difficulty swallowing, should be managed by multidisciplinary groups that include supportive and palliative care professionals.

11.3. **Palliative Radiotherapy**
Palliative radiotherapy remains an important and commonly used form of treatment for patients with lung cancer. Palliative radiotherapy is used to treat symptoms arising from the primary cancer or sites of secondary spread. The primary cancer may be treated when it causes symptoms such as breathlessness due to endobronchial obstruction or vascular obstruction, persistent cough, haemoptysis and chest pain. Radiotherapy regimens vary from single to multiple fractions and are given in high dose where the aim is to substantially reduce the size of the cancer. Secondary sites are normally treated with radiotherapy if they are causing pain. Symptoms respond in around two-thirds of patients.

Recommendation: Patients who cannot be offered curative treatment, and are candidates for palliative radiotherapy, may either be observed until symptoms arise and then treated, or be treated with palliative radiotherapy immediately.
11.4. Management of endobronchial obstruction

Endotracheal or endobronchial obstruction can be classified as intrinsic, extrinsic or mixed; intrinsic obstruction is caused by a cancer within the airway lumen and extrinsic obstruction from a cancer externally compressing an airway. Symptoms can include cough, breathlessness and obstructive pneumonia. Tracheal obstruction is a life-threatening condition and requires urgent assessment and treatment.

There are a range of treatments to prevent or treat airway obstruction including conventional external beam radiotherapy, endobronchial surgical debulking of the cancer, stenting and endoscopic endobronchial treatments. Endobronchial surgical debulking of the cancer can be undertaken using either rigid or flexible bronchoscopy. Advantages of rigid bronchoscopic procedures under general anaesthesia include the ability to remove large pieces of cancer, maintain adequate ventilation, and allow control of large volume haemorrhage. Nonetheless, flexible bronchoscopy is increasingly used for debulking procedures. These treatments are usually given to palliate symptoms and improve quality of life, but in some patients relief of endobronchial obstruction will allow assessment for subsequent treatment with curative intent.

Endobronchial techniques available are either a) used to debulk the cancer (brachytherapy, electrocautery, cryotherapy, thermal laser ablation and photodynamic therapy) or b) used to maintain/re-establish airway patency (endobronchial stenting). It was noted that thermal laser ablation, surgical debulking and stent insertion were all favoured options where immediate relief of endobronchial obstruction is required, especially if there is a relatively large cancer. Endobronchial debulking procedures are generally not suitable in cases where the predominant cause of airway obstruction is extrinsic compression. In such cases airway stenting to maintain/re-establish airway patency and/or external beam radiotherapy aimed at treating the surrounding cancer may be considered. External beam radiotherapy is effective in around two-thirds of patients and is less invasive than the other endobronchial treatments. Please see table below:

Description of endobronchial treatments:
Recommendations:

- When patients have large airway involvement, monitor (clinically and radiologically) for endobronchial obstruction to ensure treatment is offered early.
- Offer external beam radiotherapy and/or endobronchial debulking or stenting to patients with impending endobronchial obstruction.
- Every cancer network should ensure that patients have rapid access to a team capable of providing interventional endobronchial treatments.

### 11.5. Pleural Effusion

Breathlessness due to pleural effusion may be relieved by removal of the fluid via needle aspiration or narrow-bore indwelling catheter. However, symptomatic benefit from simple drainage is generally short lived due to re-accumulation of the fluid over days or a few weeks.

**Recommendations**

- Pleural aspiration or drainage should be performed in an attempt to relieve the symptoms of a pleural effusion.
- Patients who benefit symptomatically from aspiration or drainage of fluid should be offered VATS and talc pleurodesis for longer-term benefit.
11.6. **Non drug treatment for breathlessness**

The cause of breathlessness in lung cancer is often multifactorial. It can be caused by the cancer itself, e.g. airway obstruction, the treatment for the cancer, e.g. chemotherapy-related anaemia, or by co-morbidities such as chronic lung or heart disease, anxiety, depression or panic disorder. A thorough evaluation is important to ensure correctable causes are addressed and that appropriate drug therapies are optimised. Non-drug measures include exploring the patient’s understanding of breathlessness and its meaning, providing explanation, breathing retraining and anxiety management.

**Recommendations**

- Non-drug interventions based on psychosocial support, breathing control and coping strategies should be considered for patients with breathlessness.
- Non-drug interventions for breathlessness should be delivered by a multidisciplinary group, coordinated by a professional with an interest in breathlessness and expertise in the techniques (for example, a nurse, physiotherapist or occupational therapist). Although this support may be provided in a breathlessness clinic, patients should have access to it in all care settings.

11.7. **Management of cough**

About 80% of patients with lung cancer experience cough and one-third haemoptysis. The mainstay of treatment is external beam radiotherapy and drug therapy. Other anticancer treatments can also bring relief such as palliative chemotherapy and some endobronchial treatments.

**Recommendation:** Opioids, such as codeine or morphine, should be considered to reduce cough.

11.8. **Management of Hoarseness**

About 10% of patients with lung cancer experience some hoarseness of their voice. Teflon stiffening of the vocal cord can prevent paradoxical movement and lead to some improvement in the voice.

**Recommendation:** Patients with troublesome hoarseness due to recurrent laryngeal nerve palsy should be referred to an ear, nose and throat specialist for advice.

11.9. **Superior Vena Caval Obstruction**

Superior Vena Caval Obstruction (SVCO) is due either to cancer arising in the right main or upper lobe bronchus or by the presence of bulky mediastinal lymph nodes typically arising from the right paratracheal or pre-carinal stations. It causes oedema of the face, neck and arms.
Distended veins over the chest are also usually apparent. SVCO is present at diagnosis in 10% of patients with SCLC and 2% of patients with NSCLC. Traditional management of SVCO includes systemic corticosteroids (e.g. dexamethasone) and either external beam radiotherapy (more commonly used for NSCLC) or chemotherapy (generally for SCLC). Increasingly, expandable endovascular stents, placed percutaneously in the SVC are used to relieve compression and restore blood flow.

**Recommendations**

- Patients who present with superior vena cava obstruction should be offered chemotherapy and radiotherapy according to the stage of disease and performance status.
- Stent insertion should be considered for the immediate relief of severe symptoms of superior vena caval obstruction or following failure of earlier treatment.

### 11.10. Management of brain metastases

Brain metastases occur frequently in patients with lung cancer, especially SCLC, and have a profound effect on both quality of life and survival. Treatments for cerebral metastasis include corticosteroids, radiotherapy (whole brain (WBRT), or stereotactic), cytotoxic chemotherapy, targeted agents and surgical resection.

**Treatment of established cerebral metastasis.**

Corticosteroids reduce symptoms caused by cerebral metastases by reducing cerebral oedema. Dexamethasone is the most commonly used. The median survival of patients with brain metastases from primary lung cancer is 1–2 months when treated with corticosteroids alone.

Palliative whole brain radiotherapy (WBRT) may be offered to improve symptoms. Improvement in neurological symptoms is seen in half of patients after 2 weeks and three quarters after 4 weeks. About one-third of patients presenting with cerebral metastases have a solitary lesion. In patients with NSCLC and a good performance status, prolonged survival has been reported following either neurosurgical resection or stereotactic radiosurgery (SRS).

There is debate about the role of chemotherapy in the treatment of cerebral metastases.

**Recommendations**

- Offer dexamethasone to patients with symptomatic brain metastases and reduce to the minimum necessary maintenance dose for symptomatic response.
- Consider palliative whole-brain radiotherapy for patients with symptomatic brain metastases with good performance status (WHO 0 or 1).
- Discuss the role of metastatectomy in isolated brain metastasis where there is a possibility of curative/radical treatment through the lung cancer MDT

### 11.11. Spinal Cord Compression
Compression of the spinal cord, typically by metastatic epidural cancer, can lead to neurological impairment and paraplegia. At the time of diagnosis the most common symptom is pain, followed by weakness, autonomic dysfunction or sensory loss.

See NICE clinical guideline for Metastatic spinal cord compression: diagnosis and management of patients at risk of or with metastatic spinal cord compression [http://guidance.nice.org.uk/CG75](http://guidance.nice.org.uk/CG75)

11.12. **Hypercalcaemia, Bone Pain and Pathological Fractures**

Bone is one of the most frequent sites of metastasis in lung cancer and can result in pain and pathological fracture. Methods of treating bone metastases include radiotherapy, bisphosphonates and nerve blocks. Increasingly, orthopaedic interventions can be considered, e.g. vertebroplasty.

**Recommendation:** For patients with bone metastasis requiring palliation and for whom standard analgesic treatments are inadequate, single-fraction radiotherapy should be administered.

11.13. **Other symptoms: weight loss, loss of appetite, difficulty swallowing, fatigue and depression**

A thorough assessment is important to guide appropriate management by members of the multidisciplinary team providing holistic supportive and palliative care.

**Recommendation:** Other symptoms, including weight loss, loss of appetite, depression and difficulty swallowing, should be managed by multidisciplinary groups that include supportive and palliative care professionals.

12. **Survivorship**


The NCSI recommends that all patients have access to a ‘recovery package’ which consists of HNA, treatment summary, a cancer care review and access to a health and well-being clinic.

12.1. **Holistic Needs Assessment**

Holistic needs assessment and subsequent care plan fully completed to capture rehabilitation needs at all key points in the patient pathway including diagnosis, start of treatment, during treatment, end of treatment, progressive disease and palliative/end of life care.

### 12.2. End of treatment summaries

Following treatment, the trust provides electronic end of treatment summaries (including individualised care plans), with an accessible record of treatment for local units, GPs and patients. The *London Cancer Living With And Beyond Cancer Board* strongly advocates and supports the use of the National Cancer Survivorship Initiative (NCSI) treatment summary document across all pathways.


A template End of treatment summary is shown in appendix 6.

### 13. Follow-up care of lung cancer patients

- Offer all patients an initial specialist follow-up appointment within 6 weeks of completing treatment to discuss ongoing care. Offer regular appointments thereafter, rather than relying on patients requesting appointments when they experience symptoms.

- Offer protocol-driven follow-up led by a lung cancer clinical nurse specialist as an option for patients with a life expectancy of more than 3 months.

- Ensure that patients know how to contact the lung cancer clinical nurse specialist involved in their care between their scheduled hospital visits.

#### Following Pulmonary Resection

- 1 month following discharge.
- 3 monthly for 12 months.
- 6 monthly for the next 2 years.
- Annually for five years.

Minimum of chest radiography should be done at each visit and assessment with CT if development of symptoms.

#### Following Radical Radiotherapy

- The patient will be seen at least once during the treatment course and again on completion.

- As the prospects of cure are less likely than following surgery patients should be seen 2 monthly for the first year.

- 3 monthly for the next 12 months.

- 6 monthly for the next 2 years.

- Annually thereafter.
• A chest x-ray is performed at each visit.

**Following Chemotherapy**

• If this treatment is given as the sole therapy, the patient will have advanced disease.
• The patient will be seen on each day of treatment for chest x-ray and bloods.
• Thereafter the patient should be seen every 6 weeks and chest x-ray performed.

**Best Supportive Care**

• This is likely to be the largest (and most symptomatic group). They are likely to receive palliative Radiotherapy (e.g. for bone pain, haemoptysis, brain metastases, etc.).
• The prognosis in this group is poor and therefore these patients should be seen every 4 weeks with a chest x-ray whilst well enough to receive palliative therapy should symptoms arise. They should be able to attend the clinic at short notice if new problems arise.
• There should be close contact with the community through the consultant nurse in palliative care who also attends the clinic.
• There will come a time when many patients become too ill to attend. Their care will be completely taken over by the community and this transfer of care must be communicated to the clinics.

It is not the intention of these recommendations to state the duration of time that patients with advanced disease should attend the lung cancer clinics. The important theme must be a seamless link between hospital and community care. Some clinics will be busier than others and time must be kept to discuss the diagnosis of treatment with new patients, and also to see old patients with sudden new problems.
Reading List


APPENDIX 1: TNM Classification 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.

Table 3.1: TNM classification

<table>
<thead>
<tr>
<th>T</th>
<th>T = Extent of primary tumour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tis</td>
<td>Carcinoma in situ</td>
</tr>
<tr>
<td>TX</td>
<td>Positive cytology</td>
</tr>
<tr>
<td>T1a</td>
<td>The tumour is contained within the lung and is smaller than 2cm across</td>
</tr>
<tr>
<td>T1b</td>
<td>The tumour is contained within the lung and is between 2cm and 3cm across</td>
</tr>
<tr>
<td>T2a</td>
<td>&gt;3cm but ≤5cm (or tumour with any other T2 descriptors – main bronchus, &gt;2cm from carina, invades visceral pleura, partial atelectasis – but ≤5cm)</td>
</tr>
<tr>
<td>T2b</td>
<td>&gt;5cm but ≤7cm</td>
</tr>
<tr>
<td>T3</td>
<td>&gt;7cm or growth into chest wall, diaphragm, pericardium, mediastinal pleura, main bronchus &lt;2cm from carina, total atelectasis, phrenic nerve, more than 1 nodule in same lobe</td>
</tr>
<tr>
<td>T4</td>
<td>Growth into mediastinum, heart, great vessels, carina, oesophagus, vertebrae, trachea; nodules in more than 1 lobe of the same lung</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N</th>
<th>N = Condition of regional nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>N0</td>
<td>No regional lymph node metastasis</td>
</tr>
<tr>
<td>N1</td>
<td>Ipsilateral peribronchial, ipsilateral hilar</td>
</tr>
<tr>
<td>N2</td>
<td>Ipsilateral mediastinal, subcarinal</td>
</tr>
<tr>
<td>N3</td>
<td>Contralateral mediastinal or hilar, scalene or suprascapular</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th>M = Metastases</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX</td>
<td>Distant metastases cannot be assessed</td>
</tr>
<tr>
<td>M0</td>
<td>No distant metastases</td>
</tr>
<tr>
<td>M1a</td>
<td>Separated tumour nodule/s in the contralateral lung: tumour with pleural nodules or malignant pleural effusion/pericardial effusion</td>
</tr>
<tr>
<td>M1b</td>
<td>Distant metastases</td>
</tr>
</tbody>
</table>
APPENDIX 2: Detail of mediastinal diagnosis and staging (NICE)

Note: Although the NICE Guidance considers the use of conventional TBNA, London Cancer would advocate always using EBUS guidance for invasive staging of the mediastinum. The sensitivity and yield of diagnosis with EBUS is superior to conventional TBNA.
**APPENDIX 3: Chemotherapy schedules of assessment**

The following bloods should be met on D1 of each cycle of treatment unless specified otherwise in the tables below or elsewhere in the protocol book. The decision to treat or confirm a treatment outside of these recommendations should be discussed with the oncologist:

- WCC >3.0
- Neuts >1.0
- Plt >100
- Cr <ULN
- LFTs < ULN

| Table A: Schedule of Assessments for Adjuvant and Palliative Treatment for Lung Cancer (Non-Trial) – Small Cell Lung Cancer |
|---|---|---|---|---|---|---|
| Regimen | Carbo/Etop | Cis/Etop | IPM | Oral Topotecan | CAV | Gem/carbo |
| Intent | Radical/Palliative | Radical/Palliative | Palliative | Palliative | Palliative | Palliative |
| Cycle | 1-6 | 1-6 | 1-8 | 1-4 | 1-6 | 1-4 |
| Day | 1 | 1 | 1 | 1 | 1 | 1 & 8 |
| X-Ray | After every cycle of chemotherapy unless disease not evaluatable. |
| CT Scan | CT scan to be done pre-cycle one and after last cycle in all patients. CT may be additionally done after every 2-3 cycles of chemotherapy. |
| PET Scan | In radical patients pre-cycle one. | N/A | N/A | N/A | N/A |
| Complete physical examination | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Performance Status | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Echocardiography/MUGA Scan | Only required if treatment is cardio-toxic and patient has a pre-existing cardiac condition that warrants a scan |
| Weight (only recalculate BSA when >10% diff from baseline) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
### Table B: Schedule of Assessments for Adjuvant and Palliative Treatment for Lung Cancer (Non-Trial) – Non Small Cell Lung Cancer

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Vinorelbine/Cisplatin or Vinorelbine/carboplatin</th>
<th>Cis/Vino +concurrence RT</th>
<th>Cis/Vino Post - ChemoRT</th>
<th>Gemcitabin e/carboplatin</th>
<th>Gemcitabin e/cisplatin</th>
<th>Gem single agent</th>
<th>Docetaxel /Cisplatin</th>
<th>Docetaxel /Carboplatin</th>
<th>Pemetrexed /carboplatin</th>
<th>Pemetrexed /cisplatin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intent</td>
<td>Adjuvant/Palliative</td>
<td>Radical</td>
<td>Radical</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
</tr>
<tr>
<td>Cycle</td>
<td>1-6</td>
<td>1-2</td>
<td>1-2</td>
<td>1-4</td>
<td>1-4</td>
<td>1</td>
<td>1-4</td>
<td>1-4</td>
<td>1-4</td>
<td>1-4</td>
</tr>
<tr>
<td>Day</td>
<td>1 &amp; 8</td>
<td>1 &amp; 8</td>
<td>1 &amp; 8</td>
<td>1 &amp; 8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>X-Ray</td>
<td>After every cycle of chemotherapy unless disease not evaluable.</td>
<td></td>
<td></td>
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</tbody>
</table>

**CT Scan**
- CT scan to be done pre-cycle one and after last cycle in all patients. CT may be additionally done after every 2-3 cycles of chemotherapy.

**PET Scan**
- In radical patients pre-cycle one.

<p>| Complete Physical Examination | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| Performance Status            | ✔ on D1 only | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| Weight (only recalculate BSA when) | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |</p>
<table>
<thead>
<tr>
<th>Haematologic parameters¹</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry², ⁵</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Liver Function Tests³, ⁶</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Bone Profile⁴</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Table C: Schedule of Assessments for Adjuvant and Palliative Treatment for Lung Cancer (Non-Trial) – Non Small Cell Lung Cancer (contd.)**

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Gefitinib</th>
<th>Erlotinib</th>
<th>Paclitaxel/Carboplatin - 3 weekly</th>
<th>Paclitaxel/Carboplatin - weekly</th>
<th>Crizotinib</th>
<th>Docetaxel</th>
<th>Pemetrexed (Maintenance)</th>
<th>Vinorelbine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intent</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
<td>Palliative</td>
</tr>
<tr>
<td>Cycle</td>
<td>Until progression</td>
<td>Until Progression</td>
<td>1-6</td>
<td>1-6</td>
<td>Until Progression</td>
<td>1-4</td>
<td>Until progression</td>
<td>1-6</td>
</tr>
<tr>
<td>Day</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>15</td>
<td>1</td>
<td>1 &amp; 1</td>
<td>1 &amp; 8</td>
</tr>
</tbody>
</table>

X-Ray: After every cycle of chemotherapy unless disease not evaluable.

CT Scan: CT scan to be done pre-cycle one and after last cycle in all patients. CT may be additionally done after every 2-3 cycles of therapy.

PET Scan: N/A

Complete Physical: ✓ ✓ ✓ ✓ N/A N/A ✓ ✓ ✓ ✓
<table>
<thead>
<tr>
<th>Examination</th>
<th>Performance Status</th>
<th>Performance Status</th>
<th>Performance Status</th>
<th>Performance Status</th>
<th>Performance Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✓</td>
</tr>
</tbody>
</table>

| Weight (only recalculate BSA when >10% diff from baseline) | N/A | N/A | ✓ | ✓ | N/A | N/A | ✓ | ✓ | ✓ |

| Haematologica l parameters$^1$ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

CTCAE Grade Haematologica l toxicity:
If Grade 3 then withhold until ≤Grade 2 then resume at same dose level.
If Grade 4 then withhold until ≤Grade 2 then resume at dose of 200mg twice daily.
If recurrence of Grade 4 then reduce dose further to 250mg once daily.
| Biochemistry\(^2,\)\(^5\) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Liver Function Tests\(^3,6\) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bone Profile\(^4\) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Table Footnotes
1. WBC, Haemoglobin, Platelets, Neutrophils, Lymphocytes, Monocytes, Eosinophils, Basophils
2. Sodium, Potassium, Cr, Albumin
3. Bili, ALT, ALP
4. Bone Profile – Calcium and Phosphate specifically required at cycle 1
5. Consult [Dosage Adjustment for Cytotoxics in Renal Impairment](#) for recommendations on dose modifications
6. Consult [Dosage Adjustment for Cytotoxics in Hepatic Impairment](#) for recommendations on dose modifications
APPENDIX 4: Lung Protocols

**Lung Protocols – Small Cell Lung Cancer (SCLC)**

- **Limited disease**
  - Off Trial:
    - Cisplatin / Etoposide
    - Carboplatin / Etoposide
    - Concomitant/ Sequential-RT
    - Chemoradiotherapy-Cisplatin/Etoposide
    - Clinical Trial Option

- **Extensive or limited, locally advanced disease or limited disease, with ECOG >1 and/or ALP >1.5xULN**
  - Off Trial:
    - Carboplatin / Etoposide
    - Cisplatin / Etoposide
    - Gemcitabine / Carboplatin
    - Clinical Trial Option

- **Refractory / Recurrent Disease**
  - 3-6 months of previous treatment
    - Off Trial:
      - Consider re-challenge with 1st line treatment if it was well tolerated
      - CAV
      - Clinical Trial Option
  - Within 3 months of previous treatment
    - Off Trial:
      - Oral Topotecan (NICE TA184)
      - Clinical Trial Option
    - Off Trial:
      - IPM
      - CAV
      - Clinical Trial Option

Inappropriate for IPM or CAV / re-challenge with 1st line agents
Lung Protocols – Non-Small Cell Lung Cancer (NSCLC)

**Stage I / II disease**

- Off Trial:
  - Surgery followed by adjuvant chemotherapy for N1 with – Cisplatin / Vinorelbine- squamous & non-squamous
  - OR Concomitant CT / RT
  - OR Cyberknife / SABR

**Clinical Trial Option**

**Stage IIIA disease**

- Off Trial:
  - Gemcitabine / Cisplatin- squamous + sequential RT
  - Pemetrexed / Cisplatin (NICE TA181) - non-squamous + sequential RT

- Clinical Trial Option

**Stage IIIB / IV disease**

- Off Trial:
  - Pemetrexed / Cisplatin (NICE TA181) – non-squamous
  - Gem/Carlo or Gem/Cisplatin - squamous
  - Erlotinib (NICE TA258) – EGFR mutants
  - Gefitinib (NICE TA192) - EGFR mutants
  - Docetaxel / Platinum or Paclitaxel / Carboplatin

**Clinical Trial Option**

**Recurrent disease**

- Off Trial:
  - Maintenance Pemetrexed (NICE TA 190) - Non Progression; no previous Pemetrexed
  - Maintenance Pemetrexed via CDF- Non Progression- following pemetrexed/ cisplatin

**Clinical Trial Option**

**No previous TKI therapy & ALK +ve**

- Off Trial:
  - Crizotinib via CDF

**Refractory / Recurrent Disease**

- Off Trial:
  - Erlotinib (PbR excluded)

**No previous TKI therapy & ALK -ve**

- Off Trial:
  - Erlotinib

**Clinical Trial Option**
APPENDIX 5: London Cancer lung oncologists

Barking, Havering and Redbridge University Hospitals NHS Trust

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End of Treatment Summary


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 ongoing management plan are outlined below. The patient has a copy of this summary.
## Diagnosis:

<table>
<thead>
<tr>
<th>Date of Diagnosis:</th>
<th>Organ/Staging</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local/Distant</td>
</tr>
</tbody>
</table>

## Summary of Treatment and relevant dates:

<table>
<thead>
<tr>
<th>Treatment Aim:</th>
</tr>
</thead>
</table>

## Possible treatment toxicities and / or late effects:

<table>
<thead>
<tr>
<th>Advising entry onto primary care palliative or supportive care register</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes / No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DS 1500 application completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prescription Charge exemption arranged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/No</td>
</tr>
</tbody>
</table>

## Alert Symptoms that require referral back to specialist team:

<table>
<thead>
<tr>
<th>Contacts for re referrals or queries:</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Hours:</td>
</tr>
<tr>
<td>Out of hours:</td>
</tr>
</tbody>
</table>

## Secondary Care Ongoing Management Plan: (tests, appointments etc)

- District Nurse
- AHP
- Social Worker
- Dietician
- Clinical Nurse Specialist
- Psychologist
- Benefits/Advice Service
- Other

## 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).

<table>
<thead>
<tr>
<th>System 1</th>
<th>(5 digit codes)</th>
<th>All other systems</th>
<th>Version 3 five byte codes (October 2010 release)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnosis:</strong></td>
<td></td>
<td>Diagnosis</td>
<td></td>
</tr>
<tr>
<td>Lung Malignant Tumour</td>
<td>XaOKG</td>
<td>Malignant neoplasm of bronchus or lung</td>
<td>B222.</td>
</tr>
<tr>
<td>Carcinoma of Prostate</td>
<td>X78Y6</td>
<td>Malignant neoplasm of prostate</td>
<td>B46..</td>
</tr>
<tr>
<td>Malignant tumour of rectum</td>
<td>XE1vW</td>
<td>Malignant neoplasm of Rectum</td>
<td>B141.</td>
</tr>
<tr>
<td>Bowel Intestine</td>
<td>X78gK</td>
<td>Malignant neoplasm of Colon</td>
<td>B13..</td>
</tr>
<tr>
<td>Large Bowel</td>
<td>X78gN</td>
<td>Malignant neoplasm of female breast</td>
<td>B34..</td>
</tr>
<tr>
<td>Female Malignant Neoplasia</td>
<td>B34..</td>
<td>Malignant neoplasm of male breast</td>
<td>B35..</td>
</tr>
<tr>
<td>Male Malignant Neoplasia</td>
<td>B35..</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Histology/Staging/Grade:</strong></td>
<td></td>
<td>Histology/Staging/Grade:</td>
<td></td>
</tr>
<tr>
<td>Tumour grade</td>
<td>X7A6m</td>
<td>Tumour staging</td>
<td>4M...</td>
</tr>
<tr>
<td>Dukes/Gleason tumour stage</td>
<td>XaOLF</td>
<td>Gleason grading of prostate Ca</td>
<td>4M0..</td>
</tr>
<tr>
<td>Recurrent tumour</td>
<td>XaOR3</td>
<td>Recurrence of tumour</td>
<td>4M6..</td>
</tr>
<tr>
<td>Local Tumour Spread</td>
<td>X7818</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mets from 1°</td>
<td>XaFr.</td>
<td>Metastatic NOS</td>
<td>BB13.</td>
</tr>
<tr>
<td>Treatment</td>
<td>Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palliative Radiotherapy</td>
<td>Radiotherapy tumour palliation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curative Radiotherapy</td>
<td>Radiotherapy scaffold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>Chemotherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>Radiotherapy scaffold</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Treatment Aim:**

<table>
<thead>
<tr>
<th>Curative procedure</th>
<th>Curative treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palliative procedure</td>
<td>Palliative treatment</td>
</tr>
</tbody>
</table>

**Treatment toxicities/late effects:**

<table>
<thead>
<tr>
<th>Osteoporotic #</th>
<th>At risk of osteoporosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteoporosis</td>
<td>Osteoporosis</td>
</tr>
<tr>
<td>Infection</td>
<td>Infection</td>
</tr>
</tbody>
</table>

**Ongoing Management Plan**

<table>
<thead>
<tr>
<th>Follow up arranged (&lt;1yr)</th>
<th>Follow up arranged (≥1yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No FU</td>
<td>No follow up arranged</td>
</tr>
<tr>
<td>Referral PRN</td>
<td></td>
</tr>
</tbody>
</table>

**Referrals made to other services:**

<table>
<thead>
<tr>
<th>District Nurse</th>
<th>Refer to District Nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Worker</td>
<td>Refer to Social Worker</td>
</tr>
<tr>
<td>Nurse Specialist</td>
<td></td>
</tr>
<tr>
<td>SALT</td>
<td></td>
</tr>
</tbody>
</table>

**Actions required by the GP**

<table>
<thead>
<tr>
<th>Tumour marker monitoring</th>
<th>Tumour marker monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSA</td>
<td>PSA</td>
</tr>
<tr>
<td>Osteoporosis monitoring</td>
<td>Osteoporosis monitoring</td>
</tr>
<tr>
<td>Referral for specialist opinion</td>
<td></td>
</tr>
<tr>
<td>Advised to apply for free prescriptions</td>
<td></td>
</tr>
<tr>
<td>Cancer Care Review</td>
<td>Cancer Care Review</td>
</tr>
<tr>
<td>Palliative Care Review</td>
<td>Palliative Care Plan Review</td>
</tr>
</tbody>
</table>

**Medication:**

<table>
<thead>
<tr>
<th>New medication started by specialist</th>
<th>Medication given</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication changed by specialist</td>
<td>Medication changed</td>
</tr>
<tr>
<td>Advice to GP to start medication</td>
<td></td>
</tr>
<tr>
<td>Advice to GP to stop</td>
<td></td>
</tr>
</tbody>
</table>

83
<table>
<thead>
<tr>
<th>Medication</th>
<th>Information to patient:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS1500 form claim</td>
<td>XaCDx DS1500 completed 9EB5.</td>
</tr>
<tr>
<td>Benefits counselling</td>
<td>6743. Benefits counselling 6743.</td>
</tr>
<tr>
<td>Cancer information offered</td>
<td>XalmL Cancer information offered 677H.</td>
</tr>
<tr>
<td>Cancer diagnosis discussed</td>
<td>XalpL Cancer diagnosis discussed 8CL0.</td>
</tr>
<tr>
<td>Aware of diagnosis</td>
<td>Xaqly</td>
</tr>
<tr>
<td>Unaware of prognosis</td>
<td>Xavze</td>
</tr>
<tr>
<td>Carer aware of diagnosis</td>
<td>XavzA</td>
</tr>
<tr>
<td>Miscellaneous:</td>
<td>Miscellaneous:</td>
</tr>
<tr>
<td>On GSF palliative care framework</td>
<td>Xajv2 On GSF Palliative Care Framework 8cm1.</td>
</tr>
<tr>
<td>GP OOH service notified</td>
<td>Xaltp GP OOH service notified 9e0.</td>
</tr>
<tr>
<td>Carers details</td>
<td>9180. Carer details 9180.</td>
</tr>
</tbody>
</table>
APPENDIX 7: Membership of London Cancer Lung Pathway Board

- Sam Janes (Chair) - London Cancer Lung Pathway Director and Consultant Chest Physician, University College London Hospitals
- Aniana Codeniera - Patient Representative
- Alistair Reinhardt - Chest Physician, Barts Health
- Angshu Bhowmik - Chest Physician, Homerton University Hospital
- Catherine Docherty - Clinical Nurse Specialist, Royal Free Hospital
- David Feuer - Palliative Care, Barts Health and Homerton University Hospital
- Elizabeth Hadley - Chest Physician, Barking, Havering and Redbridge University Trust
- Hilly Webb-Peploe - Clinical Psychologist, Barts Health
- Julian Singer - Clinical Oncologist, North Middlesex University Hospital
- June Kauntze - Patient representative
- Karen Sennett - General Practitioner, NHS Islington
- Lucy Finucane - Clinical Psychologist, Barts Health
- Martin Forster - Medical Oncologist, University College London Hospitals
- Martin Hayward - Thoracic Surgeon, University College London Hospitals
- Michael Sheaff – Histopathologist, Barts Health
- Neal Navani - Chest Physician, University College London Hospitals
- Paula Wells - Clinical Oncologist, Barts Health
- Peter Szlosarek - Medical Oncologist, Barts Health
- Sam Hare – Radiologist, Barnet and Chase Farm Hospitals
- Sara Lock - Chest Physician, The Whittington Hospital
- Sarah How – Pathway Manager, London Cancer
- Sharon Cavanagh - AHP Lead, London Cancer
- Stephen Burke – Radiologist, Homerton University Hospital
- Tracey Horey - Clinical Nurse Specialist, Princess Alexandra Hospital
- Tony Lawlor - Cancer Commissioning Team Representative, NELCSU