Welcome to this NDRS training module on Lung and other thoracic tumours, which is designed to help Cancer Administration staff gain a better understanding of the diseases, the terminology used by the clinical teams and provide guidance on the codes to use.

Agenda

- Lung and other thoracic tumours
- Summary
- Acknowledgements

This module may be paused at any time

We're going to give you a brief introduction to the respiratory system, taking a look at anatomy and physiology before moving on to other aspects including diagnosis, and treatment options. This module deals primarily with Lung tumours and pleural mesothelioma although coding for selected other tumours is included. This module can be paused at any time.

Lung and other thoracic

In this section we will cover:

- Causes and Risk Factors
- Signs and Symptoms
- Anatomy & Physiology
- Regional Lymph Nodes
- Diagnosis
- Morphology
- Topography
- Stage
- Treatment

We're going to start with Causes & Risk factors…

Lung – Causes & Risk Factors

- Increasing age – 45% of lung cancers are diagnosed in people over the age of 75
- Over 85% of lung cancer cases are related to smoking. This includes passive smoking
- Exposure to radon gas
- Exposure to asbestos
- Exposure to other chemicals including chromium, nickel and arsenic

Most lung cancers are related to smoking, whether active or passive … but other risk factors include increasing age and exposure to asbestos or other chemicals

Lung – Signs & Symptoms

- Unresolved cough
- Haemoptysis – coughing up bright red blood, frothy blood
- Dyspnoea – difficulty in breathing
- Stridor – wheezing, shortness of breath (SOB)
- Recurrent chest infections
- Chest, shoulder or arm pain
- Loss of appetite
- Sweats or high temperatures

Symptoms of lung disease may include an unresolved cough, coughing blood, breathlessness…

Lung – Signs & Symptoms

- Weight loss
- Fatigue
- Hoarse voice
- Swelling of the face or neck (SVCO)
- Pleural effusion – abnormal fluid in the pleural cavity
- Finger clubbing – rounding of the ends and swelling of fingers
- Horner's syndrome – sinking of one eyeball, contraction of the pupil, drooping of upper eyelid, shoulder pain, loss of sweating function on one side of the face

… weight loss, fatigue or clubbing of the fingers.

Lungs – Anatomy & Physiology

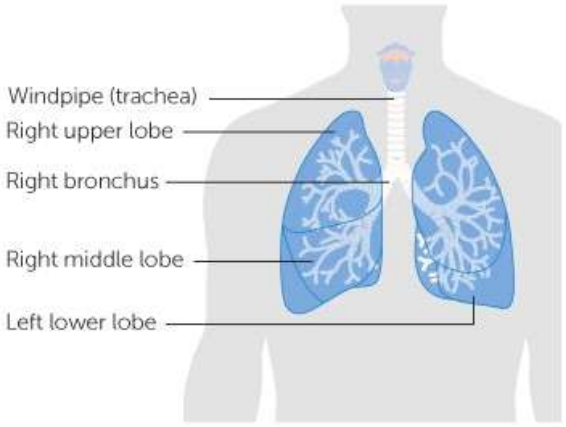
- The primary function of the lungs is gaseous exchange
- Respiration (breathing) is the process of:
  - taking oxygen from the air and transporting it to individual body cells
  - the subsequent transportation of carbon dioxide from the cells back into the air

The main function of the respiratory system is to extract oxygen from the air and deliver it to our cells… expelling waste carbon dioxide as we breathe out

Lung – Anatomy & Physiology

The parts of the respiratory system are:

- Trachea – the windpipe
- Main bronchi – the airways that lead from the trachea to each lung
- Lungs - divided into lobes
- Pleura - pairs of membranes that surround each lung



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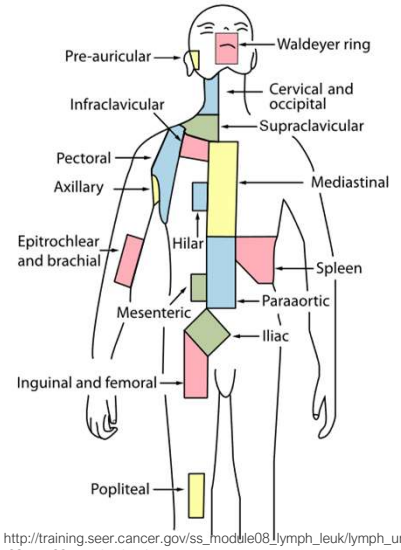
Air is taken in via the windpipe and travels through the main bronchi to the lungs. The bronchi split into smaller and smaller airways as they go into the lobes of the lungs. Surrounding each lung is a double layer of membrane called the pleura.

Lung – Regional Lymph Nodes

Regional lymph nodes for lung include the following nodes:

- Mediastinal
- Hilar
- Interlobar (between the upper and lower lobes of the lungs)
- Lobar (at the bottom of the lungs)
- Segmental / Subsegmental (near the outer bronchial branches)
- Supraclavicular
- Scalene (at the base of the throat)



http://training.seer.cancer.gov/ss_module08_lymph_leuk/lymph_unit02_sec02_reg_lns.html

During an MDT, clinical teams will often make reference to particular groups of regional lymph nodes – these will be the lymph nodes in the vicinity of the primary tumour. Discussion of these lymph nodes may indicate that the stage of the cancer has been partially or fully determined.

Lung - Diagnosis

Initial investigations may include:

- Chest X-ray
- CT and/or PET scan
- Bone scan – if bony metastases are suspected

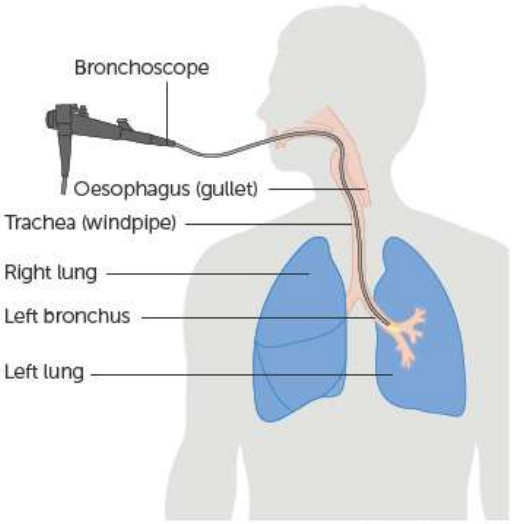
A chest X-ray

Initial investigations for a lung tumour usually include a chest x-ray and potentially other forms of imaging

Lung - Diagnosis

Further investigations may include:

- Bronchoscopy (pictured)
- Endobronchial ultrasound (EBUS)
- Mediastinoscopy
- Ultrasound
- CT guided biopsy
- Surgical biopsy



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If one or more suspicious lesions are noted on imaging, further investigations may include a bronchoscopy, EBUS or surgical biopsy.

Lung - Morphology

Non Small Cell Lung Carcinoma (NSCLC) – 80%+

- Adenocarcinoma, NOS – M8140/3
  - (other sub-types may occur)
- Squamous Cell Carcinoma, NOS – M8070/3
  - (other sub-types may occur)
- Large cell carcinoma – M8012/3
- Large cell neuroendocrine carcinoma – M8013/3
- Grade 1 NET / typical carcinoid tumour – M8240/3
- Grade 2 NET / atypical carcinoid tumour – M8249/3

Examination of tumour cells under a microscope will determine the morphology. The ICD-O-3 morphology code describes what the tumour is. Over 80% of invasive lung tumours come under the general heading of Non-Small-Cell Lung Cancer. This group includes Squamous cell- and large cell carcinomas as well as adenocarcinomas

Lung - Morphology

Small Cell Lung Carcinoma (SCLC) – up to 20%

- Small cell carcinoma – M8041/3
- Combined small cell carcinoma – M8045/3

These are classed as a form of neuroendocrine neoplasm

For more details on neuroendocrine neoplasms, please refer to the Neuroendocrine neoplasms – Key Points training module

Most other invasive tumours are Small Cell Lung cancers, a form of neuroendocrine carcinoma.

Lung - Morphology

Mesothelioma, malignant – M9050/3 (other sub-types may occur)

- A rare type of cancer caused by exposure to asbestos
- In ICD10 topography, mesothelioma is coded separately from other cancer morphologies

Each ICD-O-3 morphology code describes the behaviour of the tumour (Benign, Uncertain or unknown, In situ, Invasive). For more details on both ICD-O-3 Morphology coding and ICD10 Topography coding, please see the NDRS training module What is Cancer?, available here: https://digital.nhs.uk/ndrs/data/cancer-data-training-materials

A rare form of cancer that may affect the lungs is mesothelioma, which is caused by exposure to asbestos. In ICD10 topography, mesothelioma is coded separately from other cancers. For more details on ICD-O-3 morphology- and ICD10 topography coding, please see the NDRS training module What is Cancer?

Lung - Topography

- Main Bronchus – C34.0
- Upper Lobe, bronchus or lung – C34.1
- Middle Lobe, bronchus or lung – C34.2
- Lower Lobe, bronchus or lung – C34.3
- Overlapping lesion of bronchus or lung – C34.8
- Bronchus or lung, unspecified – C34.9

The ICD10 code generally describes the location of a neoplasm – although, as mentioned, there are exceptions. Most invasive cancers of the lung or bronchus would be ICD10 coded using these codes…

Lung – Topography – Related Codes

- Thymus – C37.0
- Heart including pericardium – C38.0
- Anterior mediastinum – C38.1
- Posterior mediastinum – C38.2
- Mediastinum, part unspecified – C38.3
- Pleura – C38.4
- Overlapping lesion of heart, mediastinum and pleura – C38.8

… with most morphologies of related organs being ICD10 coded as shown here…

Lung – Topography – Related Codes

- Trachea – C33X
- Upper respiratory tract, part unspecified – C39.0
- Overlapping lesion of respiratory and intrathoracic organs – C39.8
- Ill-defined sites within the respiratory system – C39.9

… and here.

Lung – Topography - Mesothelioma

- Mesothelioma of pleura – C45.0
- Mesothelioma of peritoneum – C45.1
- Mesothelioma of pericardium – C45.2
- Mesothelioma of other sites – C45.7
- Mesothelioma, unspecified – C45.9

… but as mentioned, mesothelioma has it's own ICD10 coding. Some suspected lung cancers may in fact be mesothelioma of the pleura or the pericardium (which is the membrane around the heart).

Lung – Topography - Non-invasive

- Carcinoma in situ of trachea – D02.1
- Carcinoma in situ of bronchus and lung – D02.2
- Carcinoma in sit of other parts of respiratory system – D02.3
- Carcinoma of respiratory system, unspecified – D02.4
- Neoplasm of uncertain or unknown behaviour of trachea, bronchus or lung – D38.1
- Neoplasm of uncertain or unknown behaviour of Neoplasm of uncertain or unknown behaviour of other respiratory organs – D38.5
- Neoplasm of uncertain or unknown behaviour of respiratory organ, unspecified – D38.6

Non-invasive tumours would also be coded differently in ICD10…

Lung – Topography - Non-invasive

While your clinical team may request that in-situ and other non-invasive tumours are recorded, these do not currently require a COSD submission from your cancer data management system – NDRS obtains this data direct from pathology laboratories

… and while your clinical team may request that non-invasive tumours are recorded, these do not currently require a COSD submission from your cancer data management system – NDRS obtains this data direct from the path labs

Lung - Stage

- All invasive carcinomas of the lung, including non-small-cell carcinomas, small-cell carcinomas and other neuroendocrine neoplasms, are staged using UICC TNM. For the purposes of COSD, a UICC TNM stage is also required for Mesothelioma of the pleura. These should all be staged as follows:
  - For diagnosis dates up to 31st December 2025 use UICC TNM v8
  - For diagnosis dates from 1st January 2026 use UICC TNM v9
- Please note that the TNM version must be accurately recorded – if you are unable to amend the version on your cancer data management system, please refer to your line manager
- If, after 1st January 2026, your cancer data management system has not been amended to include TNM v9 please record the TNM v9 stage and add the following statement to the Primary Diagnosis Subsidiary Comment field:
  - Patient staged using TNM9 not TNM8 as per CR2070

All invasive neoplasms of the lung are staged using the appropriate UICC TNM version as shown.

Lung - Stage

- Mesothelioma of the peritoneum is not stageable.
- For details on recording stage, please see the NDRS training module KPI-TNM Staging 101, available on this link: https://digital.nhs.uk/ndrs/data/cancer-data-training-materials

Please note that mesothelioma of the peritoneum is not considered to be stageable. For more details on recording stage, please see the NDRS training module KPI-TNM Staging 101

Lung - Treatment

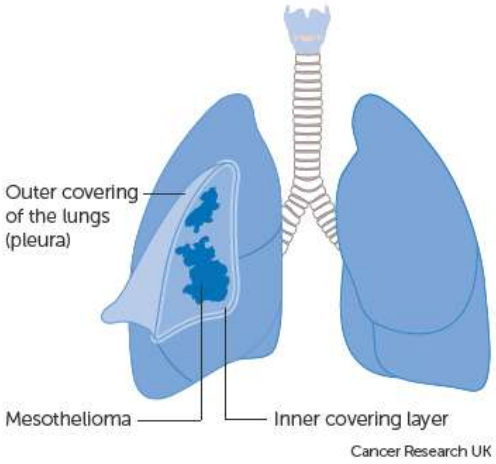
The type of treatments a patient will be offered are dependent on a number of factors, including:

- The type of cancer
- The location of the cancer
- The stage of the disease
- The patient's general health and performance status

The treatment offered to a patient will vary depending on a number of factors, including the type and location of the tumour as well as the patient's level of fitness.

Lung – Treatment – Pleural Mesothelioma

- Pleural mesothelioma is often diagnosed at a late stage, limiting the treatment options
- Patients with early stage pleural mesothelioma may be offered surgery but this is not common
- Late stage pleural mesothelioma is usually treated with chemotherapy and/or radiotherapy to control symptoms but debulking surgery may be offered



Patients with pleural mesothelioma are often diagnosed at a late stage. While surgery may be suitable for early stage mesothelioma, chemo- and radiotherapy are usually offered for later stage disease.

Lung – Treatment – Non Small Cell (NSCLC)

Surgery is the main curative treatment for NSCLC as long as the patient is medically fit

- Only 25% of patients are operable because of the extent of disease at presentation
- Of this 25% a proportion with not be fit enough for an operation so the UK resection rate is less than 20% for NSCLC

Where fit enough, a patient with Non-Small-Cell lung cancer may be offered surgery if the cancer is early stage. Resection rates in the UK are currently below 20% for this type of cancer due mainly to late stage presentation

Lung – Treatment – Small Cell (SCLC)

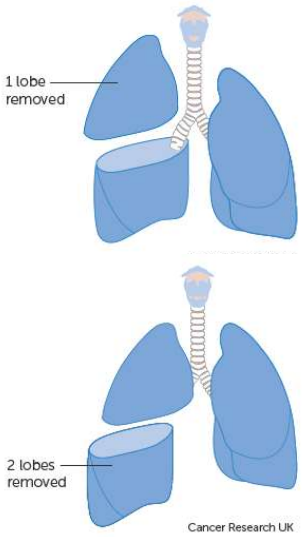
- Drug Therapy
- Radical Radiotherapy
- Prophylactic Cranial Radiotherapy (PCI)
- Surgery for limited disease
- Palliative Radiotherapy

Chemotherapy is usually the first line treatment for Small Cell Lung Cancer where the patient is fit enough. Radiotherapy may also be offered, either to the chest (after or with the chemotherapy)… or to the head to prevent the formation of brain mets. Surgery is generally only offered where the disease is limited to one lung and in the early stages. For extensive disease, palliative radiotherapy might be offered.

Lung – Treatment – Surgery

Types of surgery for lung tumours include:

- Wedge resection – removal of a wedge of lung that contains part of one or more lobes
- Segmentectomy – removes areas of lung along with the associated veins, arteries and airways
- Sleeve resection – removes a tumour located in the central portion of the lung / adjacent to the bronchi
- Lobectomy / Bilobectomy (pictured) – removal of one or two lobes of a lung
- Pneumonectomy - Removal of an entire lung

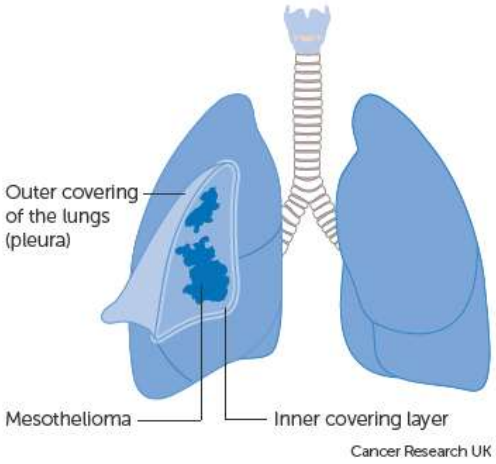


Where surgery is offered, it may be in the form of a resection, a lobectomy or the removal of an entire lung…

Lung – Treatment – Surgery - Mesothelioma

If surgery is offered for mesothelioma:

- Pleurectomy – Partial or total removal of the affected pleura
- Extrapleural pneumonectomy - Removal of the affected lung plus part of the pericardium and any affected section of the diaphragm



… while surgery offered for mesothelioma may involve the removal of either the pleura alone or the entire lung plus parts of the pericardium and diaphragm

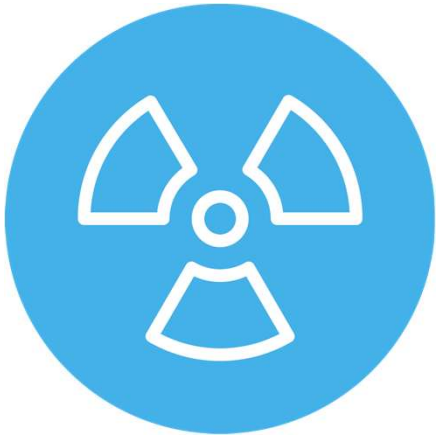
Lung – Treatment - Chemotherapy

- Chemotherapy may be given neo-adjuvantly to reduce tumour size or as the primary treatment
- It may also be given adjuvantly to reduce the likelihood of metastatic spread

A patient may be given chemotherapy before or after the surgery…

Lung – Treatment - Radiotherapy

- Radiotherapy may be given neo-adjuvantly to reduce tumour size
- It may also be given adjuvantly to reduce the likelihood of metastatic spread
- Radiotherapy may be given concurrently with Chemotherapy



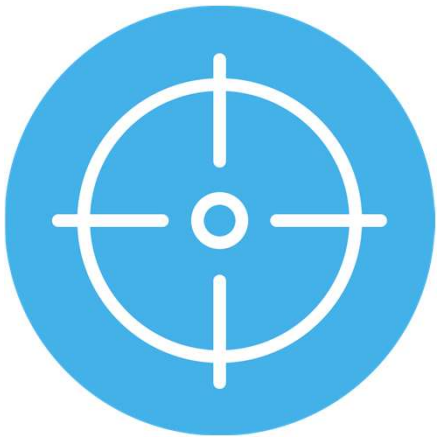
… or they may be offered radiotherapy. Some patients may be offered both.

Lung – Treatment – Targeted Drugs

Other treatment options may be available depending on the type of cancer and certain genetic mutations in the tumour. Where the patient has NSCLC they may be tested for gene mutations that result in faster tumour growth, including:

- EGFR
- ALK
- ROS1
- KRAS

Drugs may be offered to inhibit the actions of any mutated genes

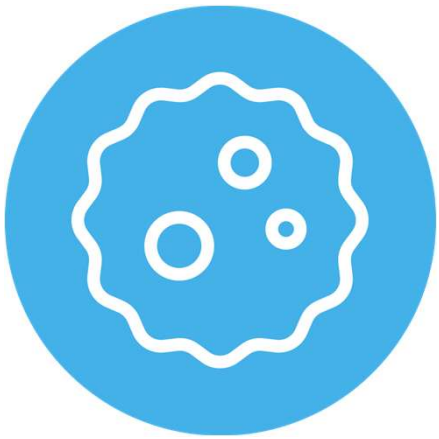


Certain genetic mutations may make targeted treatments an option to slow tumour growth

Lung – Treatment - Immunotherapy

Immunotherapy may be offered for patients with NSCLC

Immunotherapy works by helping the patient's own immune system recognise and attack the cancer cells



… while immunotherapy may be offered to assist the patient's own immune system to identify and attack the cancer cells

Lung – Treatment – Other treatments

Other treatment options that may be offered include:

- Photodynamic therapy – administering a light-sensitising drug then using very bright light on an endoscope to destroy cancer cells
- Laser therapy – delivered via endoscopy
- Microwave ablation – delivering microwaves via a CT guided probe to heat and destroy cancer cells
- Radiofrequency ablation – delivering high frequency radio waves via a CT guided probe to heat and destroy cancer cells
- Diathermy (electrocautery) – using a controlled electrical current, delivered via endoscopy, to cauterise and destroy cancer cells

Other treatments that are used non-curatively include photodynamic therapy, microwave ablation and electrocautery. These treatments are generally offered to destroy cancer cells that are blocking airways and making breathing difficult

Summary

In summary …

Summary

- The biggest risk factor for Lung tumours is tobacco smoking

Tobacco smoking greatly increase the risk of lung cancer

Summary

- The biggest risk factor for Lung tumours is tobacco smoking
- Signs of a Lung tumour can include a persistent cough, coughing blood or difficulty breathing

Patients may present with a persistent cough or difficulty breathing

Summary

- The biggest risk factor for Lung tumours is tobacco smoking
- Signs of a Lung tumour can include a persistent cough, coughing blood or difficulty breathing
- Investigations usually include imaging and may include a biopsy

Investigations usually start with a chest x-ray and potentially other forms of Imaging. A biopsy may also be taken

Summary

- The biggest risk factor for Lung tumours is tobacco smoking
- Signs of a Lung tumour can include a persistent cough, coughing blood or difficulty breathing
- Investigations usually include imaging and may include a biopsy
- All invasive neoplasms are staged using the appropriate UICC TNM version

All invasive tumours are staged using the appropriate UICC TNM version

Summary

- The biggest risk factor for Lung tumours is tobacco smoking
- Signs of a Lung tumour can include a persistent cough, coughing blood or difficulty breathing
- Investigations usually include imaging and may include a biopsy
- All invasive neoplasms are staged using the appropriate UICC TNM version
- If a tumour is diagnosed it may or may not be invasive. While all invasive tumours must be recorded, non-invasive tumours do not need to be recorded on a cancer data management system for the purposes of COSD - NDRS obtains these records directly from pathology laboratories

If a tumour is diagnosed, it may or may not be invasive. All invasive tumours must be recorded in your cancer data management system and while the clinical team might request that non-invasive tumours are also recorded, these do not need to be recorded for the purposes of COSD – NDRS obtains these records directly from the path labs

Summary

- Additional guidance on recording COSD data including morphology, topography, staging and recording a diagnosis can be found at: https://digital.nhs.uk/ndrs/data/cancer-data-training-materials
- Staging data sheets can also be downloaded from the NDRS website for clinical use: https://digital.nhs.uk/ndrs/data/cancer-data-training-materials/staging-sheets

Additional training modules as well as Staging sheets for clinical use may be downloaded from the NDRS website.

Summary

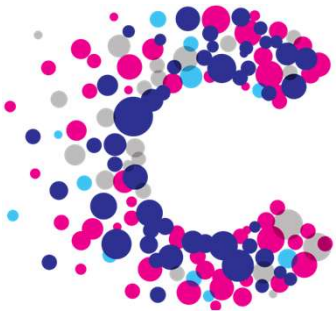
- If in any doubt as to whether you should be recording a diagnosis, please refer to the latest COSD User Guide, Appendix A & Appendix B
- For guidance on the required staging system, please refer to the latest COSD User Guide, Appendix E

- https://digital.nhs.uk/ndrs/data/data-sets/cosd#downloads

Do please remember, guidance **is** available on our website. You can download the COSD User Guide by clicking on this link and selecting the COSD version appropriate to your trust.

Acknowledgements

Many thanks to Cancer Research UK for the use of their images within this training module.



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We'd like to thank Cancer Research UK for the use of their images within this training module.

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