Lung Cancer Orientation Manual
For Indigenous Health Workers
Acknowledgments

This Lung Cancer Orientation Manual for Indigenous Health Workers is an initiative of the Queensland Health Statewide Respiratory Clinical Network, through its Indigenous Respiratory Outreach Care (IROC) Program, Lung Foundation Australia and Cancer Australia.

This project is a Cancer Australia supporting people with cancer grant initiative, funded by the Australian Government and Queensland Department of Health.

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Turtle artwork artist: Jordana Angus

For further information contact:

Queensland Health Aboriginal and Torres Strait Islander Health Unit
e-mail: ATSIHB_BM@health.qld.gov.au
phone: (07) 32340760

Lung Foundation Australia
e-mail: enquiries@lungfoundation.com.au
phone: 1800 654 301

For permissions beyond the scope of this licence contact:

Intellectual Property Officer
Queensland Health
GPO Box 48, Brisbane Qld 4001
e-mail: ip_officer@health.qld.gov.au
phone: (07) 32340889

Lung Foundation Australia
e-mail: enquiries@lungfoundation.com.au
phone: 1800 654 301

Suggested Citation:

Queensland Health Statewide Respiratory Clinical Network and Lung Foundation Australia.

ISBN: 978-1-921021-21-3

Disclaimer

This resource is designed as a guide only. Further guidance and advice regarding the management of a person with lung cancer should be sort from their doctor and relevant multidisciplinary team.
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1.0 Purpose

This Lung Cancer Orientation Manual is a resource that has been developed for the Indigenous Health Workers and Indigenous Hospital Liaison Officers working in acute and primary health care settings. This resource is a reference guide that can be sourced by those who are providing support for Aboriginal and Torres Strait Islander people with lung cancer and their families in Queensland.

2.0 Learning Objectives

1. Identify cancer as a notifiable disease in Australia.
2. Understand the impact of lung cancer on Australians.
3. Describe how cancer develops.
4. Identify risk factors of lung cancer.
5. Identify the main symptoms of lung cancer.
6. Describe how the Indigenous health worker can assist patients with suspicious or confirmed lung cancer to navigate the lung cancer pathway.
7. List the most common diagnostic tests for patients with symptoms suspicious of lung cancer.
8. Describe the role of the lung cancer multidisciplinary team.
9. Identify the main health disciplines involved in the lung cancer multidisciplinary team.
10. List the main treatment options for lung cancer.
11. Locate the nearest lung cancer multidisciplinary team meeting.
Notes:
3.0 Lungs – Anatomy

The lungs are a pair of spongy, air-filled organs located on either side of the chest (thorax). The right lung is divided into 3 lobes and the left lung has 2 lobes. When a person breathes in, the trachea (windpipe) conducts inhaled air into the lungs through its tubular branches, called bronchi (air tubes). The bronchi then divide into smaller and smaller air tubes (bronchioles), finally becoming microscopic in size.

The bronchioles eventually end in clusters of microscopic air sacs called alveoli. In the alveoli, oxygen from the air is absorbed into the blood. Carbon dioxide, a waste product of metabolism, travels from the blood to the alveoli from where it can be exhaled.

Between the alveoli is a thin layer of cells called the interstitium, which contains blood vessels and cells that help support the alveoli.

The lungs are covered by a thin tissue layer called the visceral pleura. The same kind of thin tissue also lines the inside of the chest cavity (called the parietal pleura). A thin layer of fluid acts as a lubricant allowing the lungs to slip smoothly as they expand and contract with each breath.
Notes:
4.0 What is cancer?

Cancer is a term used for diseases where abnormal cells in the body divide in an uncontrolled way and are able to keep growing and spread. Most cancer cells (except for blood cancers) form a solid lump which is called a tumour.

A primary cancer is where a cancer starts (e.g. primary lung cancer starts in the lung). As cancer grows it can spread to other parts of the body. Cancers which invade and spread are called ‘malignant’. ‘Metastases’ refers to cancer that has spread to other parts of the body.

A secondary cancer refers to cancer that has spread from one part of the body to another. Cancer which spreads to the lungs from somewhere else in the body is called secondary lung cancer.

Some growths in the body are ‘benign’ because they do not invade or spread to other organs. However they can still cause significant morbidity and occasional mortality. Calcified nodules in the lungs or benign tumours may be identified on a chest X-ray and mimic lung cancer.
Notes:
5.0 Pathology

Lung cancers can start in any part of the lung. However, 90% – 95% of cancers of the lung are thought to arise from the bronchi or bronchioles. For this reason, lung cancers are sometimes called bronchogenic carcinomas or bronchogenic cancers.

Cancers, such as mesotheliomas, can arise from the pleura (the thin layer of tissue that surrounds the lungs). Mesotheliomas are therefore cancers of the lining of the lung rather than the lung itself.

Cancers can also originate from supporting tissues within the lungs, for example blood vessels, though rarely.

There are two main types of lung cancer: non-small cell lung cancers (NSCLC) and small cell lung cancer (SCLC). The appearance of each type looks different under a microscope and the subtypes tend to behave in different ways. It is important to distinguish which type of lung cancer a person has as the two types have different treatments.

5.1 Non Small Cell Lung Cancer

Non-small cell lung cancer (NSCLC) is the most common type of lung cancer, accounting for about 80% of all lung cancers. Non-small cell lung cancer can be divided into three main sub-types that are named based upon the type of cells found in the tumour:

- Adenocarcinomas – most common sub-type
- Squamous cell carcinomas
- Large cell carcinomas – these are less common than adenocarcinomas and squamous cell carcinomas.

These sub-types are grouped together because they behave in a similar way and respond to treatment in a different way to small lung cancer. Mixtures of different types of non-small cell carcinomas are also seen.
5.2 Small Cell Lung Cancer

Small cell lung cancer has this name because the cancer cells look small under the microscope. This type of cancer is the most aggressive and is strongly related to smoking. It is very rare for someone who has never smoked to develop it. Small cell lung cancer makes up 10–15% of lung cancer and can spread quickly to other parts of the body.

Small cell lung cancers tend to be seen in the central part of the lung and spread to the lymph nodes, which are often very enlarged. It is important to differentiate small cell lung cancer from non-small cell lung cancer because it responds well to chemotherapy.

5.3 Other

There are other types of lung cancer which are far less common. These include:

- Bronchial carcinoids – generally grow and spread more slowly and usually detected early enough to be treated surgically.
- Cancers of supporting lung tissue such as smooth muscle, blood vessels or cells involved in the immune response can rarely occur in the lung.
- Adenoma – very rare tumour arising from mucus glands of small bronchi. Usually of very low malignant potential.
6.0 Risks for Lung Cancer

Research has found several risk factors that may increase a person’s chance of getting lung cancer. Having certain risk factors does not mean an individual will definitely develop lung cancer but it does increase their chance of developing it. Some risk factors for lung cancer can be modified by the individual. Key risk factors for lung cancer include:

- **Tobacco smoking or exposure to smoke**
- **Harmful chemicals such as diesel fumes and certain metals**
- **Older age**
- **Asbestos**
- **Radiation**
- **Lung cancer runs in the family**
- **Chronic lung disease**
- **Lung cancer runs in the family**

**Risk factors**

Research has found several risk factors that may increase a person’s chance of getting lung cancer. Having certain risk factors does not mean an individual will definitely develop lung cancer but it does increase their chance of developing it. Some risk factors for lung cancer can be modified by the individual. Key risk factors for lung cancer include:

**6.1 Lifestyle factors**

1. **Tobacco smoking**

Tobacco smoking is the number one risk factor for lung cancer. In Australia, about 90% of lung cancer in males and 65% of lung cancer in females is estimated to be a result of tobacco smoking. Tobacco smoking is the second largest cause of burden of disease (11.6%) for Indigenous Queenslanders.

People who quit smoking have a lower risk of lung cancer than if they had continued to smoke, but their risk is higher than the risk for people who never smoked. Quitting smoking at any age can lower the risk of lung cancer.
6.2 Environmental factors

1. Passive smoking
Tobacco smoke is a toxic mix of a variety of chemicals. Passive smoking is where a person is exposed to or breathes in second-hand tobacco smoke or the chemicals in tobacco smoke, without actually smoking a cigarette, cigar or pipe. Research studies have shown that passive smoking can cause lung cancer.

2. Occupational exposure
Inhalation of a range of industrial and chemical carcinogens including asbestos, radiation, diesel exhaust fumes and certain metals associated with specific occupations and industries can be a risk factor for lung cancer.

3. Air pollution
Outdoor pollution occurs when the air contains gases, dust or fumes in amounts which are considered harmful to the health and comfort of humans and animals. Outdoor air pollution may increase the risk of lung cancer.

Indoor air pollution may arise from incoming outdoor air or from household products, combustion from heating and cooking, tobacco smoke, building materials and soil gases. Indoor air pollutants which may affect lung cancer risk include asbestos and second-hand smoke.

4. Radon exposure
Radon is a naturally occurring radioactive gas released from the normal decay of uranium rocks and soil. While exposure to radon gas is a risk factor for lung cancer, at low levels it is not dangerous.

6.3 Biomedical factors

1. Age
Lung cancer is a disease which tends to affect older people and the risk is higher as the person grows older.

2. Family history of lung cancer
People with immediate relatives with lung cancer (parents or siblings) are at increased risk; the risk is higher for people with more than one immediate relative who has developed lung cancer.

3. Previous lung diseases
Diseases such as lung fibrosis, chronic bronchitis, emphysema and pulmonary tuberculosis may be associated with an increased risk of lung cancer. While some of the common risk factors are listed above.

Notes:
7.0 Impact of Lung Cancer on Australia and Queensland

Lung cancer was the fourth most common cancer in both men and women in Australia, with a total of 9,703 lung cancers diagnosed in 2007.

From 1982 to 2007, incidence rates which reflect new cases of lung cancer have decreased by 32% in men but increased by 72% in women.

In 2007, the risk of an Australian being diagnosed with lung cancer by the age of 85 years was 1 in 12 for men and 1 in 23 for women.

Lung cancer is the leading cause of cancer death in Queensland. There were 2,094 newly diagnosed cases of lung cancer in Queensland in 2009 and this was estimated to increase by 14% to 2,395 cases in 2012.

For lung cancer the vast majority (94% for men and 93% for women) of the burden of disease is due to premature death. In men, lung cancer is the leading cause of the burden of disease due to cancer (20%) and the fourth leading cause of the burden of disease for men from all causes (4% of the total burden) in 2011.

In women, lung cancer is the second leading cause of the burden of disease due to cancer (17%), only exceeded by breast cancer, and the seventh leading cause of the burden of disease for women from all causes (3% of the total burden) in 2011.

There is a disparity in treatment and subsequent mortality experienced by Indigenous Australians compared with other Australians. Potential causes of this disparity include the presence of co-morbidities, higher smoking rates, potential treatment variation, late presentation and diagnosis and influences of cultural beliefs.

Reliable data on the incidence and mortality for lung cancer for Indigenous Australians are available for some States. The Cancer Australia Report to the Nation – Lung Cancer 2011 noted that lung cancer is the most common cancer in Indigenous men and the second most common cancer in Indigenous women. The incidence and mortality rates of lung cancer were higher for Indigenous than for non-Indigenous Australians for 2003-2007.

However, five-year crude survival estimates (proportion of individuals alive five years after diagnosis), were not significantly different between Indigenous and non-Indigenous Australians diagnosed with lung cancer. Indigenous Australians have a shorter life expectancy than non-Indigenous Australians and are diagnosed with lung cancer at an earlier age; the impact of these factors on crude survival estimates is unclear.

Indigenous Australians are 1.9 times as likely to develop, 1.9 times as likely to die from and 1.6 times as likely to be hospitalised for lung cancer. Indigenous Australians have a lower chance of surviving 5 years following a diagnosis of lung cancer (7% compared with 11%).

The higher rates of lung cancer in Indigenous Australians could be explained by the higher prevalence of smoking compared to non-Indigenous Australians. In 2010, Indigenous Australians were 2.2 times as likely as non-Indigenous Australians to smoke tobacco (38% compared with 18% after age-standardisation). Indigenous Australians generally take up smoking at an earlier age, continue to smoke for longer and make fewer quitting attempts than non-Indigenous Australians.

Indigenous Australians with cancer often have a poor prognosis, are usually diagnosed with cancer at a later stage, are less likely to receive adequate treatment, and are more likely to die from cancers than other Australians.
8.0 Cancer Registries

In Australia, cancer is a notifiable disease. The Queensland Cancer Registry was established in 1982. It is a population based registry. The main aim of the registry is to collect data in order to describe the nature and extent of cancer in Queensland. Non melanoma skin cancers are not recorded on the register.

Data for the Cancer Registry is sourced from:
- Patient admission data from private and public hospitals and nursing homes
- Death registry
- Health institutions are required to notify the registry about cancer diagnoses and death within 1 month.

Information on the Registry includes:
- Name and address
- Date of Birth
- Country of Birth
- Indigenous status
- Clinical details about the cancer
- Notifying institution and doctor.

Access to the information can be obtained through:
- Reports published by the registry (available to the public). No identifiable patient data is released to the public.
- Application by health and medical researchers who meet strict criteria (the information can include identified patient data).

9.0 Cancer Care Pathway

9.1 Clinical Cancer Care Pathway

This is the endorsed Clinical Cancer Care Pathway in Queensland (2014).

Clinical Cancer Care Framework

- **Primary Carer**
  - Patient presents or Screening self referral
  - Primary carer assessment
  - Patient referred

- **Process Referral**
  - Receive and process referral
  - Clinical assessment of referral
  - Confirmed diagnosis of cancer direct refer to MDT

- **Specialist Review**
  - Specialist assessment and diagnostic work up (as recommended by available Tumour Stream Protocol)

- **Diagnostics**
  - Review to establish
  - Staging of cancer
  - Recommend a care plan
  - Location for treatment based on Clinical Services Capability Framework, Medical and Social Outcomes, other relevant factors
  - Advanced Care Planning

- **MDT Review**
  - Specialties involved determined by care plan/response assessment
  - Treatment as recommended in care plan and agreed by patient
  - Monitor and assess response to treatment
  - Curative or palliative treatment

- **Review & Transfer**
  - Follow up plan determined may include:
    - Shared care follow up/on going monitoring
    - Rehabilitation
    - Specialist Palliative Care
    - Other

- **Treatment Interventions**
  - Follow up plan determined may include:
    - Shared care follow up/on going monitoring
    - Rehabilitation
    - Specialist Palliative Care
    - Other
9.2 Lung Cancer Pathway

This flowchart represents what a patient’s possible lung cancer journey will look like.

Lung Cancer

- **Onset of Symptoms**
  - General Practitioner (GP)
  - Abnormal Chest XRay
  - CT Scans (Chest, Abdomen)
  - Refer to Specialist

- **Further Investigations**
  - Imaging test
  - Lung function test
  - Biopsy (such as bronchoscopy or needle aspiration)

- **Diagnosis and Staging**

- **Multidisciplinary Team (MDT) meeting**

- **Treatment Options**
  - (e.g. Surgery, Chemotherapy, Radiotherapy, Palliative Care)

- **Follow up and Support**

- **Symptoms**

- **Diagnosis**

- **Treatment Decision**

- **Treatment & Follow Up**

- **Indigenous Health Worker Support**

- **Care Coordination and Indigenous Hospital Liaison Officer Support**

- **Allied Health Support**
Notes:
10.0 Symptoms

10.1 Symptoms that could be related to lung cancer

The effects of lung cancer depend on where it is and what damage the cancer has caused. The following symptoms can be due to other conditions but may also be symptoms of lung cancer:

- A new cough that has persisted for three or more weeks
- A changed cough
- Coughing up blood (known as haemoptysis)
• A chest infection that won’t go away.

• Chest pain (stabbing or pleuritic pain in the chest)

• Short of breath (breathing difficulties like feeling short of breath or having a wheeze while breathing)
• Pain in the back or bones

• Swelling of the face

• Hoarseness (caused by laryngeal nerve involvement)

Some people have no symptoms and the lung cancer can be found by chance.
10.2 Symptoms due to metastases

‘Metastatic cancer’ refers to cancer that has spread to other parts of the body.

Lung cancer metastatic sites:
- Central nervous system (e.g. brain)
- Bone
- Liver
- Other (e.g. lymph nodes, adrenal glands).

Multiple metastases to different organs are not uncommon.

If the cancer has metastasised, then the patient may have symptoms due to the local effects of the metastasis.

- Bone pain
- Headaches
- Blurred vision
- Seizures (fits)
- Symptoms of a stroke
10.3 Non Specific Symptoms for Lung Cancer

Non specific symptoms may include:

- Anorexia and weight loss
- Weakness and fatigue
- Poor sleep (insomnia)
- Psychological symptoms such as depression and mood changes are also common
Paraneoplastic syndromes:
- Paraneoplastic syndromes refer to a number of different syndromes that can occur in cancer including lung cancer.
- They can affect different organ systems and are due to indirect effects from the cancer; in other words the signs and symptoms are not due to direct invasion, obstruction or metastases.
- The symptoms and signs can be very diverse and the precise pathogenesis is not always known although auto-immunity plays a part in some.
- The syndromes include endocrine abnormalities with the secretion of hormones and chemicals which cause changes in metabolism and biochemistry. For instance, squamous cell carcinoma can be associated with high calcium levels.
- It can also take the place of neurological syndromes particularly weakness; small cell lung cancer is often implicated.
- Finger clubbing (enlarged finger tips and highly curved finger nails) are a common paraneoplastic sign for lung cancer.
- Paraneoplastic symptoms and signs can predate the diagnosis of lung cancer.
- In some cases, paraneoplastic features may resolve with curative treatment but others may not respond to cancer treatments.
Notes:
11.0 Investigations

Investigations are used for:

- diagnosing the cancer
- staging the cancer
- assessing if the person is fit and suitable for various treatments.

11.1 Chest X-Ray

The chest X-ray provides a picture of the lungs and is the most common first test when any symptoms of lung cancer are present. These X-rays show the lungs, heart and several major blood vessels in the chest.

The X-ray will be performed in a special room with a movable X-ray camera attached to a large metal arm. The person will stand next to a “plate.” This plate may contain X-ray film or a special sensor that records the images on a computer. The person will be given a lead bib to cover their genitals. This is because sperm (men) and eggs (women) can be damaged by the radiation.

The X-ray technician will tell the person how to stand and will record both front and side views of the chest. While the images are taken, the person will be asked to hold their breath so that they stay completely still—if they move, the images might turn out blurry. As the radiation passes through their body and onto the plate, denser materials, such as bone and the muscles of the heart, will appear white.

After the images have been taken, the person can change back into their clothes and go about their day.

What you need to know:

- Doctors agree that exposure to the small amount of radiation produced during an X-ray is well worth it because of the diagnostic benefits the test provides.
- X-rays are not recommended if the person is pregnant because radiation can harm the unborn baby. If the person believes they are pregnant, they will need to tell the doctor.
11.2 CT Scan

Computed Tomography (CT) scans are specialised pictures and may be performed on the chest, abdomen and/or brain, to evaluate the primary lung cancer and any metastases. While a chest X-ray shows the whole chest in one or two pictures, a CT scan will show the chest in multiple overlapping pictures which show more detail. While a chest X-ray takes one or two large pictures of the lungs, the CT scan takes many small pictures. A CT scan can find small tumours which may not be seen on chest X-ray. The advantage is the higher picture detail of chest compared to chest X-ray but it delivers a higher dose of radiation and is more costly.

Because the machine produces X-rays, the technologist is in a separate room but can talk with the person through an intercom as the scan is being done.

During the scan, the person lies on a narrow table. Straps and pillows may be used to help the person stay in the correct position and hold still during the procedure. The table slides into the CT scanner. The CT scanner looks like a large rectangular unit with a hole in its centre, like a giant doughnut or lifesaver. The camera moves around in the scanner, taking many cross-sectional images or image slices. Computer software then stacks these image slices together to make a 3-dimensional image of the body. The person may be asked to hold their breath at times to ensure a clear image. Clicking or whirring noises may be heard during the scan. A moving light may be seen as the scanner takes images.

What you need to know:

- It is important that women tell the X-ray technologist or radiologist if they are pregnant, or think they may be pregnant, before having any type of X-ray or scan.
- If a contrast medium is used, it is important that women tell the X-ray technologist or radiologist if they are breast-feeding.
- People who are allergic to contrast may not be able to have contrast.
- In people with kidney disease, special precautions including hydration may be required.
11.3 Blood tests

Blood tests can reveal biochemical or metabolic abnormalities in the body that accompany cancer.

- **Full blood count:**
  - Haemaglobin level is checked for presence of anaemia.

- **Biochemistry blood test:**
  - Elevated levels of calcium or the alkaline phosphatase enzyme may be found in those with bony metastases. Calcium can also be elevated from abnormal hormonal release.
  - Check presence of electrolytes – chemical compounds such as sodium and potassium are critical to the body’s healthy function. Cancer can release hormones that alter the levels of these electrolytes.
  - Elevated levels of certain enzymes normally present within liver cells, including aspartate aminotransferase (AST) and alanine aminotransferase (ALT), signal liver damage, possibly from liver metastases.

Other tests may include:

11.4 Lung Function Tests

**Lung Function or breathing Tests:** These refer to a group of tests that measure how well the lungs take in and release air and how well they move gases such as oxygen from the atmosphere into the body’s circulation.

- **Spirometry** – is a breathing test that measures the amount of air that a person moves in and out of their lungs and how well the air moves. The person inhales maximally (filling his or her lungs to Total Lung Capacity), and then exhales forcefully into a device called a spirometer. The spirometer measures volume of air over time, and from this several important parameters may be calculated.

- **Gas transfer test** – is a breathing test used to determine how well the lungs move oxygen from the lungs to the bloodstream. This test measures how well gases in the air enter the lungs, move into the alveoli and then into the blood stream surrounding these air sacs.

- **Complex tests**
  - **Arterial Blood Gas (ABG)** – involves a blood sample taken from an artery. The ABG is the most precise and direct way of telling how well the lungs are bringing oxygen into the blood and how well the lungs are getting rid of carbon dioxide.
  - **Exercise test** – is done in a laboratory, either by having the person walk on a treadmill or pedalling a bicycle. As the person exercises, they will breathe through a mouthpiece connected to a machine. This machine measures how much work a person does during exercise and can give doctors an indication of how fit a patient is for treatment.

**What you need to know:**

- These tests tell us how well a person’s lungs are functioning and also how well they may breathe.
Lesions in the lung can be biopsied by taking samples with a needle inserted through the chest wall. The test will be done to see whether a lung abnormality is a lung cancer or other diagnosis.

A needle aspiration is done by inserting a thin needle into a tumour and removing cells that can be evaluated under the microscope. A pathologist looks at the cells to see if the suspicious tumour is cancer, and if it is cancer, what type of cancer.

Fine needle aspiration (FNA) and / or core biopsy are used to diagnose or stage a lung cancer.

A fine needle aspiration uses a very fine needle to aspirate (suck up) cells. In other cases, a slightly bigger needle is used to obtain a core biopsy, which is a cylinder of tissue, for the pathologist.

A fine needle aspiration or core biopsy is usually done in the Radiology (X-Ray) Department. It does not usually need any special preparation and does not take very long to do.

**Procedure:**

- FNA and core biopsy are usually done with a local anaesthetic.
- The doctor inserts the needle attached to a syringe into the lump.
- For deep lumps or lumps that cannot be felt, ultrasound or computed tomography (CT) scan can be used to guide the needle into the lump.
- Fluid or cells are withdrawn through the needle into the syringe.
- The person may feel minor discomfort during the procedure, especially in sensitive areas.
- A small bandage may be used to cover the site where the needle entered.
- The sample is sent to a laboratory to be examined under a microscope.
11.6 Bronchoscopy

Bronchoscopy is an examination of the airways with a bronchoscope (visualising the airways through a thin, fiberoptic probe inserted through the nose or mouth), which may reveal areas of tumour that can be sampled (biopsied) for diagnosis by a pathologist. This procedure helps diagnose and determine the extent of lung cancer.

A bronchoscopy is a test used to look inside the trachea and bronchi using a bronchoscope (a thin, tube-like instrument with a light and lens). A bronchoscopy is also used to perform specialised treatment procedures in the airways.

What you need to know:

- If the person is on any blood thinning medication (anticoagulants), some of these medications may need to be stopped temporarily.
- The commonest side-effects are bleeding / haemoptysis and pneumothorax. Usually the bleeding settles by itself but some pneumothoraces may require a chest tube to drain the air.
- People who have very severe lung disease may not be able to have these tests in case these side effects occur as they may result in major consequences and even death.
- The test is generally a day case procedure but the patient may not be able to drive or work that day, and should have a carer with them for 24 hours after the procedure in case of emergencies.
A bronchoscopy can be used for:

1. **Diagnosis:**
   - evaluate damage to the airway caused by trauma
   - identify infection or inflammation
   - find out why a person is coughing up blood (haemoptysis)
   - find the location of bleeding within the airway and control it
   - diagnose lung diseases or tumours
   - obtain biopsy specimens of cells for examination under a microscope or for culture (the process of growing micro-organisms, cells or tissues in a specially prepared growth media)
   - help stage lung cancer and determine if lung tumours are operable or not.

2. **Treatment of lung cancer:**
   - remove foreign objects from the airway
   - remove mucous plugs or polyps (small cauliflower-like growths on a mucous membrane)
   - brachytherapy (a type of radiation therapy that uses implants to deliver radiation directly into or near a tumour)
   - laser surgery (a surgical procedure that uses a laser to make bloodless cuts in tissue) or similar technology (e.g. Argon Plasma Coagulation and diathermy)
   - photodynamic therapy (treatment with drugs that become active when exposed to light)
   - insert a small wire mesh or silicone tube (called a stent) to keep the airway open.
11.6.1 Endobronchial Ultrasound (EBUS) Bronchoscopy

Endobronchial Ultrasound (EBUS) is a newer type of bronchoscopy, using a special bronchoscope. It uses a small ultrasound probe to identify abnormal lesions that are not in the field of view of routine bronchoscopy such as lymph nodes and small peripheral cancers.

EBUS can be used to help:

- Take samples from a cancer or lymph nodes in the mediastinum or hilar (linear or convex EBUS).
- Take samples from suspected cancers which are in the periphery of the lung and which cannot be seen with routine bronchoscopy (guide sheath mini-probe EBUS).

What you need to know:

- If the person is on any blood thinning medication (anticoagulants), some of these medications may need to be stopped temporarily.
- The common side effects of bronchoscopy are bleeding, fever, infection, low oxygen levels, exacerbation of underlying lung or heart disease and pneumothorax.
- People who have very severe lung disease may not be able to have these tests in case these side effects occur as they may result in major consequences and even death.
- The test is generally a day case procedure but the patient will not be able to drive or work that day, and should have a carer with them for 24 hours after the procedure in case of emergencies.
- Some bronchoscopies will require a general anaesthetic; otherwise it is usually done with local anaesthetic and sedative medications.
11.7 Positron Emission Tomography (PET) Scan

Positron emission tomography (PET) scan: While CT scans and Magnetic Resonance Imaging (MRI) scans look at anatomical structures, PET scans measure the metabolic activity of the body organs, using a radio-labelled synthetic sugar (glucose) dye. PET scans can determine whether a tumour tissue is actively taking up glucose and can suggest different cancer types.

A PET scan may be done to:
- confirm the diagnosis of certain types of cancer
- determine the stage (find out how far the cancer has spread and if it is present in other organs and tissues)
- find out if cancer treatment is working
- check if cancer has come back (recurred) after treatment or spread to other locations.

A PET scan is used if other imaging tests are unclear, inconclusive or surgical procedures are not possible.

What you need to know:
- PET scans are only available at specialised centres and the patient may have to travel for this day case test.
- If the person is diabetic, this may affect the PET scan and this should be notified to the team performing the PET scan.
11.8 Magnetic Resonance Imaging (MRI) Scan

A Magnetic Resonance Imaging (MRI) Scan is a test that uses a magnetic field and pulses of radio wave energy to make pictures of organs and structures inside the body. An MRI may give different information about structures in the body as well as showing problems that cannot be seen with other imaging methods. Magnetic resonance imaging (MRI) scans may be appropriate when precise detail about a tumour’s location is required.

An MRI may be done to:

• Diagnose cancer in certain locations. An MRI can help find tumours in the brain, spinal cord, head, neck, bones, breast, muscles or other soft tissue.
• Determine the stage (how far the cancer has spread and if it is present in other organs and tissues).
• Help plan cancer treatment.

With this procedure the person lies on a movable examination table. Straps and pillows may be used to help the person stay in the correct position and hold still during the examination. Surface coils may be placed around or near the area being scanned. These coils help improve the image quality of superficial structures, such as the neck, shoulder, knee or breast. The person lies on a table, which glides into a narrow cylinder that houses the MRI scanning magnet. The inside of the scanner is well lit and has a fan that gently blows fresh air. The part of the body being examined is positioned in the centre of the cylinder. The surface of the cylinder may be just a few inches from the person’s face. The person needs to lie still inside the MRI machine while it takes pictures. The person may be asked to hold their breath at times to ensure a clearer picture.

What you need to know:

• If the person having the MRI has any metal parts or pacemaker in their body, they will need to tell their doctor or nurse before this procedure is performed.
• An MRI is not a standard test for lung cancer; it is used in specific circumstances when it can provide very useful information.
11.9 Bone Scan

A bone scan is a test that can find cancer that has spread to the bones. During a bone scan, a radioactive substance called a tracer is injected into a vein in the arm. The tracer travels through the bloodstream and into the bones. Then a special camera takes pictures of the tracer in the bones. Areas that absorb little or no amount of tracer appear as dark or “cold” spots. This could show a lack of blood supply to the bone or certain types of cancer. Areas of fast bone growth or repair absorb more tracer and show up as bright or “hot” spots in the pictures. Hot spots may point to problems such as a tumour, a fracture, or an infection.

Bone scans are used to determine whether a lung cancer has metastasised to the bones.

What you need to know:
- It is important that women tell the X-ray technologist or radiologist if they think they are pregnant, or think they may be pregnant, before having a bone scan.
11.10 Thoracentesis

Sometimes lung cancers involve the lining tissue of the lungs (pleura) and lead to an accumulation of fluid in the space between the lungs and chest wall (called a pleural effusion). Normally only a small amount of pleural fluid is present in the pleural space. A build-up of excess pleural fluid (pleural effusion) may be caused by many conditions including cancer. If a large amount of fluid is present, it may be hard to breathe.

Thoracentesis (also called pleural tap) is a procedure used to remove fluid from the space between the lungs and the chest wall called the pleural space. It is done with a needle (and sometimes a plastic catheter) inserted through the chest wall. Ultrasound pictures are often used to guide the placement of the needle.

Aspiration of a sample of this fluid with a thin needle (thoracentesis) may reveal the cancer cells and establish the diagnosis.

A thoracentesis is done to either or both:
- collect fluid for examination under a microscope to help diagnose the cause of the pleural effusion.
- remove excess fluid from the pleural cavity. Removing extra fluid helps a person to breathe easier.

What you need to know:
- If the person is on any blood thinning medication (anticoagulants), some of these medications may need to be stopped temporarily.
- The common side effects of thoracocentesis are pneumothorax, bleeding, fever/infection, low oxygen levels and pain.
- Most often, an ultrasound will be used to help localise the site for drainage.
- The test is generally a day case procedure but the patient will not be able to drive or work that day, and should have a carer with them for 24 hours after the procedure in case of emergencies.
11.11 Surgical Biopsy

If a diagnosis cannot be made through the previously mentioned methods then surgery can be performed to obtain tumour tissue for diagnosis.

The surgical procedures include:

**Mediastinoscopy**

Mediastinoscopy is a surgical procedure to examine the inside of the upper chest between and in front of the lungs (mediastinum). During a mediastinoscopy, a small cut (incision) is made in the neck just above the breastbone or on the left side of the chest next to the breastbone. Then a thin scope with a light (mediastinoscope) is inserted through the opening.

A mediastinoscopy is done to diagnose lung cancer. A tissue sample (biopsy) can be collected through the mediastinoscope and then examined under a microscope for lung cancer.
Video-assisted thoracoscopic surgery

Video-assisted thoracoscopic surgery (VATS) is a less invasive surgical procedure in selected cases, much like laparoscopic or ‘keyhole’ surgery.

VATS is used for:
- Diagnosis:
  - Lung Biopsy: A tissue sample is extracted from the lung for laboratory analysis; the specimen is taken from an area that appears altered due to disease (lesion).
  - Pleural Biopsy: A pleural biopsy is a procedure to remove a sample of the tissue lining the lungs and the inside of the chest wall to check for disease or infection.
- Treatment:
  - Drain pleural effusion to decrease shortness of breath
  - Stop pleural effusion from recurring by sticking the pleura together using a chemical such as talc (talc pleurodesis).

Thoracotomy

A thoracotomy or thoracostomy is an incision into the pleural space of the chest. It is performed by a surgeon to gain access to the thoracic organs (e.g. lungs). It is the first step in many surgeries including lobectomy or pneumonectomy for lung cancer and is performed under general anaesthesia.

It may be used to biopsy suspected cancer on occasions and if cancer is present, the surgeon may then go ahead and remove the cancer at the same setting.

What you need to know:
- If the person is on any blood thinning medication (anticoagulants), some of these medications may need to be stopped temporarily.
- People who have very severe lung disease may not be able to have these tests.
- The surgeon will discuss the risks and benefits of these more invasive tests with the patient and their families / carers.
Notes:
12.0 Staging

Staging describes the extent or severity of a person’s cancer based on the size and/or extent (reach) of the original (primary) tumour and whether or not the cancer has spread in the body.

Staging:
- Helps the doctor plan the appropriate treatment
- Can be used in estimating a person’s prognosis.

Staging lung cancer is based on whether the cancer is local or has spread from the lungs to the lymph nodes or other organs. Because the lungs are large, tumours can grow in them for a long time before they are found. Even when symptoms (such as coughing and fatigue) occur, people can think they are due to other causes. For this reason, early-stage lung cancer (stages I and II) is difficult to detect. Most people with lung cancer are diagnosed at stages III and IV.

Small cell lung cancer used to be staged using a two-tiered system:
- Limited stage – usually meant that the cancer was only in one lung and perhaps in lymph nodes on the same side of the chest. The cancer was most often confined to an area that was small enough to be treated with radiation.
- Extensive stage – meant that the cancer had spread widely throughout a lung, to the other lung, to lymph nodes on the other side of the chest or to distant organs. Many doctors also called cancer that had spread to the fluid around the lung extensive stage.

Now both small cell lung cancer and non-small cell lung cancer can be staged by the TNM (Tumour, Nodes, Metastasis) system. That is:
- The size of the main tumour and whether it has grown into nearby areas
- Whether the cancer has reached nearby lymph nodes
- Whether the cancer has spread to other parts of the body.

Applying the TNM system to lung cancer:
- Stage I: The cancer is located only in the lungs and has not spread to any lymph nodes. Only one lobe of the lung is affected.
- Stage II: The cancer is in the lung and has spread to nearby lymph nodes or the cancer has grown into the chest wall.
- Stage III: Cancer is found in the lung and in the lymph nodes in the middle of the chest, also described as locally advanced disease. Stage III has two subtypes:
  - If the cancer has spread only to lymph nodes on the same side of the chest where the cancer started, it is called Stage IIIA.
  - If the cancer has spread to the lymph nodes on the opposite side of the chest, or above the collar bone, it is called Stage IIIB. Here the cancer has spread extensively to lymph nodes in the centre of the chest (mediastinum) or have become attached to major blood vessels or the trachea (windpipe).
- Stage IV: This is the most advanced stage of lung cancer, and is also described as metastatic disease. This is when the cancer has spread to both lungs, to fluid in the area around the lungs, or to another part of the body, such as the bones, liver or other organs.

12.1 Prognosis

When health professionals talk about prognosis, they are talking about the person’s chance of getting better and the expected outcomes of their cancer.

It is not possible for any doctor to predict the exact course of the person’s lung cancer illness. Instead, they can give an idea about common issues that people with the same type of cancer experience.

The results of lung cancer treatment are best when the cancer is found and treated early. People who are operated on in the early stages of lung cancer have the best chance of survival.
13.0 Multidisciplinary Team (MDT)

The multidisciplinary team (MDT) meets on a regular basis to consider all information to confirm a diagnosis and collaboratively develop an evidence based treatment plan for each patient, taking into account the psychological and physical needs of the patient.

The MDT comprises specialist doctors and other health professionals from the following disciplines:

- Respiratory medicine
- Thoracic surgery
- Radiation oncology
- Medical oncology
- Pathology
- Radiology
- Nuclear medicine
- Palliative care
- Specialist respiratory and/or cancer nurse
- Allied health which may include, nutrition and dietetics, physiotherapy, occupational therapy, social work, psychiatry, psychology
- MDT Coordinator
- Indigenous Hospital Liaison Officer

All patients newly diagnosed with lung cancer should be given the opportunity to have their case discussed at a Multidisciplinary Team meeting.
14.0 How lung cancer is treated

Treatment for lung cancer can involve surgical removal of the cancer, chemotherapy, or radiation therapy, as well as combinations of these treatments. The decision about which treatments will be appropriate for a given individual must take into account the localisation and extent of the tumour as well as the overall health status of the patient.

Treatment depends on type of cancer, stage of disease and patient fitness and preference. This will be discussed with patient and family / carer by the team to work out treatment that achieves the best outcome for the patient. In general, early stage cancer can be treated with curative intent to try and cure the cancer – usually with surgery and radiation therapy. For metastatic disease the usual treatment intent is palliative to alleviate symptoms, improve quality of life and prolong survival for the person.

Different treatments will have different potential side effects for the person and these will need to be discussed with the person in the setting of their fitness. This is usually assessed by measurement of their performance status and functional level.

14.1 Surgery

The type of surgery performed is dependent on the size and location of the tumour. Surgery is mostly used to treat non-small cell lung cancer. But alternate cancer treatment such as radiotherapy, chemotherapy or possibly both may be used if the cancer is very near any of the following structures:

- Heart
- Trachea
- Oesophagus
- Major blood vessels.

Wedge resection of the lung (removal of a part of one lobe)

A wedge resection removes an area of the lung that includes part of one lobe. A segmentectomy removes areas of the lung along with their veins, arteries and airways. These types of operations are used when the surgeon thinks that the cancer has been diagnosed early and is only in one very small area and if there is a concern about sufficient lung function. If the surgeon thinks that there are cancer cells elsewhere in the lung, they will not recommend this type of operation.
Lobectomy

Lobectomy is the removal of one lobe of the lung. The surgeon will recommend this type of operation if they think the cancer is just in one part of one lung. It is the most common type of operation for lung cancer.

Pneumonectomy

Removing the whole lung is called pneumonectomy. The surgeon will recommend this operation if the tumour is in the central area of the lung and involves either the 2 lobes of the lung on the left or the 3 lobes of the lung on the right. A person is still able to breathe properly with only one lung but if the person has chronic lung disease and reduced lung function, they may not be able to have this surgery.

Lymph Node Sampling

During the operation the surgeon may remove some of the lymph nodes from around the lung. This is because the lymph nodes may contain cancer cells that have broken away from the main cancer. The lymph nodes are sent to a laboratory where they are examined under a microscope. If the nodes contain cancer cells this may affect the treatment that the person may need after surgery.

What you need to know:

- If the person is on any blood thinning medication (anticoagulants), some of these medications may need to be stopped temporarily.
- The time it takes to recover from lung surgery depends on how much of the lung is removed and the health of the person before surgery.
- It may take up to 3 months to fully recover.
- There are risks and complications of surgery such that not everyone is able to tolerate surgery; the surgeon will discuss these risks and benefits with the patient and their carer.
14.2 Radiation Therapy

Radiation may be employed as a treatment for both small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC).

It may be given as:
- curative therapy
- palliative therapy
- adjuvant therapy in combination with surgery or chemotherapy.

The radiation is either delivered:
- externally by using a machine that directs radiation toward the cancer, which is the most common way, or
- internally through placement of radioactive substances in sealed containers, within the area of the body where the tumour is localised (Brachytherapy).

Radiation for cancer treatment uses higher doses of radiation to destroy cancer cells. Radiation therapy works by damaging the cancer cells over and over again. The cancer cells don’t have time to repair themselves in between daily treatments, so eventually they die. Normal cells can repair and replace themselves between these daily sessions of radiation therapy.

Even though cancer cells and normal cells react differently to radiation, it’s very hard to destroy cancer cells without damaging some normal cells too. The goal of radiation therapy is to give enough radiation to destroy cancer cells in the body, but not so much that normal cells cannot recover.

What you need to know:
- Radiation only destroys cells (cancer and normal) directly in the path of the radiation beam. Therefore, it cannot be used to treat large areas of the body.
- Most side effects of radiation therapy go away soon after treatment is finished.
- Radiation treatments only take a short while but may need to be repeated. Some treatments may take several weeks depending on the dose to be given, some treatments may only require 1 session.
14.3 Chemotherapy

Chemotherapy is the treatment of cancer with anti-cancer (cytotoxic) drugs. The aim of chemotherapy is to kill cancer cells while doing the least possible damage to healthy cells.

Chemotherapy is commonly given to patients whose cancer is large or has spread outside the lungs. It may be given:

- before surgery to try to shrink the cancer and make the operation easier
- before radiotherapy or combined with radiotherapy (chemoradiation), to increase the chance of the radiotherapy working
- after surgery to reduce the chances of the cancer coming back
- as palliative treatment to reduce symptoms, improve the quality of life or extend the life of the person.

Generally, chemotherapy is administered intravenously through a drip or a plastic catheter (tube) inserted into a vein in the arm, hand or chest. Some types of chemotherapy are given orally (in tablet form).

Chemotherapy is given in cycles that typically last three weeks each. Intravenous chemotherapy may be given for a few days. The rest of the time is a break from treatment. The number of treatments the person will have will depend on the type of lung cancer they have and how well their body is handling the side effects. They may be able to have treatment as an outpatient.

If the person has tablet chemotherapy it will probably be given on a continuous basis.

What you need to know:

- The type of lung cancer will affect which drugs are used for chemotherapy.
- The side effects of chemotherapy depend on the individual and the dose used.
- Side effects of chemotherapy usually go away once treatment is finished.
- Newer chemotherapy regimens cause fewer side effects and are as effective as older treatments.
- The doctors and nurses will carefully look after the patient during the treatment and adjust the treatment as needed to best help the person.
14.4 Targeted Therapy

Targeted Therapy is a newer form of treatment often using tablets to treat some types of lung cancer. Targeted treatments directly target the cancer cells while sparing normal cells. Targeted therapy uses a biological agent, often a tablet, to specially target a cancer mutation.

Cancer cell signals cause a cell to grow and reproduce too much. Some of these signals are due to mutations in certain genes (that is, a result of a change (mutation) of the cell’s DNA or genetic material). These mutations “drive” the growth of the cancer. Targeted therapies have been developed to reverse the effects of these gene mutations.

What you need to know:
• These are newer treatments, often given as a tablet.
• They work differently than chemotherapy and usually work if the lung cancer has a treatable target.
• The side effects are also different from chemotherapy.
• Sometimes extra biopsies of the cancer are needed to find these targets.
14.5 Palliative Care

Palliative care allows people with advanced cancer to maintain their quality of life in a way that is meaningful to them. It also provides support to families and carers.

The role of palliative care is to:

- Help the person achieve the best quality of life that they can for as long as possible
- Make sure the person’s physical, practical, emotional and spiritual needs are catered for
- Help the person feel in control of their situation and make decisions about their treatment and ongoing care
- Make the time that the person has as valuable as can be for them and their family – not prolong or shorten life.

Palliative care is about enabling the person to live for as long as possible in the most satisfying way that they can, within the limits of their illness. It is not just about dying.

While some people may only use palliative care services for a few weeks or months, the number of people receiving care for several years is increasing. Because improved treatments can help stop the spread of cancer and relieve side effects, cancer may be considered a chronic (long-lasting) disease. The person can have palliative care while they are having active treatment.

One reason that some people don’t access palliative care services early – or at all – is because they have the fear or misconception that by doing so, it will mean they have given up hope or are going to die soon.

The reality is that some people do die from cancer. As people draw closer to death, the end-of-life care aspect of palliative care becomes important.

What you need to know:

- Palliative care does not automatically mean ‘end of life care’. While end of life care can be an important aspect of palliative care, with improved treatments to help stop the spread of cancer and relieve side effects, some people receive palliative care alongside treatments directed at the cancer itself.
- Specialist palliative care services are available and can be accessed at the same time as other multi-disciplinary care.
- Palliative care can be delivered in the hospital or community setting and can be very helpful for both the patient and their families
15.0 Less Common Treatment

15.1 Local Ablation Treatment

Ablation can be used to treat early-stage lung cancer and tumours that have spread to the lungs from other cancers.

Ablation can be a viable and effective treatment option if the person:

- wishes to avoid conventional surgery
- is too ill to undergo surgery
- has a small number of metastases in the lungs. These are tumours that have spread from a cancer located elsewhere in the body, such as the kidney, intestine or breast.

It may also be helpful to:

- reduce the size of a tumour so that it can be more easily treated by chemotherapy or radiation therapy
- provide relief when a tumour invades the chest wall and causes pain.

Ablation is not intended to replace surgery, radiation therapy or chemotherapy in all patients. It may be effective when used alone or in conjunction with these treatments.

There are two common types of ablation.

Microwave Ablation (MWA)

Microwave ablation is a cancer treatment in which microwave energy is sent through a narrow, microwave antenna that has been placed inside a tumour. During microwave ablation, radiologists place a thin microwave antenna directly into the tumour. An electromagnetic wave then agitates water molecules in the surrounding tumour tissue, producing friction and heat that eventually destroy the tumour. It is a newer method of treating lung cancer that can target and kill cancerous cells and relieve pain.

Radiofrequency Ablation (RFA)

Another treatment similar to microwave ablation is radiofrequency ablation. Radiofrequency ablation (RFA) offers a nonsurgical, localised treatment that kills the cancer cells with heat, while sparing nearby healthy lung tissue. In this procedure, the radiologist guides a small needle through the skin into the tumour. From the tip of the needle, radiofrequency energy (similar to microwaves) is sent to the tip of the needle, where it produces heat in the tissues. The dead tumour tissue shrinks and slowly forms a scar.
What you need to know:
- These are very specialised procedures and generally only available in tertiary centres.
- If the person is on any blood thinning medication (anticoagulants), some of these medications may need to be stopped temporarily.
- People who have very severe lung disease may not be able to have this treatment because of the risk of side-effects.
- The test is generally a day case procedure but the patient will not be able to drive or work that day, and should have a carer with them for 24 hours after the procedure in case of emergencies.
15.2 Relieve airway obstruction

15.2.1 Stents

Sometimes an airway can become blocked by pressure put on it by the cancer, which makes it close. This can sometimes be relieved by using a small device called a stent, which is put inside the airway to hold it open.

The most commonly used stent is a small wire frame. It’s inserted through a bronchoscope in a folded-up position, and as it comes out of the end of the bronchoscope, it opens up like an umbrella. This pushes the walls of the narrowed airway open.

Airway stents are usually put in under a general anaesthetic. When the person wakes up, they probably won’t be able to feel that it’s there but they will be able to breathe more easily. The stent can stay in the lung permanently and shouldn’t cause the person any problems.

What you need to know:
- These are very specialised procedures and generally only available in tertiary centres.
15.2.2 Endobronchial treatment

Lung cancer sometimes causes breathlessness by blocking the windpipe (trachea) or one of the main airways that take air from the windpipe into the lungs. If the blockage is caused by a tumour within the airway it can often be relieved by local treatments in the airway given through the bronchoscope.

These include:

1. Argon Plasma Coagulation

Argon plasma coagulation (APC) is a thermal coagulation technique that uses ionised argon to transmit high-frequency electrical current, contact free, to tissue. It is a form of electrosurgery used to treat tumours of the lung. Argon plasma coagulation has been used in surgery for more than 20 years, particularly for stopping superficial bleeding (haemostasis). It requires less specialised equipment than laser and is more widely available.

2. Laser Therapy

Laser therapy was traditionally used to burn cancers in the lumen of airways to relieve obstruction from the cancer. Laser therapy doesn’t destroy the tumour completely, but it can help to reduce or get rid of breathlessness.

Laser therapy is usually carried out under a general anesthetic using very complex equipment. A bronchoscopy is done while the person is asleep, and a flexible tube is passed through the bronchoscope to aim the laser beam at the tumour. The laser beam burns away as much of the tumour as possible. The bronchoscope is then removed.

3. Diathermy

Diathermy (or electrocautery) uses an electrical current passed through a probe to destroy cancer cells. It can be used on its own or sometimes with radiotherapy. It is performed with a bronchoscopy. The probe is put down a tube (bronchoscope) which is inserted into the windpipe by a doctor. If the airway is blocked, diathermy can make it easier for radiotherapy to be carried out.

What you need to know:

- There are usually few side effects from endobronchial therapy.
- If the treatment has been straightforward, the person may be able to go home the same evening or the next day.
- If there has been an infection in the lung, the person may need to stay in hospital for a few days for antibiotic treatment and physiotherapy.
- If the blockage in the airway comes back, laser treatment can be used again. Sometimes radiotherapy is given as well, to try to make the relief given by the laser therapy last longer.
- These are very specialised procedures and generally only available in tertiary centres.
15.3 Treatment of symptoms

Lung cancer can cause complications such as coughing up blood, fluid in the chest and pain as it progresses. Treatment of complications of lung cancer may include:

- Lung cancer may cause bleeding in the airway, which can cause the person to cough up blood (hemoptysis). Sometimes bleeding can become severe. Treatments such as diathermy may be used to control any bleeding.

- Advanced lung cancer that spreads to the lining of a lung or to another area of the body, such as a bone, can cause pain. Pain may initially be mild and intermittent, but can become constant. Medications, radiation therapy and other treatments may be used to help manage pain from advanced lung cancer.

- Lung cancer can cause fluid to accumulate in the space that surrounds the affected lung in the chest cavity (pleural space). Fluid accumulating in the chest can cause shortness of breath. Treatments are available to drain the fluid from the chest.

- Lung cancer often spreads (metastasises) to other parts of the body, such as the brain and the bones. Cancer that spreads can cause pain, nausea, headaches, or other signs and symptoms depending on what organ is affected.
Notes:
16.0 Benefits of Treatment

There is always something that can be done to help the person with lung cancer. Benefits of treatment include:

- To make life more enjoyable by controlling symptoms
- To help the patient live longer

The patient will have a team of doctors, nurses, health workers and other professionals who know how to best look after the patient during their journey.

The team will diagnose and stage the cancer so that a treatment plan can be made in accordance with the patient’s preferences with support from their family and carers.

If the cancer is localised and early stage, the team will discuss the possible curative intent treatments which are usually surgery or radiation with or without chemotherapy.

Once lung cancer has spread to other organs, it’s generally not curable. Treatments are available to decrease signs and symptoms and to help the person with lung cancer to live longer.
17.0 Possible side effects from treatment

17.1 From Surgery

Possible side effects from surgery include pain, shortness of breath and elevated temperature. After lung surgery, air and fluid tend to collect in the chest and may cause some pain in the chest and the arm as well as shortness of breath.

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<tr>
<th>1. Pain</th>
<th>2. Shortness of breath</th>
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<tr>
<td>Pain often occurs after surgery because of trauma to the tissue during surgery. Pain-relieving medications are used to control pain. It may take time for pain to decrease after surgery, depending on the procedure done, how the person heals or how they tolerate pain. If pain persists or pain medications are not relieving the pain, check with the doctor.</td>
<td>Many people who’ve had part of their lung removed experience some breathlessness. If the person’s lung function was poor before surgery, or if they have had one whole lung removed (pneumonectomy), they will feel breathless but exercising will help to reduce the breathlessness.</td>
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3. Temperature
Some people may develop a temperature after surgery. Though not a common side effect, an elevated temperature may indicate presence of an infection. Antibiotics may be used to help treat any infection.

17.2 From Radiation Treatment
Possible side effects from radiation treatment include:

1. Heartburn
Heartburn can occur when radiation therapy irritates the lining of the lower oesophagus. Spicy and fried foods and foods that cause gas should be avoided. Antacids or other medications may be needed. These symptoms often go away after treatment has ended.
2. **Shortness of Breath and Cough**

Radiation therapy lowers the level of the lung’s surfactant, a substance that helps the lungs expand. This can result in a dry cough or shortness of breath. Occasionally, steroids are given to ease these symptoms.

3. **Feeling tired**

Fatigue usually occurs during or after the second week of radiation therapy. Symptoms of fatigue may increase or become more severe over the course of treatment. Fatigue is one of the most common side effects of radiation therapy. Fatigue may be caused by anaemia, poor appetite or depression. It may also be related to toxic substances that are produced when cancer cells break down and die. During radiation therapy, the body uses more energy to heal itself, so fatigue will not always be relieved by rest. Making frequent, daily trips for radiation treatments can also be tiring.
4. Skin Reaction

Skin reactions occur because external beam radiation travels through the skin to reach the area being targeted for treatment. The skin in the radiated area may become red, dry or itchy. It may change colour (become darker or tanned looking). Most skin reactions occur within the first 2 weeks of receiving radiation therapy. They usually go away a few weeks after treatment, but some skin changes, like skin darkening or scarring, can be permanent. Some people do not experience any skin reactions with radiation therapy.

5. Sore Throat

Difficult or painful swallowing or heartburn can occur if the pharynx or oesophagus is in the treatment area. Radiation can cause inflammation of the pharynx (called pharyngitis) and oesophagus (called oesophagitis) that can contribute to difficulty with swallowing. Symptoms usually begin 2 to 3 weeks after radiation treatment starts.

Difficulty swallowing because of pharyngitis or oesophagitis often goes away when treatment ends and inflammation decreases. If difficult or painful swallowing causes problems with eating, the radiation therapy team can make suggestions that will help.
17.3 From Chemotherapy

Possible side effects from chemotherapy include:

1. Loss of appetite

Some chemotherapy drugs can cause temporary changes in taste and smell, which can make foods seem less appetising. Some people lose interest in food completely and don’t eat, even though they know they need to. This can lead to weight loss and malnutrition. Maintaining good nutrition during and after chemotherapy is important to help a person recover from treatment.

2. Muscle Weakness

Some chemotherapy drugs can cause aching in the muscles and joints. Burning, numbness, tingling or shooting pains in the hands and feet may also occur. This may continue for a period of time after treatment ends. The healthcare team will give instructions about what medicines to use to relieve the discomfort.
3. Hair loss

Hair loss (alopecia) is a common side effect of many, but not all, chemotherapy drugs. Hair follicles are vulnerable to chemotherapy drugs because they grow fast. The extent and duration of hair loss is unpredictable because it depends on the type and dose of drugs used as well as personal factors. Hair loss can occur on all parts of the body, including the face and scalp. Hair loss can begin within a few days or 2–3 weeks after chemotherapy starts. Hair usually grows back once chemotherapy treatments are over. If hair loss occurs, some people may decide to wear a hat, bandanna, scarf or wig whilst out in public until their hair grows back.

4. Feeling Tired

Fatigue makes a person feel more tired than usual and can interfere with daily activities and sleep. It occurs for a variety of reasons. Fatigue may be caused by anaemia, specific drugs, poor appetite or depression. It may also be related to toxic substances that are produced when cancer cells break down and die. Fatigue can occur days after a chemotherapy treatment cycle and can continue for a period of time after the person has finished cancer treatment.
5. Nausea and Vomiting

Some chemotherapy drugs may cause nausea and vomiting. Individual drugs vary in their effects, but nausea and vomiting are more likely when combinations of chemotherapy drugs are given. Nausea and vomiting can occur within the first few hours after chemotherapy drugs are given and usually last about 24 hours. Sometimes delayed nausea and vomiting may continue for a few days after treatment. The healthcare team can help with management of nausea and vomiting by prescribing medication (antiemetics) and education on how to take them more effectively.

6. Low Blood Count

Certain chemotherapy drugs can damage bone marrow. Bone marrow makes blood cells, which grow rapidly, making them very sensitive to the effects of chemotherapy. Chemotherapy kills many of the cells in bone marrow, but the cells recover with time.
7. Mouth Ulcers

Painful sores, ulcers or infection can develop in the mouth, throat or gums. A sore mouth (also called stomatitis or oral mucositis) occurs because of chemotherapy’s effect on cells inside the mouth. Many drugs can cause a sore mouth and it occurs more often when higher doses of drugs are used. A sore mouth occurs about a week after chemotherapy is started. It often improves on its own a few weeks after treatment is finished. Thorough, regular mouth care can help prevent a sore mouth and reduce infection.

8. Bruising

Bruising and bleeding are usually caused by some kind of trauma or injury. However, certain underlying conditions may cause the person to bruise or bleed more easily than normal. The most common reason for this in cancer patients is a low platelet count, a condition also referred to as thrombocytopenia. Platelets, also called thrombocytes, are fragments of blood cells which are found in the circulating blood and are critical for stopping bleeding. Platelets plug the small holes that form in blood vessels daily and work with other blood factors to form a blood clot, which stops bleeding in larger blood vessel injuries.
9. Infection

Many chemotherapy drugs can damage the bone marrow, where blood cells are made. White blood cells are the cells that fight many types of infections, which means that chemotherapy can leave a person at risk for infection. The bacteria that cause most infections are normally found on a person’s skin, in a person’s mouth, intestines and genital tract. Sometimes, the source of an infection is unknown. Infections can happen to people even when they are very careful.

10. Constipation or Diarrhoea

When chemotherapy affects the cells lining the intestine, it can cause diarrhoea (watery or loose stools). The person may have diarrhoea that continues for more than 24 hours. Some anti-cancer medicines, pain medicines, and other medicines can cause constipation. It can also occur if the person is less active or if their diet lacks enough fluid or fibre.
Notes:
18.0 Quiz

1. Is cancer a notifiable disease in Australia?
   - True
   - False

2. Cancer develops when abnormal cells in the body divide without control and are able to invade other healthy cells?
   - True
   - False

3. When cancer spreads across the body it is called?
   - Homeostasis
   - Metastasis
   - Osmosis

4. Which of the following exposures can increase the risk of getting lung cancer?
   - Asbestos
   - Insecticide
   - Tobacco
   - Chemicals (e.g. paint solvent)
   - Pollution
   - All of the above

5. Which one of the following risks factors is the most common cause of lung cancer?
   - Genetic factors
   - Smoking
   - Air pollution
   - Lung infection
6. Name five symptoms that could relate to lung cancer.


7. List six investigations a person with suspected lung cancer may undergo for diagnosis.


8. Can lung cancer be treated with surgery, radiotherapy and chemotherapy?

☐ Yes
☐ No

9. As a part of a lung cancer treatment plan can you use radiotherapy, surgery and chemotherapy as a combination?

☐ Yes
☐ No

10. What type of cancer treatment uses a type of drug to stop or slow the growth of cancer?

☐ Radiation treatment
☐ Chemotherapy
☐ Physiotherapy
11. Does radiotherapy use radiation to damage DNA within cancer cells to stop them reproducing?

☐ Yes
☐ No

12. Name the main health professional disciplines involved in a lung cancer multidisciplinary team meeting.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

13. Name the location of the nearest lung cancer multidisciplinary team to your community.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

14. All newly diagnosed patients with lung cancer should be staged and discussed at a lung cancer multidisciplinary team meeting, to recommend an evidence based recommended treatment plan that meets the person’s preferences.

☐ True
☐ False
15. The Indigenous health workers are able to help a person in their community with lung cancer by understanding the lung cancer pathway.

- [ ] True
- [ ] False

16. Label the lung diagram below.
Scenario 1
Uncle John has just been told by his local doctor that he has to go to the major hospital for tests, to see if he has lung cancer. Uncle John hasn’t really understood the information that he has received so far and would like you to tell him more about the tests and what they do. He also wants to know if he has lung cancer what will happen next. What resources and information will you give Uncle John?

Scenario 2
Uncle John has been diagnosed with lung cancer and has to attend a Brisbane hospital for treatment. Uncle John has financial concerns, doesn’t want to leave the community and is unsure of how it will all “go”. He also has no car or family in Brisbane. He finds the big city scary. Who can you inform in Brisbane to ensure Uncle John’s experience is not too distressing?
19.0 Lung Cancer Contacts

19.1 Multidisciplinary Team

**Multidisciplinary Team (MDT)**
Location:

**MDT Coordinator**
Name:
Phone:

**Chair Person**
Name:
Phone:

**Cancer Care Coordinator**
Name:
Phone:

**Health Worker**
Name:
Phone:

**Indigenous Hospital Liaison Officer**
Name:
Phone:

**Respiratory Nurse**
Name:
Phone:

**Palliative Care Contact**
Name:
Phone:

**Dietician**
Name:
Phone:

**Occupational Therapist**
Name:
Phone:

**Psychologist**
Name:
Phone:

**Psychiatrist**
Name:
Phone:

**Social Worker**
Name:
Phone:

**Physiotherapist**
Name:
Phone:
19.2 Other Contacts

General Practitioner (GP)
Name:
Phone:

Health Worker
Name:
Phone:

19.3 Lung cancer internet sites

Some internet sites you may find useful:

- Australian Indigenous HealthInfoNet - [www.healthinfonet.ecu.edu.au](http://www.healthinfonet.ecu.edu.au)
- Cancer Council Queensland - [www.cancerqld.org.au](http://www.cancerqld.org.au)