1. Understanding Cancer and the Lungs

What is cancer?
Cancer is a disease of the cells. Cells are the body’s basic building blocks and our bodies are constantly making new cells to help us grow, to replace worn-out cells, or to heal damaged cells after an injury.

Normally cells grow, multiply and die in an orderly way. However, sometimes something goes wrong with the cell cycle process. This can lead to the uncontrolled growth and or survival of abnormal cells, which may develop into a lump called a ‘tumour’.

A tumour can be benign (not cancer) or malignant (cancer). A benign tumour does not spread outside its normal boundary to other parts of the body. However, if a benign tumour continues to grow at the original site, it can cause a problem by pressing on nearby organs.

A malignant tumour is a mass of cancer cells growing out of control and capable of spreading to other organs in the body. The tumour is called ‘cancer in-situ’ or ‘localised cancer’ if hasn’t yet to spread to nearby tissues. As the tumour grows, it may invade surrounding tissue, becoming invasive cancer.

Cancer cells can spread by travelling through the circulatory system (blood) or the lymphatic system. The lymphatic system is a network of tissues, capillaries, vessels, ducts and nodes that removes excess fluid from tissues, absorbs fatty acids and transports fat, and produces immune cells. When cancer cells reach a new site in the body, they may continue to grow and form another tumour at that site. This is called a ‘secondary cancer’ or metastasis.

Cancer that starts and grows in the lungs is known as ‘primary lung cancer’. Sometimes cancer can spread to the lungs, having started as a ‘primary’ in another part of the body such as the breast, bowel, or prostate. These cancers are called lung ‘secondaries’ or ‘metastases’. A metastasis keeps the name of the original cancer. For example, lung cancer that has spread to the bones is still called lung cancer even though the person may be experiencing symptoms caused by problems in the bones.

How cancer starts

How cancer spreads

Illustration source: Cancer Council Victoria ©
The lungs – their function and anatomy

The lungs are the main organs in the body’s system for breathing, called the respiratory system. The respiratory system also includes the nose, mouth, windpipe (trachea) and airways to each lung – known as the large airways (bronchi) and small airways (bronchioles).

The respiratory system

The respiratory system includes the upper and lower respiratory tract.

The upper respiratory tract consists of:
- the nose and nasal cavity;
- the throat (pharynx); and
- the voice box (larynx).

The lower respiratory tract consists of:
- the windpipe (trachea);
- breathing tubes (bronchi and bronchioles); and
- air sacs (alveoli).

Structure of the lungs

The two lungs are located inside the chest, protected by the ribcage. The lungs are soft and look like two large, spongy cones.

Sections called lobes make up each lung. The left lung has two lobes and the right lung has three. The lungs rest on the diaphragm – a wide, thin muscle that helps with breathing.

Several structures lie in the space between the lungs, called the mediastinum, including:
- the heart and large blood vessels;
- the windpipe;
- the tube that carries food from the mouth to the stomach (oesophagus); and
- lymph glands (also known as lymph nodes).

A double layer of thin membrane called the pleura surrounds the lungs. The pleura are about the thickness of plastic cling wrap. Its inner layer (the visceral layer) is attached to the lungs and its outer layer (the parietal layer) lines the chest wall and diaphragm. Between the two layers is the pleural cavity, which normally contains a thin film of fluid. This fluid allows the two layers of pleura to slide against each other so your lungs can move smoothly against the chest wall as you breathe.
Within the lungs is a transport system for oxygen and carbon dioxide. Each time you breathe, you draw air into the windpipe (trachea) via the mouth and nose.

The windpipe splits into two breathing tubes (bronchi) – one to the left lung and one to the right lung. The breathing tubes continue to divide into smaller and smaller tubes (bronchioles), which take air down into each lung.

The air sacs are where oxygen, which is a gas, is absorbed into the bloodstream. Oxygen is then carried along the bloodstream, through the heart, to where it’s needed in the body.

Carbon dioxide (CO₂) is a waste product that is produced by the body. Carbon dioxide is a gas that moves from the bloodstream back into the air sacs and through the airways, where it’s breathed out.

How you breathe
The lungs are not a muscle and do not move on their own. The diaphragm is the main breathing muscle, when you breathe in, the diaphragm acts like a pump, contracting and moving down. The muscles between the ribs also contract. The lungs expand and draw air into the lungs. When you breathe out, the diaphragm relaxes and moves back up. The muscles between the ribs relax. The lungs reduce to normal size and push air out of the lungs.
Lung Cancer – a patients guide

1. Understanding Cancer and the Lungs

Lung cancer in Australia*

In Australia, lung cancer is the fourth most commonly diagnosed cancer in both men and women, with more than 9,700 new cases diagnosed each year. However, among our indigenous population, it’s the most common cancer in men and the second most common cancer in women.

Tobacco smoking is a major cause of lung cancer with studies showing smoking (or exposure to smoke) causes up to 90 per cent of lung cancers in men and about 65 per cent of lung cancers in women. Environmental factors including occupational exposure to industrial and chemical carcinogens, and indoor and outdoor air pollution also may increase the risk of lung cancer. Other factors are a family history of lung cancer and previous lung cancer disease.

Lung cancer incidence relates strongly to age, increasing sharply after the age of 50 years. (In Australia, only about five per cent of lung cancers are diagnosed in people who are under 50 years of age.) More than 84 per cent of new lung cancers in males and 80 per cent in females are diagnosed in the 60 years plus age group.

“Cancer is not a death sentence, plenty of people survive it.”

Michael, 52, a former lung cancer patient

The incidence rate has been decreasing in men but increasing in women over the past 30 years. However, men are still almost twice as likely to be diagnosed with lung cancer as women are, with about 6,000 Australian men and 3,750 women diagnosed with lung cancer annually.

The prognosis for lung cancer has improved in Australia. However, lung cancer remains the leading cause of cancer deaths in both Australian men and women. The highest mortality rates are among indigenous Australians, people living in remote areas and those in the lowest socio-economic status areas. Significantly, Australia’s death rate from lung cancer is lower than the rates in North America, Northern Europe and Eastern Asia.

* Based on the 2007 statistics released by the Australian Institute of Health and Welfare.

Chapter Summary

▷ Cancer is a disease of the cells. It can be contained as a ‘growth’ (tumour) or spread (metastasize) to different parts of the body.

▷ The lungs are the body's main organs for breathing and transporting oxygen into the body.

▷ More than 9700 new cases of lung cancer are diagnosed each year in Australia, making it the fourth most common cancer in both men and women.