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ALL 'BOUT CANCER

LUNG CANCER NETWORK MALAYSIA

Conquering Lung Cancer Together !

Patient's Guide To
LUNG CANCER
Empower. Inspire. Action

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Authors Lung Cancer Network Malaysia

Dr Anand Sachithanandan, MB BCh BAO (Dublin), FRCS (C-Th)(Ire), FRCS (Edin), FICS (USA), FACS (USA)
Consultant Cardiothoracic Surgeon - Sunway Medical Centre & Subang Jaya Medical Centre, Selangor.

Dr Anand Sachithanandan read medicine in Dublin, Ireland at the Royal College of Surgeons. He completed his postgraduate specialist training in the United Kingdom at leading NHS hospitals in Belfast, Birmingham and Stoke-on-Trent. He is a highly published British board certified adult cardiothoracic surgeon with a special interest in lung cancer. He is an honorary senior lecturer in surgery at Monash University Malaysia. Dr Anand is the founding President of Lung Cancer Network Malaysia (LCNM) and a passionate advocate for screening of lung cancer to facilitate detection of curable early stage disease.

Dr Tho Lye Mun, MBBS(Sydney), MRCP(UK), FRCR(UK), PhD(Glasgow), CCT(UK), Fellowship in Molecular Oncology(UK)
Head of Oncology and Consultant Clinical Oncologist, Beacon Hospital, Petaling Jaya, Selangor.

Dr Tho Lye Mun is Vice President of Lung Cancer Network Malaysia and Head of Oncology at Beacon Hospital. He has a special interest in lung cancer and is a pioneer doctor in using immunotherapy in Malaysia. He has also pioneered the use of stereotactic body radiotherapy and stereotactic brain radiosurgery for lung cancer in Malaysia. Dr Tho trained in oncology in the United Kingdom and completed a PhD in molecular oncology under a prestigious joint Cancer Research UK and Royal College of Radiologists research fellowship. He returned to serve in Malaysia as an Associate Professor in University Malaya before starting private practice. Dr Tho currently is principal investigator for many lung cancer studies and serves on numerous regional and international advisory bodies and guideline committees.

Dr Hilmi Lockman, MB, BCh, BAO, LRCPI & LRCSI (Ireland), MRCP(UK)(Respiratory Medicine); CCT(UK) (Internal Medicine & Respiratory Medicine)
Consultant Respiratory Physician, Prince Court Medical Centre, Kuala Lumpur.

Dr Hilmi Lockman completed his undergraduate studies at the Royal College of Surgeons in Ireland, Dublin and did further training in internal medicine and respiratory medicine in the United Kingdom. He has a special interest in lung cancer diagnosis and pleural diseases. He is actively involved with the Malaysian Thoracic Society, a committee member of the Lung Cancer Network Malaysia and actively teaches undergraduate medicine at Universiti Sains Islam Malaysia.

Dr Caryn Khoo Shiao Yen, MD
Consultant Palliative Medicine Physician, Sunway Medical Centre, Selangor.

Dr Caryn Khoo obtained her medical degree from Dalhousie University, Canada. She pursued postgraduate training in Internal Medicine at the Mayo Clinic, USA and then fellowship in Hospice & Palliative Medicine at Stanford University, USA. She is American board-certified in Internal & Palliative Medicine and registered on the National Specialist Register for Palliative Medicine. She is a member of the Malaysian Hospice Council (MHC), Lung Cancer Network Malaysia (LCNM), Asia Pacific Hospice Palliative Care Network (APHN), American Academy of Hospice and Palliative Medicine (AAHPM), International Association for Hospice and Palliative Care (IAHPC), International Association for the Study of Pain (IASP), as well as the technical committee that developed the National Palliative Care Policy and Strategic Plan 2019-2030. Dr Caryn Khoo was previously Head of Palliative Care Medicine at National Cancer Centre (IKN).

Authors National Cancer Society Malaysia

Dr Tan Jia Hwong, MD (ELAM)

Project Executive at the National Cancer Society of Malaysia (NCSM). Upon completing his Medicinae Doctor in Latin American School of Medicine, Cuba, he had trained abroad as a medical intern in Guyana. His area of interest is improving health outcomes and reducing disease burden through both clinical and preventive healthcare, and improving health disparities in underserved populations.

Kenneth Low, BSc (Food Science & Nutrition) Hons (UMS)

Assistant Manager of the Health Education, Literacy, Promotion, and Policy (HELPP) department at the National Cancer Society of Malaysia (NCSM). Kenneth was a recipient of Anugerah Pelajaran DiRaja (Pingat Jaya Cemerlang), Malaysia's highest undergraduate public university award. His work focuses on community education on cancer risk factors.

Mandy Thoo, BBiotech (ANU), MSciComm (ANU)

Head of the Health Education, Literacy, Promotion, and Policy (HELPP) department at the National Cancer Society of Malaysia (NCSM). Prior to working at NCSM, Mandy was a science writer for various Australian research institutions, and a science columnist for The Star, Malaysia's leading English daily. She also leads the Society's advocacy and policy work in non-communicable diseases.

Dr Murallitharan M, MD MCommHSc MSc PhD

Managing Director of the National Cancer Society of Malaysia (NCSM). He is a Public Health physician and was a 2015/2016 Chevening Scholar at the London School of Economics and the London School of Hygiene and Tropical Medicine as well a PhD ASEAN Economic Community Scholar at Chulalongkorn University. His research and capacity building efforts are centred around public health-related issues in non-communicable diseases especially cancer.

Expert Reviewers

Dr Jamalul Azizi bin Abdul Rahaman, MBBChBAO, LRCP & LRCS (Ireland), MMED Internal Medicine (UKM), FCCP (USA)
Consultant Pulmonologist, Serdang Hospital, Selangor.

Dr Jamalul Azizi completed his undergraduate studies at the Royal College of Surgeons in Ireland, Dublin, Ireland. He did training in internal medicine at the National University of Malaysia. After the initial training in Malaysia, he completed his training in pulmonary medicine at Sir Charles Gairdner Hospital, Perth, Western Australia. He received further training in interventional pulmonology in Marseille, France and Arizona, USA. He has a special interest in rigid bronchoscopy and pulmonary physiology. Dr Jamalul Azizi is the current President of the Malaysian Association for Bronchology and Interventional Pulmonology (MABIP).

Assoc Prof Pang Yong Kek, MD (USM), MRCP (UK)
Senior Consultant Respiratory Physician, University of Malaya, Kuala Lumpur.

Associate Prof Dr Pang Yong Kek is currently a Senior Consultant at the Respiratory Division of University Malaya Medical Centre and a lecturer at the Faculty of Medicine, University Malaya. He has a wide range of research interests, which includes lung infections, obstructive airway disease, interstitial lung disease and lung cancer. He has published extensively in these fields. In addition, he is also very active in several professional societies, which include the Malaysian Thoracic Society, where he is the current President; and the Lung Foundation of Malaysia which he serves as a trustee in the Foundation's board.

Prof Dr Raja Amin bin Raja Mokhtar, MBBS(Malaya) M.Surgery(Malaya) FRCSEd
Professor and Head of Cardiothoracic Surgery Division, University of Malaya, Kuala Lumpur.

Dr Raja Amin is currently Professor and Head of Cardiothoracic Surgery division, Department of Surgery, Faculty of Medicine at University of Malaya. He is also a senior Consultant Cardiovascular and Thoracic Surgeon at University Malaya Medical Centre and at University Malaya Specialist Centre. He is a member of the board of Cardiothoracic Surgery, and a member of the board of studies at Universiti Teknology Mara (UiTM). Dr Raja Amin is a member of the Education and Evaluation Committee of the National Specialist Register. He is the Past President of Malaysian Association of Thoracic & Cardiovascular Surgery.

Dr Muhammad Azrif Bin Ahmad Annuar, MBBS(London) MRCP FRCR(UK)
Fellowship Radiation Oncology (Toronto)
Consultant Clinical Oncologist at Prince Court Medical Centre and Gleneagles Kuala Lumpur.

Dr Muhammad Azrif completed his specialist oncology training at the Christie Hospital and one year Radiation Oncology Fellowship in Canada before returning to Malaysia in 2007. He served at the National University of Malaysia Medical Centre (UKMMC) as a Consultant Clinical Oncologist before joining private practice in 2012. He has served on various national oncology committees, published in peer-reviewed journals and participated in numerous clinical trials. He is frequently invited to chair or participate in cancer advisory boards and expert panels. He is the current Honorary President of the Malaysian Oncological Society.

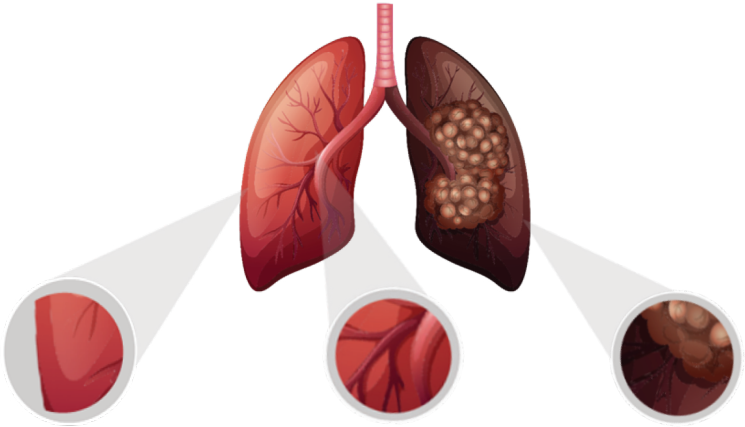
Table of Contents

What Is Lung Cancer?

Lung cancer occurs when abnormal (cancerous or malignant) cells grow and multiply uncontrollably in the lungs. It can spread to nearby lymph nodes (glands) and other organs.[1]

TYPES[1,2]

Non-small cell lung cancer (NSCLC) 80-85%



Adenocarcinoma

- Most common form
- Starts in mucus producing cells; often found in the outer part (periphery) of the lungs.

Squamous cell carcinoma

Starts in cells that line the inside of the airways, usually found in the central part of the lungs.

Large cell carcinoma

Appears in any part of the lung and often grows and spreads quickly.

SYMPTOMS TO WATCH OUT FOR:[1]

- A new or different cough that doesn't stop after 2 or 3 weeks
- Coughing up blood or rust-coloured sputum
- Chest pain when breathing, coughing or laughing

1. Health Harvard Publishing. "Lung cancer overview" [Internet]. Mar 2021 [cited 5 April 2021]. Available from: https://www.health.harvard.edu/a_to_z/lung-cancer-overview.
2. American Cancer Society. "What Is Lung Cancer?" [Internet]. Oct 2019 [cited 5 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/about/what-is.html

Small cell lung cancer (SCLC) 15-20%

SCLC is a more aggressive form of lung cancer that begins in the middle of the chest. It tends to spread easily to other parts of the body (metastasize). Smoking is a major risk factor for developing SCLC.

OTHER TYPES OF LUNG TUMOURS

Lung carcinoid tumours contributes fewer than 5% of lung tumors. Most of these grow slowly.

Other types of lung cancer such as adenoid cystic carcinomas, lymphomas, and sarcomas.

Cancers from other organs that spread to the lungs: Cancers from other organs (such as the breast, liver, pancreas, colon or kidneys) can sometimes spread to the lungs. These are called lung metastasis or secondary lung cancers.

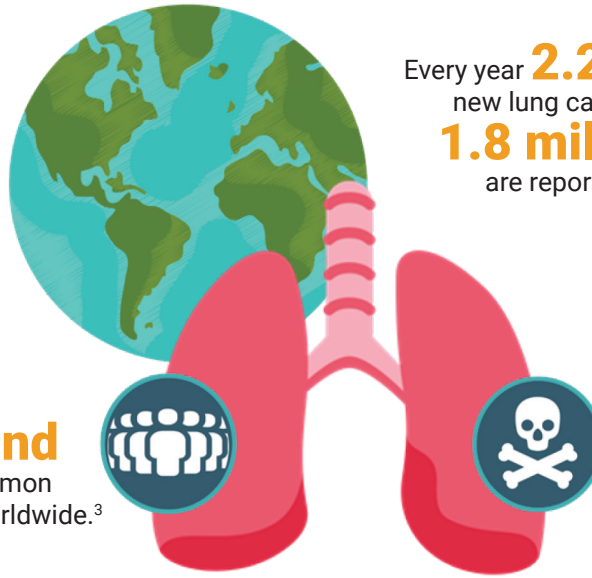
Persistent breathlessness

Loss of appetite or unexplained weight loss

ZzZ Persistent lethargy and fatigue

1. Health Harvard Publishing. "Lung cancer overview" [Internet]. Mar 2021 [cited 5 April 2021]. Available from: https://www.health.harvard.edu/a_to_z/lung-cancer-overview.
2. American Cancer Society. "What Is Lung Cancer?" [Internet]. Oct 2019 [cited 5 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/about/what-is.html

How Common Is Lung Cancer?



Every year **2.2 million** new lung cancer cases and **1.8 million** deaths, are reported worldwide.[3]

It's the **No.1** leading cause of cancer deaths worldwide.[3]

It is the **2nd** most common cancer worldwide.[3]

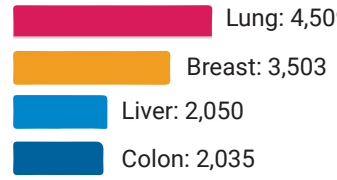
IN MALAYSIA,

lung cancer is the 3rd most common cancer. [4]

1st **4th**

Most common cancer among male and female.[4]

Estimated cancer deaths in 2020: [4]



3. Sung H, Ferlay J, Siegel RL et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin [Internet]. 4 Feb 2021 [cited 5 April 2021];caac.21660. Available from: https://onlinelibrary.wiley.com/doi/10.3322/caac.21660
4. World Health Organization. Global Cancer Observatory (GCO). "Malaysia Fact Sheet" [Internet]. March 2021 [cited 6 April 2021]. Available from: https://gco.iarc.fr/today/data/factsheets/populations/458-malaysia-fact-sheets.pdf

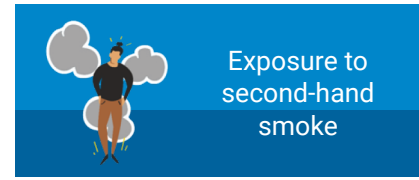
What Are the Risk Factors And What Can I Do to Reduce My Risks?

While there are some risk factors that you can act to change (modifiable), there are some that you cannot simply change (non-modifiable). For instance, you can quit smoking to lower you risk of lung cancer but you cannot change your genes or family history.

Cigarette smoking is the main risk factor for lung cancer. Tobacco smoke contains over thousand chemicals, and most of them are known to promote cancer (carcinogens).[5]

WHAT YOU SHOULD DO?

Quitting smoking is the best way to reduce your risk of lung cancer as it helps to repair previous damage caused by smoking. So, it is never too late to quit



Second-hand smoke is also known as passive smoking. Breathing in second-hand smoke can put you at risk of developing lung cancer as it contains harmful chemicals. [10]

WHAT YOU SHOULD DO?

Avoid breathing in second-hand smoke by keeping yourself away from people who smoke. You may ask your family or friends not to smoke at home.[b] Also, you can insist on a smoke free zone at restaurants and other public places.

WHAT YOU SHOULD DO?

Check whether your household materials contain asbestos.[9]

Avoid buying asbestos construction materials that are sold in the market.

Asbestos can be found in construction materials such as roof and ceiling tiles. People who are exposed to it have an increased risk of developing lung cancer or pleural mesothelioma.[6]

5. Centres for Disease Control and Prevention (CDC). "What Are the Risk Factors for Lung Cancer?" [Internet]. Sep 2020 [cited 6 March 2021]. Available from: https://www.cdc.gov/cancer/lung/basic_info/risk_factors.htm
6. American Cancer Society. "Lung Cancer Risk Factors" [Internet]. Oct 2019 [cited 6 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/causes-risks-prevention/risk-factors.html
7. American Cancer Society. "Can Lung Cancer Be Prevented?" [Internet]. Oct 2019 [cited 6 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/causes-risks-prevention/prevention.html
8. Centres for Disease Control and Prevention (CDC). "What Can I Do to Reduce My Risk of Lung Cancer?" [Internet]. Sep 2020 [cited 6 March 2021]. Available from: https://www.cdc.gov/cancer/lung/basic_info/prevention.html
9. Mayo Clinic. "Lung cancer- symptoms and causes" [Internet]. [cited 15 April 2021]. Available from:https://www.mayoclinic.org/diseases-conditions/lung-cancer/symptoms-causes/syc-20374620.
10. Cleveland Clinic. "Secondhand Smoke: Dangers" [Internet]. Sep 2020. [cited 15 April 2021]. Available from: https://my.clevelandclinic.org/health/articles/10644-secondhand-smoke-dangers

Exposure to radon and other elements

Radon is a gas that originates from rock and soil that can accumulate in houses and buildings until it reaches an unsafe level which can increase risk of lung cancer. Contact with the processing of arsenic, cadmium, steel and nickel may also be risk factors.[6]

WHAT YOU SHOULD DO?

Check the radon level at your place by using a home testing kit or call a specialist to test it. Ensure there are no cracks in the flooring through which gases may seep in.

Protect yourself from exposure to toxic chemicals in the workplace by wearing protective gear. [9]

Family history of lung cancer

People with a first-degree relative (parent or sibling) with lung cancer have an increased risk of the disease.[5]

WHAT YOU SHOULD DO?

Discuss with your doctor if you should be screened for lung cancer.

Personal history of lung diseases

Lung diseases such as chronic bronchitis, pulmonary tuberculosis or lung fibrosis can increase risk of cancer.[5]

WHAT YOU SHOULD DO?

Discuss with your doctor if you should be screened for lung cancer.

OTHER WAYS OF PREVENTION:

Eat healthy diet

Choose a healthy diet with a variety of fruits and vegetables may also help reduce your risk of lung cancer. [11]

Get physically active

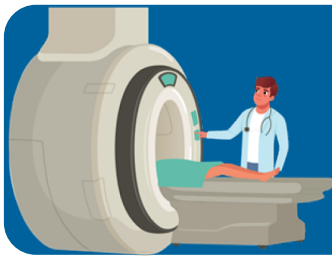
Do at least 30 minutes of moderate-intensity physical activity daily (e.g., brisk walking, jogging, hiking and swimming). [11]

5. Centres for Disease Control and Prevention (CDC). "What Are the Risk Factors for Lung Cancer?" [Internet]. Sep 2020 [cited 6 March 2021]. Available from: https://www.cdc.gov/cancer/lung/basic_info/risk_factors.htm
6. American Cancer Society. "Lung Cancer Risk Factors" [Internet]. Oct 2019 [cited 6 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/causes-risks-prevention/risk-factors.html
9. Mayo Clinic. "Lung cancer- symptoms and causes" [Internet]. [cited 15 April 2021]. Available from:https://www.mayoclinic.org/diseases-conditions/lung-cancer/symptoms-causes/syc-20374620.
11. Recommendations and public health and policy implications.. Continuous Update Project Expert Report 2018. World Cancer Research Fund/American Institute for Cancer Research [Internet]. May 2018. [cited 5 March 2021]. Available from: https://www.wcrf.org/sites/default/files/Recommendations.pdf

Who Should Be Screened for Lung Cancer?

Screening tests are designed to detect diseases early in the absence of symptoms or history of diseases. A low-dose computed tomography scan (LDCT) is the best available test for lung cancer screening. [13]

There is no national lung cancer screening programme in Malaysia, but several public hospitals and many private institutions provide LDCT for lung cancer screening. [12]



During the procedure, patient will lie on a table and an X-ray machine uses a low dose (amount) of radiation to visualise the lungs with detailed images. The scan only takes a few minutes and is not painful. You do not need to fast before the scan and no prior blood test is required. So you can walk into any major hospital and get screened.

WHO SHOULD BE SCREENED?[13]

It is recommended for individuals who have no symptoms but are at high risk, including:

- are current or ex-smoker between 45-75 years old, ***and***
- are or were heavy smokers (history of at least 20 pack years or more), ***and***
- have not had lung cancer before, ***or***
- non-smokers who have a strong family history of lung cancer.

Calculating pack-years*

(20 cigarettes=1 pack)

E.g. 1 pack per day for 30 years is 30 packs-years

** Your doctor can help you determine the number of pack-years you have smoked.*

If you are thinking about getting screened, discuss with your doctor if you should be screened.

12. Malaysia Health Technology Assessment Section (MaHTAS). Low dose computed tomography for lung cancer screening. Ministry of Health Malaysia [Internet]. 2017 [cited 7April 2021]. MOH/P/PAK/355.17(TR). Available from: https://www.moh.gov.my/moh/resources/Penerbitan/MAHTAS/HTA/HTA-LDCT%20for%20lung%20ca%20screening.pdf
13. American Cancer Society. "Can Lung Cancer Be Found Early?" [Internet]. Feb 2021 [cited 16 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/detection-diagnosis-staging/detection.html

How Is Lung Cancer Diagnosed?

If you present with any suspected signs and symptoms of lung cancer, your doctor will recommend some tests to determine whether it's lung cancer:[1,14,15]

START

Blood test
The doctor may run a complete blood count to check your general health state.

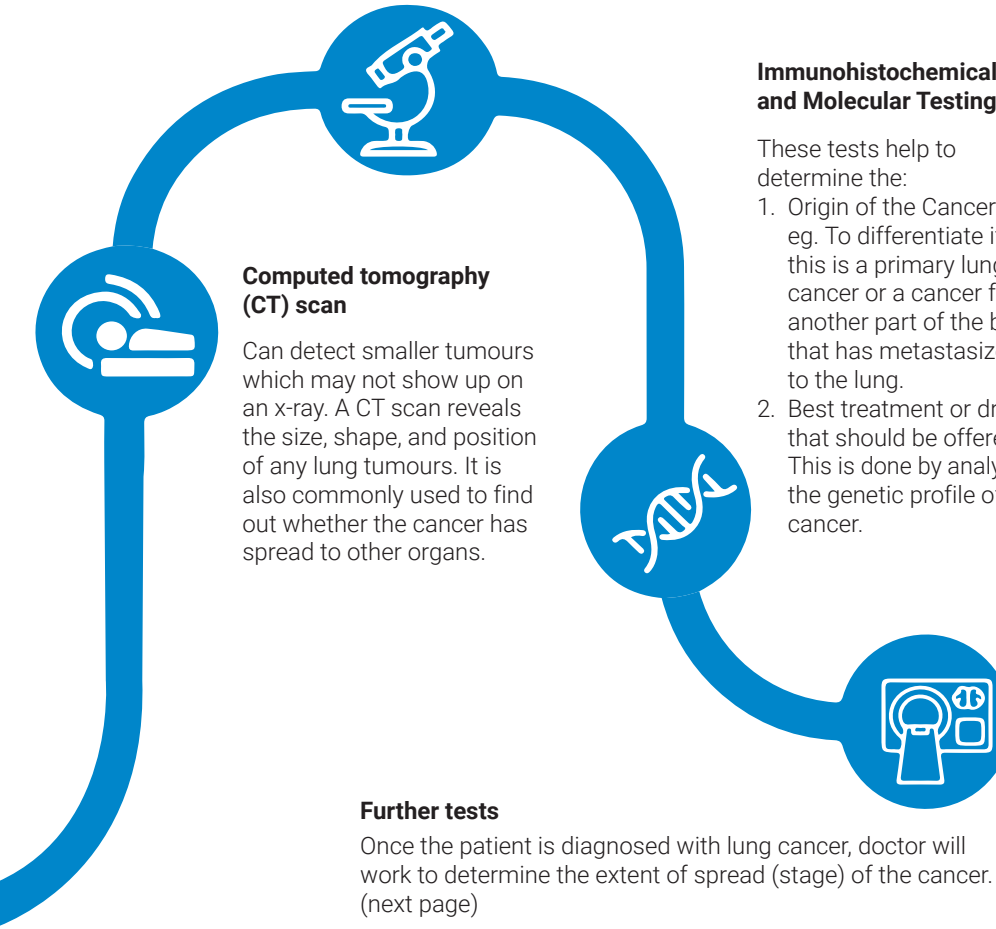
Lung function test
Check how well your lungs are working. You may be asked to breathe in and out into a machine called a spirometer that measures airflow.

Chest x-ray
It is usually used as an initial lung imaging tool. If anything suspicious is found (e.g. mass or nodules), the doctor might request for more specific test.

1. Health Harvard Publishing. "Lung cancer overview" [Internet]. Mar 2021 [cited 5 April 2021]. Available from: https://www.health.harvard.edu/a_to_z/lung-cancer-overview.
14. American Cancer Society. "Tests for Lung Cancer" [Internet]. May 2020 [cited 8 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/detection-diagnosis-staging/how-diagnosed.html
15. Mayo Clinic. "Lung cancer- Diagnosis and Treatment" [Internet]. [cited 10 April 2021]. Available from: https://www.mayoclinic.org/diseases-conditions/lung-cancer/diagnosis-treatment/drc-20374627

Biopsy: Bronchoscopic approach / CT-guided biopsy

A small amount of tissue will be extracted from the lung or the lymph nodes nearby, both of which will be sent for examination under a microscope. Sometimes this is done through a scope in the airway (bronchoscopy) or from the outside with an x-ray guided needle (CT-guided biopsy).



Computed tomography (CT) scan

Can detect smaller tumours which may not show up on an x-ray. A CT scan reveals the size, shape, and position of any lung tumours. It is also commonly used to find out whether the cancer has spread to other organs.

Immunohistochemical and Molecular Testing

These tests help to determine the:

1. Origin of the Cancer – eg. To differentiate if this is a primary lung cancer or a cancer from another part of the body that has metastasized to the lung.
2. Best treatment or drugs that should be offered. This is done by analyzing the genetic profile of the cancer.

Further tests

Once the patient is diagnosed with lung cancer, doctor will work to determine the extent of spread (stage) of the cancer. (next page)

These tests include a **positron emission tomography (PET) scan** and a **magnetic resonance imaging (MRI) of the brain** in some cases.

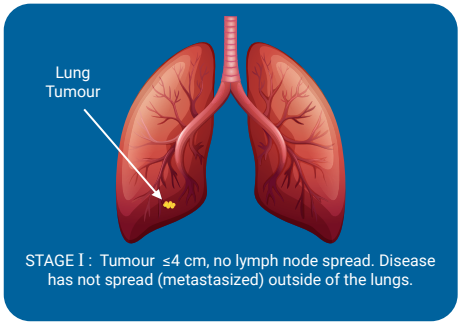
1. Health Harvard Publishing. "Lung cancer overview" [Internet]. Mar 2021 [cited 5 April 2021]. Available from: https://www.health.harvard.edu/a_to_z/lung-cancer-overview.
14. American Cancer Society. "Tests for Lung Cancer" [Internet]. May 2020 [cited 8 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/detection-diagnosis-staging/how-diagnosed.html
15. Mayo Clinic. "Lung cancer- Diagnosis and Treatment" [Internet]. [cited 10 April 2021]. Available from: https://www.mayoclinic.org/diseases-conditions/lung-cancer/diagnosis-treatment/drc-20374627

How Is Lung Cancer Staged?

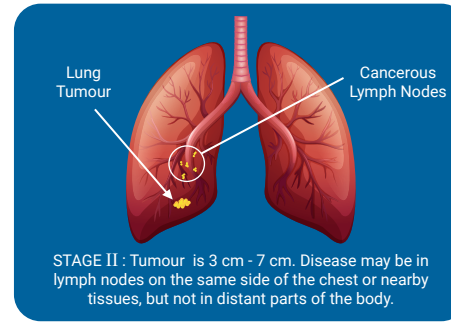
After lung cancer diagnosis is made, doctors will work to determine the extent (stage) of cancer, such as how large the tumour is, and if it has spread. This helps doctor to understand the patients' chances of survival and plan the appropriate treatment for them.

In Malaysia, almost **95%** of lung cancer cases were **detected at (late) stage (III & IV)** for both **men and women**.[16] Stage III is locally advanced disease, whilst stage IV is metastatic disease.

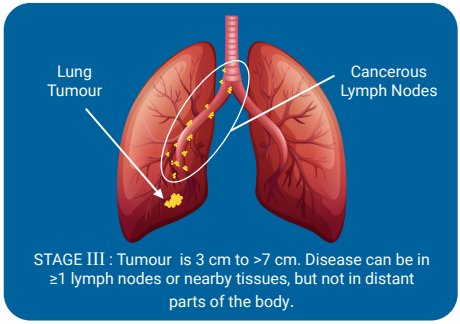
Simplified Example Of Lung Cancer Staging



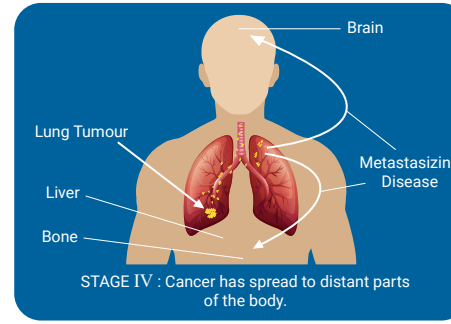
STAGE I : Tumour ≤4 cm, no lymph node spread. Disease has not spread (metastasized) outside of the lungs.



STAGE II : Tumour is 3 cm - 7 cm. Disease may be in lymph nodes on the same side of the chest or nearby tissues, but not in distant parts of the body.



STAGE III : Tumour is 3 cm to >7 cm. Disease can be in ≥1 lymph nodes or nearby tissues, but not in distant parts of the body.



STAGE IV : Cancer has spread to distant parts of the body.

16. National Cancer Institute. Malaysia National Cancer Registry Report (MNCRR) 2012-2016 [Internet]. National Cancer Registry. 2019. 1–116 p. Available from: http://nci.moh.gov.my/index.php/ms/list-penerbitan/35-laporan/398-summary-of-malaysian-national-cancer-registry-report-2007-2011

NSCLC[1]

STAGE I	STAGE II	STAGE III	STAGE IV
Small lung tumours ≤4cm, no lymph node spread.	Larger lung tumours and/or spread to lymph nodes on the same side of the chest.	Larger tumours which have invaded into chest wall, heart, nerves and/or lymph nodes that have spread to the middle of the chest or opposite lung.	Tumours that have spread to the lining of the lung (pleura) or other parts of the body such as liver, bones, brain.

SCLC[1]

LIMITED STAGE	EXTENSIVE STAGE
Cancer that has not spread beyond the chest and is small enough to be treated by radiotherapy with an intention to cure.	Cancer that has spread (metastasized) outside the lung, eg. liver, bone, brain or is too big / advanced to be cured by radiotherapy.

Please refer to LCNM's Counselling tool for further info:
https://lungcancer.net.my/hcp/wp-content/up-loads/2021/03/2019-08-01_LCNM-Pt-Counselling-Tool.pdf

How Is Lung Cancer Treated?

Treatment for lung cancer is now highly personalised and customised for patients based on:

1. Lung cancer type and stage
2. Genetic mutations present in the cancer
3. Patient's age and general health status (fitness)
4. Patient's concerns and wishes

Quite often, the best outcome is achieved with a combination of different treatments including surgery.

1. Health Harvard Publishing. "Lung cancer overview" [Internet]. Mar 2021 [cited 5 April 2021]. Available from: https://www.health.harvard.edu/a_to_z/lung-cancer-overview.

TREATMENT OPTIONS BASED ON LUNG CANCER TYPE & STAGE

Non-small cell lung cancer (NSCLC)[17]

STAGE I or II	STAGE III	STAGE IV
• Surgery is usually recommended to remove the cancer and the surrounding lymph nodes. • Radiotherapy may be used if the patient chooses not to undergo surgery. • Doctors may recommend chemotherapy and/or targeted therapy after surgery to help prevent cancer recurrence. (i.e. the cancer coming back or to treat possible undetected microscopic disease). This is called adjuvant therapy.	• Patients with a small and a limited number of lymph nodes may be considered for surgery. This is done in combination with chemotherapy and/or radiotherapy and/or targeted therapy and/or immunotherapy either BEFORE (neoadjuvant) or AFTER (adjuvant) the surgery. • Those where surgery is not recommended may be treated with a combination of radiotherapy and chemotherapy and/or targeted therapy and/or immuno therapy.	• Patients with a small and a limited number of lymph nodes may be considered for surgery. This is done in combination with chemotherapy and/or radiotherapy and/or targeted therapy and/or immunotherapy either BEFORE (neoadjuvant) or AFTER (adjuvant) the surgery. • Those where surgery is not recommended may be treated with a combination of radiotherapy and chemotherapy and/or targeted therapy and/or immunotherapy.

Small cell lung cancer (SCLC)[18]

LIMITED STAGE (STAGE I,II and III)	EXTENSIVE STAGE (STAGE IV)
• Chemotherapy, with radiotherapy is typically used to treat limited-stage disease with few exceptions, surgery is rarely offerred for SCLC.	• The goal of therapy is to prolong life and preserve quality of life. Cure is seldom achievable. In other words, palliative therapy. • Usually chemotherapy in combination with immunotherapy is offered. • Radiotherapy can also be offered to tumours which are not responding to chemo/immune or are causing symptoms such as pain.

17. Health Harvard Publishing. "Non-small cell lung cancer" [Internet]. Aug 2020 [cited 11 April 2021]. Available from: https://www.health.harvard.edu/a_to_z/non-small-cell-lung-cancer
18. Health Harvard Publishing. "Small cell lung cancer" [Internet]. Aug 2020 [cited 11 April 2021]. Available from: https://www.health.harvard.edu/a_to_z/small-cell-lung-cancer

Surgery[19]

This procedure is recommended for patients with early stage of NSCLC, and is individually tailored to each patient based on the size and location of the cancer, the patients' general wellbeing and their lung function.

During surgery, lymph nodes should be removed to determine the presence of microscopic silent (occult) spread of cancer cells.

These procedures may be carried out using different surgical approaches, including:

a. Minimally invasive thoracoscopic surgery (VATS). The surgeon makes a few cuts in the chest wall and inserts a video camera as well as operating instruments to carry out the operation from outside the chest.

b. Thoracotomy - when a slightly bigger cut is made between the ribs to remove the cancer. It is also called open surgery.

As this is a cancer operation, what is most important is for the surgeon to remove the tumour completely and clear out all accessible lymph nodes (Systematic nodal dissection). This provides the best chance of a cure and good long term survival (prognosis).

WHAT TO EXPECT AFTER SURGERY?

Tubes and drips
A drip (branula) is inserted in a vein in the arm to give antibiotics, fluids, and pain killers. 1-2 chest tubes coming out of chest will allow fluid and air to drain out freely.

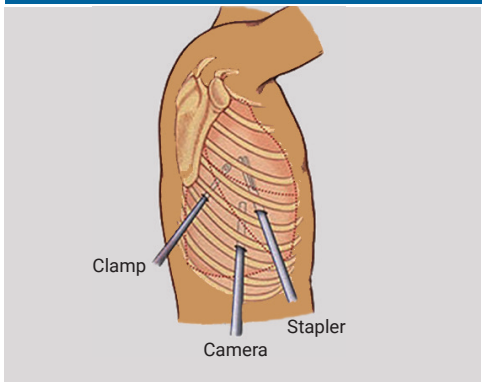
Side effects such as pain, swelling or discomfort after surgery are usually minor and short term.

Recovery time
Usually 5 - 7 days but can take up to 6 - 12 weeks.

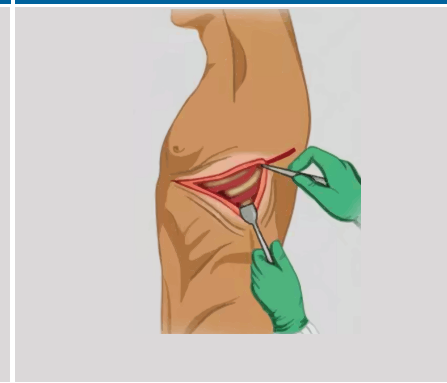
Rehabilitation
Pulmonary rehabilitation program or physiotherapy can help improve breathing and recovery of lung function.

19. American Cancer Society. "Surgery for Non-Small Cell Lung Cancer "[Internet]. Oct 2020. [cited 10 April 2021]. Available from: https://www.cancer.org/cancer/lung-cancer/treating-non-small-cell/surgery.html

a. Video Assisted Thoracoscopic Surgery (VATS)

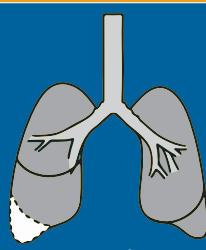
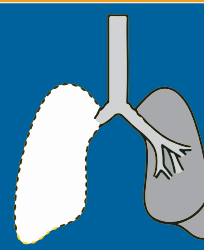
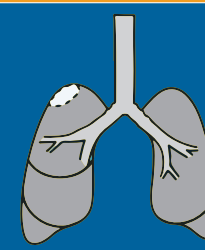


b. Thoracotomy (Open surgery)



Types of lung resection

Surgery for lung cancer may remove all or part of a lung.

Lobectomy	Pneumonectomy	Wedge resection
		
One lobe of a lung is removed.	One whole lung is removed.	Only part of a lobe is removed.

Chemotherapy[15]

Oncologists have used chemotherapy drugs to kill cancer cells since the 1960s. It is designed to target cells which grow and multiply quickly, and since cancer cells divide faster than most cells in the body, they are selectively killed by the chemotherapy. However some fast-growing healthy cells, like those of the skin, hair, intestines, and bone marrow can also be affected and that's how side effects can happen.

Chemotherapy is a form of systemic treatment, in other words it uses the bloodstream to travel around the body to reach cancer cells wherever they may have spread to. This is particularly useful when we need to target cancer cells that are not visible on the scan.

Many of these drugs are given intravenously (iv), usually as a day-care procedure or short overnight stay. Less commonly, some can be given orally (tablets). Chemotherapy is usually given in "cycles" for example a 3 weekly cycle means if you have chemotherapy today, you then go home to rest for 3 weeks, and then return for your next round of chemotherapy. The scheduled breaks in between allow time for your normal cells to recover and your body to heal.

Possible side effects that may occur include:

- mouth sores,
- loss of appetite,
- weight loss,
- nausea,
- diarrhoea,
- temporary weakening of the immune system,
- easy bruising,
- hair loss,
- nail changes, and
- skin changes.

Patient receiving iv Chemotherapy

15. Mayo Clinic. "Lung cancer- Diagnosis and Treatment" [Internet]. [cited 10 April 2021]. Available from: https://www.mayoclinic.org/diseases-conditions/lung-cancer/diagnosis-treatment/drc-20374627

Radiotherapy[15]

Radiation therapy or radiotherapy is the use of high-energy x-rays to kill cancer cells. Over half of all cancer patients will need radiotherapy at some point during the course of their illness. Radiotherapy nowadays is often combined with other treatments to achieve the best results such as chemotherapy and immunotherapy.

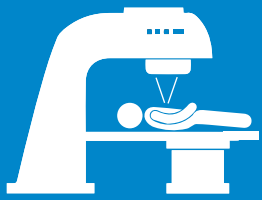
The energy of the x-rays used in radiotherapy are in the order of mega-voltage (10^6) compared to diagnostic x-rays used in CT scans or normal x-ray which are kilo-voltage (10^3). At these high doses, the x-rays will damage the DNA in cancer cells which trigger them to die. This process can take up to weeks and months to completely accomplish. When the damaged cells die, they are broken down and removed by the body.

It is delivered using a machine known as a linear accelerator (linac). The machine works by accelerating electrons to create a beam of radiation, a miniature version of particle accelerators found in nuclear physics labs. They are highly specialized machines that take a whole team of engineers and physicists to maintain in top working order.

Radiation to the Chest may cause :

- Shortness of breath
- Sore chest wall
- Skin irritation
- Stiff shoulders
- Radiation pneumonitis
- Radiation fibrosis

Radiotherapy



15. Mayo Clinic. "Lung cancer- Diagnosis and Treatment" [Internet]. [cited 10 April 2021]. Available from: https://www.mayoclinic.org/diseases-conditions/lung-cancer/diagnosis-treatment/drc-20374627

Targeted Therapy[15]

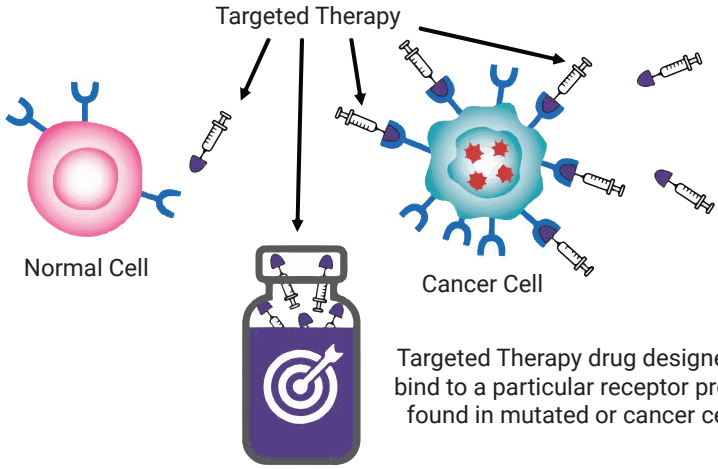
By studying a tumour's genetic makeup, oncologists are able to analyse the genetic changes that are responsible for the cancer growth and match a right targeted therapy unique for that individual. This strategy is also known as personalized or precision medicine. This is done through the mutation testing of a biopsy sample taken from the patient's tumour. Targeted therapies are becoming more common as doctors and scientists are inventing ever more drugs that specifically hone in on a particular protein/mutation.[15]

SIDE EFFECTS

Possible side effects in targeted drug therapy include:

- skin rash,
- fatigue,
- diarrhoea,
- weight loss,
- loss of appetite, and
- high blood pressure

In lung cancer it has now become standard procedure to test for different genetic changes commonly EGFR, ALK, ROS-1 and increasingly MET, HER2, BRAF, RET, NTRK, KRAS.



15. Mayo Clinic. "Lung cancer- Diagnosis and Treatment" [Internet]. [cited 10 April 2021]. Available from: https://www.mayoclinic.org/diseases-conditions/lung-cancer/diagnosis-treatment/drc-20374627

Immunotherapy[15]

Our immune system is required to detect and destroy abnormal cells that form due to mutations. This kills off cancers at an early stage to prevent them from growing and spreading. We often find immune cells surrounding tumours, these are called tumor-infiltrating lymphocytes or TILs, are a sign that the immune system is responding to the tumor.

Common side effects in immunotherapy include:

- fatigue
- diarrhoea
- constipation
- cough
- nausea
- joint pain

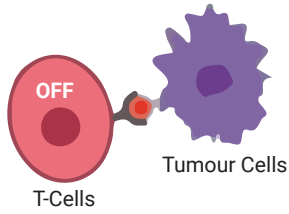
Even though the immune system is usually able to eliminate cancer cells, but over time some cancers adapt and develop ways to avoid destruction by the immune system. They become camouflaged.

Immunotherapy drugs called immune checkpoint inhibitors have been developed to "unmask" these camouflage mechanisms and allow the immune system to recognize the cancer cells again and thereby kill them. Checkpoint inhibitor (eg. PD-1 and PDL-1 inhibitors) are in widespread use for lung cancer.[16]

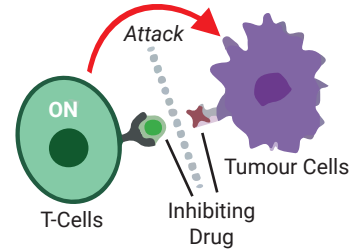
Other forms of immunotherapy such as CAR-T cells, T-cell therapy, dendritic cell therapy and vaccines have not been shown to be very successful in lung cancer and more research is required.

**The exact treatment choice depends on many factors. You will need to have a discussion with your treating oncologist.*

Tumour cells binds to T-Cells receptor causing the T-cells to deactivate & stop attacking the Tumour Cells.



Immunotherapy drugs prevent the Tumour cells from deactivating T-Cells & the T-cells can then kill the Tumour Cells, shrinking the tumour size.



15. Mayo Clinic. "Lung cancer- Diagnosis and Treatment" [Internet]. [cited 10 April 2021]. Available from: https://www.mayoclinic.org/diseases-conditions/lung-cancer/diagnosis-treatment/drc-20374627

Palliative Care[20,21]

Individuals with lung cancer may have symptoms such as breathlessness, cough, pain, fatigue, loss of appetite, anxiety or depression. Palliative care is specialized medical care that focuses on providing patients relief from such symptoms, no matter the diagnosis or stage of disease, with the aim of improving the quality of life for both patients and their families.

Palliative care is patient-centred and addresses and relieves pain and other problems, whether physical, psychosocial or spiritual in a holistic manner.

Palliative care uses a team approach to support patients and their caregivers, and is provided by doctors, nurses and other specially trained people. This form of care is offered alongside curative or other treatments you may be receiving, as an extra layer of support that complements your ongoing care.

Endobronchial Therapy

Some patients with an advanced tumour affecting the airways may experience difficulty breathing or may repeatedly cough up blood (haemoptysis) which can be bothersome and even life-threatening. Partial clearance (tumour debulking with laser or cryotherapy and airway stenting) can be offerred by the Interventional Pulmonologist (Chest Physician) or Radiologist.

20. https://www.mayoclinic.org/tests-procedures/palliative-care/about/pac-20384637. Accessed July 2021.
21. https://www.who.int/news-room/fact-sheets/detail/palliative-care. Accessed July 2021.

Lung Cancer Network Malaysia
No. 109, Lot P05A, Empire Shopping Gallery, Jalan SS16/1,
47500 Subang Jaya, Selangor, Malaysia

E: LCNM.Secretariat@hotmail.com

www.lungcancer.net.my

lungcancernmsia | lung-cancer-network-malaysia | lungcancernmsia | MYLUNGTV | MYLUNGTV

National Cancer Society Malaysia
No. 66, Jln Raja Muda Abdul Aziz, 50300, Kuala Lumpur, Malaysia

T: 03 2698 7300 F: 03 2698 4300 E: contact@cancer.org.my

www.cancer.org.my

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