



# Lung cancer screening

Lung cancer screening is the process of using tests to find the disease at an early stage, before symptoms are present.

Unlike other cancers, routine screening for lung cancer is not common across the world. However, research has found that lung cancer screening can improve survival rates. Many health organisations are calling on governments and international organisations to start offering programmes to people considered to be high-risk.

This factsheet looks at what lung cancer screening is, the risks and benefits of screening and the current position of health organisations.

## Overview

Lung cancer is the biggest cancer killer in Europe; it causes more deaths than colon, breast and prostate cancers combined. When lung cancer is detected based on symptoms, the disease is mostly at a late stage, making treatment much less effective.

Screening can detect cancer at a much earlier stage. Finding cancer earlier means that treatments can work better and even cure lung cancer, improving the outcomes for people living with the disease and reducing medical costs.

## What does lung cancer screening involve?

There are several tests that can look at how healthy our lungs are. The test that is seen as most effective for finding lung cancer at an early stage is known as a low-dose CT (Computed Tomography) scan. It uses x-ray and computer technology to take multiple pictures of the chest. A computer combines these images to produce detailed pictures of your lungs. These images are more detailed than regular chest x-rays.

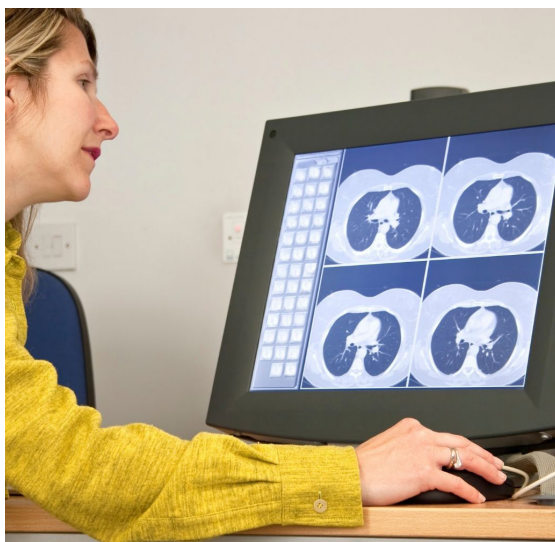
A screening programme involves routinely checking certain groups of people at regular intervals. These kinds of programmes exist in many countries for other cancers, such as breast or cervical cancer, where screening is routinely offered to women in a certain age group.

## What happens during a low-dose CT scan?



Low-dose CT scans are quick and painless. The scanning machine is usually a large donut-shaped machine with a short tunnel in the centre. The images are produced as you lie on a flat bed that moves under the scanning machine, in and out of the short tunnel. A radiographer operates the machine from the next room to take the pictures that are required.

## How does the chest CT scan detect lung cancer?



A radiologist will analyse the images produced to look for any abnormal areas in the lungs that could suggest cancer. A spot seen on the image is known as a lung nodule and is something that should be followed up.

These spots are relatively common. As well as being a sign of lung cancer, they could also suggest other issues, such as scarring from infections or growths that are not cancerous. While these abnormalities may require monitoring, they often do not require immediate action.

If the nodule is considered large or if gets bigger between scans, this is more likely to be lung cancer. Further tests, including more scans or a procedure to remove a piece of the nodule for testing (biopsy), are then required.

## What are the benefits of screening programmes?

When lung cancer is detected based on symptoms – such as a long-term cough and repeated chest infections – the lung cancer is likely to already be at a late stage. There are fewer treatment options available the later lung cancer is detected. Finding cancer sooner can help increase the chance of cancer treatments being effective – helping people live longer and improving quality of life.

Screening programmes can help find lung cancer much earlier. Research suggests that using low-dose CT scans is up to four times more likely to pick up an early tumour compared to a traditional chest x-ray.



*“ERS, advocates for the earliest detection and screening of lung cancer. Lung cancer still remains the largest killer among cancers. Rolling out programmes for low dose CT screening of high risk individuals (former or current smokers) could save lives and help change this devastating curve.”*

**Arzu Yorgancıoğlu, ERS Advocacy Council Chair**

Evidence also suggests that screening programmes can help reduce the number of deaths from lung cancer:

- Results from the largest trial looking at lung cancer screening were published in 2011. They found that using low-dose CT scans to screen for lung cancer could reduce the number of deaths by 20% compared to chest x-rays.<sup>1</sup>
- The second largest trial to date was conducted in Belgium and Holland with results published in 2020. It found that lung cancer deaths were reduced by 24% after 10 years when low-dose CT scans were offered to men at high-risk of lung cancer.<sup>2</sup>

Screening programmes can also identify other issues– such as chronic obstructive pulmonary disease (COPD) or heart disease. If these issues are found, they will be followed up.

*“I am very supportive of targeted screening programmes. It is so important to roll out targeted screening in the way we currently offer for other conditions so people can understand the benefits – for example regular eye checks and diabetic eye tests for specific risks.”*

**Janette, UK, lung cancer survivor and patient advocate**

## Are there any risks of screening programmes?

Screening programmes are not perfect and there are some risks involved. To minimise these risks, screening programmes are only offered to people who are considered at a high risk of the disease.

### Low-dose of radiation

All x-rays use small amounts of radiation during the process of scanning. The dosage is 90% lower with a low-dose CT scan compared to a traditional chest CT scan. There is still some radiation exposure, which can cause cancer in a very small number of cases. The

amount is equivalent to the radiation a person is exposed to on average over 6 months through the natural environment or equivalent to 15 traditional chest x-rays.

### Getting the wrong result

Although it is rare, tests can sometimes give the wrong results, indicating a person has lung cancer when they do not. This can happen for a variety of reasons, for example if a person is experiencing an infection at the time of a scan. This is called a false-positive result. This result is usually followed up with more tests, which may cause stress and anxiety.

### Treating a cancer that may have been harmless

Sometimes cases of lung cancer are detected that may grow very slowly and are less harmful in comparison to other types. Again, you could be sent for more tests and treatment that may not have been needed. This is called overdiagnosis. It is important to discuss with your doctor the risks and benefits of tests and potential treatments based on any other health problems you may have. This will help you to reach an informed decision on how to proceed.

Over the last 20 years, research has focused on understanding more about the lung nodules that are detected on CT scans. There are several guidelines that help healthcare professionals to identify lung nodules and therefore manage the next steps after they have been seen on a scan. Multidisciplinary teams of specialised respiratory doctors and chest radiologists are required to help work on finding and managing any abnormalities that are found. This has helped to greatly reduce the risks linked with screening to ensure that only the nodules that are cancer are being treated.

## What is a national screening programme?

A national screening programme involves finding groups of people who are considered most at-risk of lung cancer and offering lung screening appointments.



Smoking is by far the biggest risk-factor for lung cancer. The evidence currently suggests that screening programmes work best when they target people between the ages of 50 and 74 years who currently smoke or people who used to smoke and have quit. Women have also been found to respond better to lung cancer treatment at an early stage, and the benefits of screening could therefore be greater for women.

Researchers believe that lung cancer screening programmes could be even more effective when combined with support to help people quit smoking.

These specific groups of people do not account for all lung cancer cases. There are other risk factors linked with lung cancer, such as air pollution, exposure to radon gas or asbestos, or other substances that are toxic for your lungs. By selecting a specific high-risk group, such as older smokers, a screening programme aims to find as many cases as possible, while lowering the risk to otherwise healthy people.

It can be worrying to think about trips to the hospital for scans and tests. Some countries are considering how to make this an easier process for people. For example, in the UK, a pilot scheme was launched offering 'lung health checks' in mobile health units that parked at supermarkets. People were able to drop in for a quick check and received follow-up appointments if they were needed.

*“There is work still to do to decide which people would receive screening but whichever group it is, the benefits of detecting lung cancer earlier are huge and could save lives.”*

**Janette, UK, lung cancer survivor and patient advocate**

## Is there a screening programme available in my country?

To date, the USA and China are the only countries that offer people the option of screening for lung cancer. This is covered by the national health systems in these countries. Countries such as the Netherlands and the UK offer screening in some locations.

It is the job of health authorities and screening councils to balance the risks and harms and develop robust and effective screening programmes.

## What does the future hold?

Most experts believe that the evidence supports the use of lung cancer screening to help save lives and now is the time to implement national programmes.

The European Respiratory Society has joined with the European Society of Radiology in calling for action to implement national screening programmes. More



information can be found on the ERS website: <https://www.ersnet.org/advocacy/eu-affairs/lung-cancer-screening--cutting-costs--saving-lives>

Recommendations are now needed at the European and international level to support and encourage individual countries to start their own screening programmes. It is likely that national screening programmes will begin in the coming years in countries across Europe and the world.

## Further reading

- A report produced jointly by these Societies in 2020 outlined the latest evidence on lung cancer screening and the steps needed to achieve national programmes: <https://erj.ersjournals.com/content/erj/55/2/1900506.full.pdf>
- The supplementary material from this report can be downloaded here and it provides an up-to-date summary of the different stages each European country is at with delivering national screening programmes: <https://erj.ersjournals.com/content/55/2/1900506#sec-14>
- Watch a video from the European Respiratory Society about the importance of lung cancer screening: <https://youtu.be/wyLb3cBkWz4>



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The European Lung Foundation (ELF) was founded by the European Respiratory Society (ERS), with the aim of bringing together patients, the public and respiratory professionals to positively influence respiratory medicine. ELF is dedicated to lung health throughout Europe, and draws together the leading European medical experts to provide patient information and raise public awareness about lung disease.

This material was compiled with the help of Janette Rawlinson, ELF Patient advisory group member, Dr Georgia Hardavella (Respiratory Consultant) and Dr Nikolaos I. Kanellakis (Postdoctoral Researcher). This factsheet has been endorsed by Lung Cancer Europea (LuCE).

**Produced in February 2021.**