Radiotherapy for lung cancer
Introduction

If you or someone you care for has just been diagnosed with lung cancer then it's almost certain that you will have lots of questions needing answered. This booklet was produced in partnership with lung cancer experts and people affected by lung cancer.

Understanding your lung cancer will help you make informed decisions about your care. Please remember that most healthcare professionals are only too happy to answer your questions and discuss any of your concerns. This booklet should be used along with information provided by your healthcare team.

We hope that this booklet will be of use to you. However, if any of your questions remain unanswered, talk to your cancer doctor or lung cancer nurse specialist, or call the Roy Castle Lung Cancer Helpline free on 0333 323 7200 (option 2). You can also contact one of the many support organisations available (see page 51 of our Living with lung cancer booklet). You can also view the support organisations online at www.roycastle.org/usefulcontacts

Our Lung cancer - answering your questions pack contains two booklets - Living with lung cancer and Managing lung cancer symptoms, along with a DVD. Also available are four separate treatment booklets which can be slotted into the pack as required.

• Chemotherapy for lung cancer
• Radiotherapy for lung cancer
• Surgery for lung cancer
• Targeted therapies for lung cancer

You can view and order this information online at www.roycastle.org/ayqpack or call the Roy Castle Lung Cancer Helpline free on 0333 323 7200 (option 2).
## Contents

- Introduction .................................................................................................................. 2
- Understanding radiotherapy for lung cancer ................................................................. 4
- Preparing for radiotherapy ............................................................................................ 9
- Receiving radiotherapy ................................................................................................. 12
- After radiotherapy treatment finishes ......................................................................... 18
- Questions to ask ............................................................................................................ 20
- About us ....................................................................................................................... 23
Understanding radiotherapy for lung cancer

What is radiotherapy?
Radiotherapy is a type of cancer treatment which uses high energy x-ray beams. Cancer cells are able to grow and divide faster than healthy cells. Radiotherapy works by killing cancer cells and is often used to treat lung cancer. It works by targeting the cancer cells and disrupting the cell growth. Cancer cells can’t repair themselves, so they die. Although normal cells surrounding your cancer may be affected by radiotherapy, they are usually able to repair themselves.

It may be used on its own or as part of a combined treatment with surgery and/or chemotherapy.

It is usually given from outside your chest (external beam radiotherapy) by directing high energy x-ray beams at your cancer. The machines that are most commonly used for this are called linear accelerators (LINAC).

Radiotherapy can also be given by putting a small amount of radiation directly inside your lung (internal or interstitial radiotherapy). This type of treatment is called brachytherapy or endobronchial therapy. It is most commonly used to unblock or clear an airway, and help improve breathing and reduce breathlessness. This type of treatment is not available at every cancer hospital. Your clinical oncologist (a cancer doctor with special expertise in radiotherapy) will discuss the best type of treatment for you.

Radiotherapy is a common treatment used for non-small cell lung cancers. Small cell lung cancer can also be treated with radiotherapy if chemotherapy is not suitable or has already been given. It can also be combined with chemotherapy (chemoradiotherapy - see page 5). Radiotherapy can also be helpful for treating lung cancer that has spread outside of the lungs, for example, bones (metastatic disease).
**Why am I getting radiotherapy?**

There are several reasons why you may be receiving radiotherapy as a treatment for lung cancer:

The table below explains terms used for radiotherapy and why you may be receiving it:

<table>
<thead>
<tr>
<th>Radiotherapy</th>
<th>Why is it given?</th>
<th>How is it given?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjuvant</td>
<td>To get rid of any cancer cells which may still exist after having both lung cancer surgery and chemotherapy.</td>
<td>Daily treatments, usually over three to four weeks.</td>
</tr>
<tr>
<td>Combined Chemotherapy and Radiotherapy (Chemoradiotherapy)</td>
<td>To try to cure either stage 2 – 3 non-small cell lung cancer which is not suitable for surgery or limited-stage small cell lung cancer. This method of treatment is very aggressive but may allow for the cancer cells to be destroyed at a faster rate.</td>
<td>When radiotherapy and chemotherapy is given at the same time it is called concurrent. If radiotherapy is given after first chemotherapy treatment it is called sequential. Your doctor will give more information on how many treatments you will need. There are many ongoing clinical trials to decide what dose and number of chemotherapy/radiotherapy sessions are the most effective. There is an increase in side-effects by giving both treatments at the same time. Your doctor will check whether you are fit enough for this treatment.</td>
</tr>
</tbody>
</table>

*Note: The table content has been formatted to fit within the constraints of the image.*
### Radiotherapy for lung cancer

<table>
<thead>
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<tr>
<td><strong>Palliative</strong></td>
<td>To shrink the tumour and help reduce symptoms such as coughing, pain and breathlessness when lung cancer is not curable. Also may be used in treatment of lung cancer which has spread to other parts of the body, for example, bones or the brain.</td>
<td>Usually daily treatments, for a short length of time. The amount needed varies from 1-15 days.</td>
</tr>
<tr>
<td><strong>Prophylactic Cranial Irradiation (PCI)</strong></td>
<td>To reduce the chance of disease spreading to the brain after a good response to chemotherapy (only recommended in small cell lung cancer).</td>
<td>Daily treatments, usually over 10 days.</td>
</tr>
<tr>
<td><strong>Radical (either SBRT, SABR or CHART, see page 7)</strong></td>
<td>To try to cure stage 1 – 3 lung cancer which is not suitable for surgery. The cancer must be small enough and in a suitable position so that the radiotherapy beam can totally surround it and you must be well enough for your body to cope with the treatment.</td>
<td>Daily treatments, at a cancer centre. Usually given over a period of around four weeks.</td>
</tr>
</tbody>
</table>
What is CHART?
CHART stands for Continuous Hyperfractionated Accelerated Radiotherapy. This is a shorter, more intensive way of giving radiotherapy. It is given as an inpatient treatment over a period of 12 days. Radiotherapy is given three times a day. This type of treatment is not suitable for everyone or available at every cancer hospital.

What is stereotactic radiotherapy (SRT)?
This type of treatment is also sometimes called radiosurgery, stereotactic ablative radiotherapy (SABR) or stereotactic body radiotherapy (SBRT).

It is a type of external radiotherapy that delivers highly focused very high doses of radiotherapy to a small area with more beams and angles than conventional radiotherapy. Cancer cells can be targeted very accurately using this type of treatment. This means that an increased dose of radiation can be delivered to cancer cells, without causing more side-effects to healthy cells.

It is used to treat some very early stage lung cancers when surgery is not possible. It can also sometimes be used to treat the spread of lung cancer to your brain.

Please note, this type of treatment is not suitable for everyone. Your doctor will advise you if it may be suitable for you.
There are various types of machines used for this type of treatment. Specialised conventional radiotherapy machines (LINACs) can be used to deliver SRT. You get the following specific SRT systems:

**CyberKnife™**: This SRT system can be used to treat very early stage lung cancer when surgery is not possible, due to either the position of your cancer or other pre-existing health problems.

It can also be used to treat spread of lung cancer to your brain (metastasis). Despite its name, CyberKnife is not a surgical procedure – no cutting or knife is involved. Instead, CyberKnife delivers high doses of radiation directly to cancer cells.

**GammaKnife™**: Can be used to treat spread of lung cancer to your brain (metastasis). GammaKnife is not a surgical procedure – no cutting or knife is involved. Not everyone is suitable for this type of treatment. It is used if you have well controlled cancer outside of your head and only have a small amount of cancer spread to your brain.
Preparing for radiotherapy

Where will I go for radiotherapy treatment?
Radiotherapy is only given in specialist cancer centres because the treatment is very specialised. It may involve long journeys to get to your nearest cancer centre, depending on where you live. If you have a long way to travel each day to get to your radiotherapy appointment you may feel more tired, especially if you have side-effects from the treatment. If you can, ask a friend or relative to take you to your hospital appointment. If you need help with travelling, the radiotherapy staff or your lung cancer nurse specialist may be able to help to arrange transport for you.

When will I get my radiotherapy?
Most radiotherapy is given on an out-patient basis, Monday to Friday. The radiotherapy department will try to make an appointment time to suit you. However, this can sometimes be difficult due to the high number of patients needing to be treated. If you have your own transport this will allow for more time slot options.

How will my treatment be planned?
Your doctor will look at your test results, the type of tumour you have, where it is and whether it has spread. All this information will be carefully considered when planning your treatment. Treatment planning may involve:

• **CT planning scan** - This is a special type of scan where a number of pictures are taken. It helps your doctor to plan your radiotherapy treatment and to position the treatment machines accurately. CT planning is similar to a normal CT scan and will not cause you any discomfort.

• **Simulator** - This is a special x-ray machine similar to the radiotherapy treatment machine and is used to plan the treatment to ensure that only the area that needs treatment will actually be treated.
Your treatment may be planned using either or both of these, and it may take a few visits before your treatment is ready to start. These scanners and extra visits help the doctors have a practice run at your treatment plan before you start.

Radiotherapy equipment
If you have radiotherapy to your lung you may be fitted for a special body cradle to keep your body completely still during treatment. The cradle is made of a soft material that moulds to your body and is designed to make treatment more comfortable. For some of the more technical treatments you may also be fitted with a special vest, which is only worn during treatment. This allows the machine to work in time with your breathing pattern.

If you have radiotherapy to your brain, you may have a head frame to keep your head completely still during the treatment. Alternatively, a special plastic mask may be used to cover your head and face which helps you stay in position during radiotherapy. Some people find this can be a little claustrophobic. Speak to your lung cancer nurse specialist or radiographer if you feel this may be difficult.

This equipment is not required for every type of radiotherapy and may vary from hospital to hospital.

Radiotherapy skin markings
The radiographer will make three tiny (pinhead size) ink marks on your skin at your treatment planning appointment (they look like freckles). These are to show the radiographer where to direct the radiotherapy beams when you are receiving treatment. These are permanent and won’t wear off. You will be asked for permission before this is done. If this is a concern for you, ask your radiographer if there are any alternative options.
Sometimes a permanent pen may be used to mark out the treatment area, although this option is not always available. If this happens, you will be asked not to remove these marks until the end of treatment.

If you are to have treatment to your head or neck, any marks will be made on your mask: not your skin.

**How many treatments will I need?**
The number of radiotherapy treatments you need is calculated by your doctor. The number may vary from 1 treatment to 26 treatments. This will depend on factors such as your general health, and the size and location of your tumour. Each treatment is called a fraction.

Please see our *Living with lung cancer* DVD for more information. See page 2 for details on how to get a copy.
Radiotherapy for lung cancer

Receiving radiotherapy

What will happen when I come for my radiotherapy treatment? This information is for external radiotherapy.
The radiographer will go over your personal details and explain what is going to happen to you. You may be asked to change into a treatment gown or just remove your clothing.

Radiotherapy machines are very big and are either fixed in one position or able to rotate around your body. Some people feel a little bit nervous when they first see the treatment room. This is normal but your radiographers will be able to reassure you.

The radiographers will position you carefully on the treatment table. They will move the machine above the area that is to be treated, using your skin markings to line up the radiotherapy beams. This will probably take longer than the treatment itself.

When the radiographer has both you and the radiotherapy machine in the correct position they will leave the room. You will be alone in the room when receiving your treatment but watched through a window or on a monitor by the radiographers at the control desk. You may be able to speak to them through an intercom and they may be able to speak to you. It is important that you stay very still during treatment. The machine may rotate around you during treatment. Treatment itself usually only takes a few minutes and is painless.
How is internal radiotherapy given?
Before this procedure you will usually be given a sedative to make you sleepy. A narrow, flexible tube called a bronchoscope will be inserted through your mouth or nose into your airways. A thin tube called a catheter is then passed through the bronchoscope and into your lung. The radiation is then given to the lung through the catheter. The doctor leaves it in place for a few minutes and then removes it.

Giving the treatment this way means that radiation is delivered directly to the cancer cells and surrounding healthy cells are not affected. This reduces the risk of side-effects.

Is receiving radiotherapy painful?
No, the treatment itself is totally painless, although you may find the treatment table hard and slightly uncomfortable. If you have internal radiotherapy it can be a bit uncomfortable when the tube is inserted, but this doesn’t last long. Your doctor can prescribe painkillers if you have discomfort.

“I was terrified when I first went for radiotherapy, but it wasn’t such an ordeal and it didn’t hurt at all.”
Zara

How do the doctors know if the radiotherapy is working?
The treatment can go on working for many weeks after the radiotherapy course has finished, so it is sometimes difficult to know straight away whether there has been a response. Your doctor will use a combination of x-rays and scans to find out if there has been a reduction in the size of your tumour. Remember the results will never be normal as radiotherapy causes inflammation and scarring to the lungs. However, if your symptoms have improved that would indicate a response.
Should I change my diet during radiotherapy?
Try to maintain a healthy diet. Avoid alcohol, very hot drinks, rough foods (like crisps or crusty bread) and strong spices, particularly if your gullet (throat) has become irritated. Try mashing foods, adding sauces/gravies, or mixing smoothies. If you experience a burning feeling in your gullet and have difficulty swallowing, there is a medicine that can be prescribed to ease this discomfort. Regular painkillers can also help. Ask your doctor or lung cancer nurse specialist for advice.

“When my throat was sore after radiotherapy I found creamy milkshakes one of the easiest drinks to swallow.”

Zainab

Please see our Living with lung cancer booklet for more information on diet. See page 2 for details on how to get a copy.

Am I radioactive?
No you are not radioactive and you can still mix with family and friends.
Are there any side-effects?
All forms of cancer treatment have side-effects of one sort or another. Radiotherapy does have side-effects, although they vary from person to person depending on the type of treatment you have and your general fitness.

Not everyone who experiences radiotherapy will experience side-effects. **If you have radical radiotherapy you are more likely to have more side-effects than if you are having palliative radiotherapy.**

Short-term side-effects
The following symptoms can begin during your treatment and may continue for a short time after your treatment has finished. Your radiotherapy nurse or doctor will see you regularly throughout your treatment and radiographers are available daily to answer any questions you may have.

• **Increase in your cough and sputum (spit)**
  Don’t worry, this is quite normal, but if you are having difficulties let your doctor know. Please make sure you let your doctor know if your spit is bloody or discoloured.

• **Itchy dry skin**
  Your skin in the treated area may become a little pink or red. It may also feel a little dry or itchy. You may bathe or shower during treatment, but do not have the water too hot. Use mild baby soap and try not to rub the treated area too hard. It’s best to pat the area dry with a soft towel. Avoid perfumed talcum powder or lotion.
• **Pain in your chest in the 24 hours after the first treatment**
  This is usually mild and settles down fairly quickly. Use an over-the-counter painkiller and if this does not work speak to your GP.

• **Sore throat**
  This is caused by the gullet (oesophagus) becoming irritated by the treatment. There are soothing liquid medicines which can be prescribed by your doctor. However, you may find cool/lukewarm drinks or ice-cream soothing. Eat food that is soft or mushy, for example, porridge or soup.

• **Extreme tiredness following treatment (fatigue)**
  This can last for a number of weeks after treatment has ended. Make sure that you take it easy and rest when you feel tired. However, please also remember that small amounts of regular exercise can help in your recovery too.

“Even when I felt tired after my treatment, I strolled to my local shop to pick up a newspaper. The fresh air and exercise really helped.”

  Carl
Long-term side-effects
Radiotherapy can also cause the following long-term side-effects:

• **Scarring of the lung (pulmonary fibrosis)**
  This might lead to your lung not working quite as well as it did before. You might notice a slight increase in breathlessness. If this becomes a problem, see your hospital doctor or GP, as there are medicines and breathing exercises which can help.

• **Scarring of the oesophagus (food pipe)**
  This may make it difficult to swallow solid food. Occasionally, a minor operation may be required to stretch your oesophagus.

• **Spinal cord/heart damage**
  As the treatment is often close to these areas there is a very rare chance they may be damaged. Your doctor will explain if you are at high risk of damage.

You will be given a contact number to phone if you experience difficulties with side-effects. This number should be used at times when it may be difficult to contact your lung cancer nurse specialist or doctor, such as during the night or at the weekend. There is space at the end of page 21 for you to write down the phone numbers.

Please see our *Managing lung cancer symptoms* booklet for more information. See page 2 for details on how to get a copy.
After radiotherapy treatment finishes

How will I feel after treatment ends?
Once you have finished treatment you may be anxious that you are no longer attending the radiotherapy department. You may have been attending for a number of weeks and suddenly your routine is changed. This change in routine can make you feel a bit low. This is normal. However, slowly you should start to feel that things are getting back to normal.

If you have had palliative radiotherapy any side-effects you may be experiencing should wear off after several weeks. If you have had radical radiotherapy it may take longer for any side-effects to wear off.

You may still feel more tired than usual for a while and should rest when you need to. Gentle exercise will help you to feel better.

Please see our *Living with lung cancer* booklet for more information on exercise and relaxation. See page 2 for details on how to get a copy.
How will I be followed up?

Your clinical oncologist (radiotherapy doctor) will arrange to see you anything from one to six weeks after your treatment has finished, depending on how many fractions of radiotherapy you have had. It is important to assess how well your treatment is working and to ensure that you are not experiencing any other problems. Follow up appointments give you the chance to discuss any worries which may have come up. It can help to write a list of things to discuss before you go so you don’t forget anything.

If you have had radical radiotherapy you will have a scan between three and six months after treatment finishes.

You may have regular follow up appointments at the radiotherapy department or at your original hospital. How often you go varies from one hospital to another and on whether you require any other treatment. But as you recover from radiotherapy you probably won’t need to go so often.

If you have any problems or worries in between your appointments, contact the radiotherapy department or your lung cancer nurse specialist. You don’t have to wait until your next clinic appointment.

Your GP will be sent a report about your treatment.
Questions to ask

Questions to ask your doctor or lung cancer nurse specialist
Before choosing radiotherapy as a treatment option, you should understand the expected benefits, side-effects and risks. Ask your cancer doctor or lung cancer nurse specialist these questions at your next visit. It may help to ask these questions during your next visit. You can also use the notes page at the back of this booklet. Learn as much as you can about your treatment, and get an idea of the expected outcome.

1. What type of radiotherapy will I be getting?

2. What is the aim of the radiotherapy?

3. Are there other treatments that could be suitable for me instead of radiotherapy?

4. What are the risks and side-effects of the radiotherapy I will be having? How do these side-effects compare with side-effects of other treatments?

5. How long will I have to wait before starting treatment?

6. How will I know if the radiotherapy is working?
7. How often will I get the radiotherapy, and for how long?

8. Where will I go for the radiotherapy?

9. What can I do to prepare for treatment and reduce the chance of side-effects?

10. Will I need to change my lifestyle in any way?

11. Will I also need other treatment such as surgery, chemotherapy, or both? If so, when and why?

12. If radiotherapy doesn’t work, are there other treatments I can get?

13. Are there any clinical trials I would benefit from?

Lung cancer nurse specialist
Name:
Phone number:
Other contact phone number:
About our lung cancer information

All of our information is written either by our information team or by lung cancer experts. We have a panel of lung cancer experts made up of doctors, nurse specialists and other health professionals involved in the care of people affected by lung cancer. These people help us on a voluntary basis. You can find out about our Expert Panel at [www.roycastle.org/expertpanel](http://www.roycastle.org/expertpanel)

Our information is also reviewed by members of our Reader Panel (made up of people who have experience of lung cancer). This ensures that our lung cancer information meets their needs. You can find out about our Reader Panel at [www.roycastle.org/readerpanel](http://www.roycastle.org/readerpanel)

This booklet was produced in partnership with [Health & Care Information you can trust](http://www.nationallungcancerforum.org.uk)

Our information is accredited by The Information Standard, which makes sure that it is trustworthy, easy to read and reliable. It also must be based on the best clinical evidence that is available.

The information is evidence based and follows national clinical guidelines for the management of lung cancer. You can find references to sources of information within this booklet at [www.roycastle.org/evidence](http://www.roycastle.org/evidence)

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Many thanks to staff at The Beatson West of Scotland Cancer Centre for images supplied.

We value your feedback
If you would like to tell us what you think about this information booklet or would like to join our Reader Panel and review our lung cancer information, please e-mail us at info@roycastle.org
Roy Castle Lung Cancer Foundation is the charity that gives help and hope to people affected by lung cancer. The charity has two aims – supporting people living with lung cancer and saving lives.

**Supporting people living with lung cancer**
Working closely with lung cancer nurses, we provide information, run lung cancer support groups and offer telephone and online support. Our patient grants offer some financial help to people affected by lung cancer.

**Saving lives**
We fund lung cancer research, campaign for better treatment and care for people who have lung cancer, and raise awareness of the importance of early diagnosis. Our lung cancer prevention work helps people to quit smoking and encourages young people not to start smoking.

**Contact us**
For more information please call the [Roy Castle Lung Cancer Helpline free on 0333 323 7200 (option 2)](tel:03333237200) or visit our website at [www.roycastle.org](http://www.roycastle.org)

**Head Office**
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**GIVING HELP AND HOPE**

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