



The Clatterbridge
Cancer Centre
NHS Foundation Trust

Radical radiotherapy for non-small cell lung cancer

Radiotherapy



A guide for patients and carers

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You are being offered a course of radiotherapy for the treatment of non-small cell lung cancer. This kind of radiotherapy is called radical or high dose radiotherapy.

Before you have any treatment, your cancer doctor will explain why you need treatment, its effectiveness and possible side effects. If you agree to have the treatment, you will be asked to sign a consent form.

This guide will explain:

- Why radiotherapy is given
- What radiotherapy is and how it helps treat lung cancer
- What to expect during the planning stage of your treatment
- What to expect when you have your radiotherapy sessions
- The possible side effects during and after treatment and how they can best be managed
- Follow-up after radiotherapy treatment finishes
- Answers to frequently-asked questions
- Details of who you can contact for advice and support

Why is radiotherapy given

Radiotherapy is an alternative treatment to surgery for lung cancer which is not operable and the aim is to either cure or control the cancer. Radiotherapy is also given after surgery if a tumour has not been completely removed. This usually means when tumour cells are found close to the edge of the tumour that has been removed.

Radiotherapy and how it helps treat your cancer

Radiotherapy is the treatment of cancer using high energy x-rays (radiation). It is given from outside the body by a machine called a linear accelerator. It accurately delivers radiation to the area requiring treatment. By giving a patient radiation in small individual doses (fractions), over a number of days and aimed precisely at the tumour, radiotherapy treatment will destroy cancer cells while doing as little harm as possible to normal cells. Treatment takes approximately 10 minutes and is completely painless.

The aim of this treatment is to control the lung cancer and hopefully cure it. In some people, the lung cancer stays the same size and becomes dormant and in others it may shrink.

The cancer doctor, usually called a clinical or radiation oncologist, is the person who is responsible for prescribing and supervising your course of treatment. The radiographer and radiotherapy assistant are the people who operate the radiotherapy machines and deliver your treatment.



Radiotherapy is usually given as out-patient treatment through a series of short daily sessions for between four and six weeks Monday to Friday. It is generally given in 20 or 30 daily fractions. Very occasionally, some people may need to stay as in-patients during part of their treatment and this generally only happens if they cannot attend daily or become unwell.

Radiotherapy and chemotherapy

In the treatment of lung cancer, chemotherapy can be used at the same time as radiotherapy. If this applies to you, it will be discussed in detail by your cancer doctor. Chemotherapy is usually given the same day as radiotherapy, before the radiotherapy treatment as a 'Day Case' on one of the wards at Clatterbridge Cancer Centre - Wirral. Generally, people do not stay in the hospital overnight. The details will be discussed with you.

The planning stage of your radiotherapy

To deliver the radiotherapy treatment accurately to the tumour needs preparation which is described as radiotherapy planning. It involves a CT scan, followed by a process called 'computer planning' which is carried out by the planning team at the hospital and does not need your presence.

Getting to your planning session

Before you begin actual radiotherapy treatment, you will be asked to come as an out-patient for a planning session at Clatterbridge Cancer Centre - Wirral. The planning session will not make you feel tired or unwell, but many people like to come with a family

member or friend for support. The appointment will last about an hour in total and after the planning session you will be able to return home.

Please refer to the information leaflet 'About The Clatterbridge Cancer Centre' for details of transport arrangements available.



Radiotherapy planning

Radiotherapy planning involves a CT scan of the chest, as you will have had previously. The CT scan is taken in the same position as you will be in for the actual radiotherapy treatment and is necessary to work out exactly how and where to give radiotherapy. It is used by the radiotherapy team to prepare the treatment plan.

Planning CT scan

You will be taken to the room with the CT scanner, where you will spend 15-20 minutes. You will have a private space to remove clothing and jewellery from your waist up to your chin.

Sometimes, an intravenous injection is given during the scan. We will discuss this with you, if it applies to you. This is a contrast dye, which allows blood vessels to be seen more clearly on the CT scan to help the cancer doctor plan the treatment. If you are going to have contrast dye, you will be cannulated before you go on the scanner - a little needle will be inserted into a vein in your arm in



preparation for the dye to be injected. It is important to inform the radiographer if you have had a reaction to IV contrast previously.

You will be asked to lie on the 'couch' part of the CT scanner with your arms above your head. This couch, which looks more like a narrow table than a couch, has a hard surface, but most people don't find it particularly uncomfortable. Because the treatment delivery is very precise, it is important for you to be comfortable and to try to keep as still as possible. For this reason, there are rests for your knees and elbows and a bar for you to hold on to. Very occasionally, an "immobilisation cast" is required, depending on where in the lung is being treated. This ensures that your shoulders and neck are kept in the correct position during treatment. A cast is a form of plastic netting which can be stretched over your upper chest and neck when warm and then hardens when it cools down.

A breathing monitoring device may also be used to give a 4D (four-dimensional) CT scan. It's called 4D because the scan can determine the position of the tumour over time (with breathing). If you require a 4D scan, a small box will be placed on your chest when you are scanned and this monitors breathing motion. After the scan, the radiographers will need to put up to four tiny dots on your skin using a felt-tip pen. At the end of the planning session, your permission will be asked to make these marks permanent by tattooing very small dots. These tattoo dots are used during treatment to ensure that you are in exactly the same position every day. As felt-tip pen marks can smudge and wash

off, we recommend permanent marks so you can wash normally before and during the treatment.

A member of our booking desk team will contact you within three working days of having your scan to arrange your first radiotherapy appointment. You will receive the remainder of the appointments on your first day of treatment.

Your radiotherapy will not start for about 10 days after the planning appointment. There is no need to worry that your tumour will change significantly during this time. A gap between the planning stage and actual treatment is normal and will not be to your disadvantage.

If you have been given the contrast dye injection, you will be asked to wait about 30 minutes after the scan in the waiting area. This will be discussed with you before we administer the injection.

Your radiotherapy sessions

Your radiotherapy treatment will be either at Clatterbridge Cancer Centre - Wirral in the same building where you went for planning or at Clatterbridge Cancer Centre - Aintree. The treatment will be daily on weekdays and appointments are for 15 minutes. Please be prepared to spend somewhere between ½ and 1 hour in the hospital each day.

At your first treatment session, we will explain the process and tell you if there is anything you need to do or to know before you come into the treatment room. You can ask us any questions at this point or raise any matter you need to discuss.



For treatment, you will lie in the same position as you were in for your planning session. Although you will be asked to undress the upper part of your body before treatment, once you are on the treatment couch we will cover you up as much as possible.

We usually dim the lights in the treatment room while getting you into position. This can take a few minutes and the radiographers often need to talk to each other, rather than to you, to ensure you are in the correct and safe position. They often use technical words or abbreviations at this point. Please try to lie still and relax. If you have any questions about the words used, please do not hesitate to ask your radiographers.

If you have permanent marks from your pre-treatment planning on your skin, the radiographers may also mark the skin with a felt tip pen. These pen marks are only required at the time of the treatment and can be removed with gentle washing if you wish to remove them.

When the radiographers have finished setting up, they leave the room to switch on the treatment machine. When they are outside the room the radiographers need to confirm the details of your treatment, so it is usual to have a short delay before the machine is switched on.

Often before starting the actual treatment we take a scan using the treatment machine. This scan is a cone beam CT and is used to check the position of the area being treated before the machine is turned on. All you will see is the machine rotating around you and making a buzzing noise. The cone beam CT scans then take a few minutes to analyse and it may be necessary to adjust the position

of the treatment couch. At this point, you may feel the couch being moved a little.

The linear accelerator will then be turned on to give the radiation treatment. It will be delivered either from a number of different

directions or as it rotates around you. The machine will make a noise as it moves around you, and beeps will be heard when the radiation is being delivered. You will not feel anything during the treatment.

Throughout the treatment, the radiographers watch you through closed-circuit television and can hear and see you at all times.

When the treatment session is over, a member of the team will come to help you get off the couch and take you to where you can get dressed. You will be free to leave the hospital as soon as the treatment is finished.

Treatment reviews

While you are having treatment, we generally check on how you are. This is done in regular weekly or two weekly treatment review appointments when you will be seen by a cancer doctor, radiographer or a specialist nurse. These reviews are held in a clinic



room in the radiotherapy department and will be scheduled for when you are coming to the hospital for a treatment session, so you won't need to make an additional visit. These appointments are to discuss any side effects that you may be experiencing, answer questions and ensure that you have all the medication you need.

Possible side effects

Side effects during and after treatment

Please be assured that many people experience few or no side effects. The reason for letting you know what may happen is not to frighten. It is just to be informed, so you understand if side effects happen how to deal with them.

Side effects may develop during treatment, but both the timing and how they appear vary from person to person. However, side effects may continue beyond treatment and some may peak up to two weeks after the completion of the radiotherapy before they start to improve.

Some side effects will be specific to the area of the body being treated, and some will be more general, such as feeling tired. We strongly advise you not to smoke during radiotherapy treatment as it may reduce its effectiveness and may make side effects more likely and they can be more severe.

Here is a list of the possible side effects which you may experience during and shortly after treatment, and how to deal with them.

Possible side effects	Advice
Discomfort in the treatment area	This is generally mild. Your cancer doctor, nurse or radiographer may give you painkillers, if necessary.
Discomfort when swallowing (dysphagia)	If the cancer is close to the oesophagus (food pipe or gullet), after you've received about half of your radiation treatment that area may become inflamed, and this sometimes makes swallowing a bit difficult and uncomfortable. The cancer doctor, nurse or radiographer can prescribe soothing liquid medicine to help as well as nutritional drinks if eating is a problem. It's best to avoid spicy or hot food, smoking and alcohol during treatment. It also helps to have softer foods with liquid such as sauces and gravies. The problem usually gets better within a week or two after the radiotherapy treatment is complete. Please refer to our 'eating well and coping with side effects' leaflet.
Tiredness	This often starts during treatment and may continue for up to six to eight weeks after the end of treatment. Feeling tired is more usual and tends to be worse if you're also having chemotherapy. Give yourself plenty of rest. However, remaining active can help with the tiredness. Try to include things that you enjoy, no matter how simple the activity.



Skin reactions

It is possible you may have a skin reaction on the area of your body being treated, and your skin could become slightly red and sore or itchy. If this happens, it will be after about 10 days of starting radiotherapy. Your radiographer will give you Aquamax cream to help your skin stay moisturised and avoid becoming dry. Any skin reaction to radiotherapy will usually settle down 2-4 weeks after the treatment has finished, but the area may stay slightly darker than the surrounding skin. If the skin is uncomfortable, try wearing loose fitting clothes in the treatment area.

During treatment, you can continue to bathe or shower as normal, but do not have the water too hot, and pat the treated area dry with a soft towel rather than rubbing it. Avoid strong soaps, perfumes and lotions (apart from Aquamax cream) on the treated area.

You may notice some hair loss in the treated area. This should start to return once radiotherapy has been completed.

After treatment, you will need to protect the skin in the treated area from strong sunshine for at least a year. Once any skin reaction has settled down, you should use a sunscreen with a high sun protection factor (SPF) of at least 30.

You can usually go swimming once any skin reaction has settled down. Remember to use a waterproof sunscreen if you're swimming outdoors.

Breathlessness and coughing

Radiation may cause inflammation of the lung (pneumonitis) during treatment and you could experience symptoms of breathlessness and a dry cough. If this happens, let the doctor or radiographer know as steroids can be given to treat these symptoms.

You may produce more phlegm (sputum) during treatment. If the phlegm is thick and yellow/green, it may indicate you have a chest infection not related to treatment and you may need treatment with antibiotics. Please mention this when you come for treatment and we can arrange for you to see one of the radiotherapy doctors.

The radiotherapy treatment always gives some radiation to normal lung. Although the radiation dose to the normal lung is kept as low as possible, the lung cannot be avoided and sometimes it may cause damage to the lungs. This can appear 1-3 months after finishing treatment. It is sometimes difficult to distinguish the effect of radiation on the lungs from other lung conditions such as exacerbation of COPD and therefore, if your breathing gets worse, it is important to see your GP or come to our clinic.

Other side effects

Depending on the area treated, there may be some risk of rarer side effects. If this is a possibility, your cancer doctor will identify this prior to starting treatment and will discuss it in detail with you as part of the consent process



Long-term side effects a few months after radiotherapy

Although rare, radiotherapy for lung cancer can cause long-term side effects such as inflammation or hardening and thickening (fibrosis) of the lungs. This can cause symptoms such as shortness of breath and a cough.

The oesophagus (food pipe or gullet) may also be affected and become narrower, making swallowing difficult; this can be treated. Very rarely the inflammation of the oesophagus may lead to the development of a small hole (fistula) which would need repair.

These long term side effects can take months or even years to develop.

Please seek medical advice if you develop any symptoms by contacting your Clinical Nurse Specialist or your cancer doctor via their secretary.

Follow-up after the course of radiotherapy treatment

Following completion of radiotherapy, generally 4-6 weeks later, you will be seen by your cancer doctor to discuss what happens next.



The effect of the treatment you received takes some time to show and it is important to allow enough time before checking how successful the treatment has been.

Frequently-asked questions

Question	Answer
Can I eat and drink before my CT scan and radiotherapy treatments?	Yes, you can eat and drink normally both before and after your CT scan and radiotherapy treatments.
Will I be well enough to get to my radiotherapy sessions by myself?	Many people like to have a family or friend with them when they receive radiotherapy although they cannot come into the actual treatment room. The radiotherapy session will not make you feel any better or worse than you felt immediately before it, so it's possible for you to come by yourself. If you feel tired, please don't drive to your appointment. If you are using your own transport, you may wish to have a friend or family member with you for company and they will be most welcome. If you are using hospital transport, an escort can be arranged for the days you are seen in clinic.
Am I radioactive after having radiotherapy?	Radiotherapy does not make you radioactive, so it is safe to be with anyone, including pregnant women, children and babies.



Will I be able to continue working during my radiotherapy sessions?

Not everyone feels tired during radiotherapy treatments – or after they have been completed – but many people do. This means that although some people want to continue working and are able to, others need to take time off work. A certificate (sick note) can be issued if you need to provide one for your employers. If you feel you would like to continue working, and feel able to, you can.

Will I be able to wear my glasses/contact lenses, and keep my hearing aid and/or dentures in while having my CT scan and radiotherapy sessions?

In general, yes, you can - none of these need to be removed.
If you are having an immobilisation cast made, glasses, dentures and hearing aids may occasionally need to be removed and this will be discussed at the time of the planning CT scan.

Do I need to take off all items of jewellery during my CT scan and radiotherapy sessions?

Only jewellery on the body below the chin and above the waist needs to be removed. Watches, bracelets and earrings do not need to be removed.

I know someone who started their radiotherapy only a few days after their CT scan. Why am I having to wait longer? Is this a good or bad sign?

Everyone has their own treatment plan for their own particular tumour. It's best not to compare yourself with anyone else because their tumour is different so their plan will be different from yours.

Who to contact for advice and support

Whenever you come to the hospital, there will be opportunities to talk to a member of staff. The Lung Cancer Clinical Nurse Specialist (CNS) is based at Clatterbridge Cancer Centre - Wirral to ensure that patients and/or carers who have a diagnosis of lung cancer have access to written and verbal information on all issues surrounding the management of lung cancer, advice on treatment options, psychological support and symptom management.

Are you a smoker?

If so, you should be aware that there is evidence that side effects are worse if you smoke. We can support you in giving up smoking; please ask your treatment team or speak to the staff in PharmaC, located on the ground floor at Clatterbridge Cancer Centre - Wirral, for more information.



Additional information

The Clatterbridge Cancer Centre NHS Foundation Trust

www.clatterbridgecc.nhs.uk

telephone: 0151 556 5000

Lung Cancer Clinical Nurse Specialist (CNS) based at Clatterbridge Cancer Centre - Wirral

Tel: 0151 556 5346



If you have any questions before starting your treatment, please contact the Information and Support Radiographer at Clatterbridge Cancer Centre - Wirral, Monday to Friday (9am - 5pm) on 0151 556 5314.

The Clatterbridge Cancer Centre Hotline 0800 169 5555

If you are unwell during or up to 8 weeks following your cancer treatment please call The Clatterbridge Cancer Centre Hotline.

Your call will be answered by a dedicated nurse advisor. This line is available 24 hours a day, 7 days a week.

You and/or your carers may find it useful to talk to others who have been treated for lung cancer by contacting a support group. Contact the local Macmillan Cancer Support or the Roy Castle Lung Cancer Foundation for details. Alternatively, if you are familiar with using the internet, there are lots of cancer charities that have online communities.

If you need advice regarding financial issues, we can arrange for you to see our Macmillan Welfare Benefits advisor.

Macmillan Cancer Support

www.macmillan.org.uk telephone 0808 808 0000

Macmillan Cancer Information and Support at:

Clatterbridge Cancer Centre - Wirral 0151 556 5570

Clatterbridge Cancer Centre - Aintree 0151 556 5959

How we produce our information

All of our leaflets are produced by staff at The Clatterbridge Cancer Centre and this information is not sponsored or influenced in any way. Every effort is made to ensure that the information included in this leaflet is accurate and complete and we hope that it will add to any professional advice you have had. All our leaflets are evidence based where appropriate and they are regularly reviewed and updated. If you are concerned about your health in any way, you should consult your healthcare team.

We rely on a number of sources to gather evidence for our information. All of our information is in line with accepted national or international guidelines where possible. Where no guidelines exist, we rely on other reliable sources such as systematic reviews, published clinical trials data or a consensus review of experts. We also use medical textbooks, journals and government publications.

References for this leaflet can be obtained by telephoning 0151 556 5570.

If you need this leaflet in large print, Braille, audio or different language, please call 0151 556 5570.

If you have a comment, concern, compliment or complaint, please call 0151 556 5203.

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