

# Total body irradiation

This factsheet gives information on total body irradiation. This is a radiation treatment that you have been advised to have as part of your conditioning treatment before your stem cell or bone marrow transplant. There are many different types of radiation treatments, but this factsheet only discusses total body irradiation (TBI). If you have any queries or concerns, call the National Cancer Helpline on 1800 200 700 or speak to your cancer doctor or nurse.

### What is radiotherapy?

Radiotherapy is the use of high-energy X-rays to treat cancer. These high-energy rays come from a machine called a linear accelerator and can damage and destroy cancer cells within the area being treated. Radiotherapy also affects normal cells in the area being treated, but these cells can usually recover better than cancer cells.

### What is total body irradiation?

Total body irradiation is radiotherapy to your whole body. By giving radiotherapy to your entire body, you are being prepared to receive a stem cell or bone marrow transplant. The radiotherapy does this in several ways:

- It kills any cancer cells that may be left behind in your body after your chemotherapy.
- It gets rid of your bone marrow, which makes space for the transplanted cells.
- It suppresses your immune system, which prevents your body rejecting the donated stem cells.

### Where is total body irradiation given?

The treatment is given in a radiotherapy department by radiation therapists. Your dose will be prescribed by a team of doctors and specialists. In most cases, you will have to stay in the hospital as an inpatient and be taken to the radiotherapy department. The number of treatments you need will depend on the type of cancer that you have. It may be given as a single dose or as 6-8 smaller doses.

## What happens before I receive total body irradiation?

Before you receive any treatment, you will attend the radiotherapy department for a planning appointment. This is called simulation. A special X-ray machine called a simulator is used to plan your treatment. You will have to lie still on a hard table in a room with machines above you. This may be uncomfortable but does not hurt.

Your planning session can last up to an hour. During this time you will need to lie very still while a doctor and radiation therapist take some X-rays and measurements. CT scans may also be taken to plan your treatment. The radiation specialist then calculates the exact amount of radiation that you are to receive, while also protecting your important organs. Your doctor will explain your treatment, so do ask as many questions as you like.

## Getting total body irradiation

Your treatment may be given as a single dose or as 6-8 smaller doses. The number of doses may depend on the type of cancer you have, but your doctor will discuss this with you. During the treatment, you will have to lie still in the same position you were in on your first visit. You will be alone in the treatment room but the radiation therapists will watch you from outside on a TV monitor and can talk to you. It may be helpful to bring some music with you so that you do not hear the machines working. You do not have to undress if you wear light, loose clothing with no metal clips or buttons. A pair of pyjamas or tracksuit bottoms and t-shirt would be suitable.



## What are the side-effects of total body irradiation?

Radiotherapy affects cancer cells but also the normal tissue nearby. This can lead to side-effects. The chemotherapy drugs that are used in your conditioning regime can also cause similar effects. These can be divided into early or acute side-effects, which occur within a few hours of treatment, and late or long-term side-effects, which develop years after treatment. It is difficult to know in advance what side-effects may occur, as every patient is different.

### *Early, acute side-effects*

**Nausea and vomiting:** You may have experienced nausea and vomiting before due to chemotherapy. Generally, nausea from radiotherapy is milder than that caused by

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chemotherapy. You will be given anti-sickness medication before your treatment. If you do get nausea or vomiting, let your nurse know.

**Parotitis (inflammation of your salivary glands):** Your salivary glands are located in your upper neck and also known as your parotid glands. These glands can become inflamed after radiotherapy. The swelling of these glands in turn can cause stiffness in your jaw and some discomfort. It can be treated with painkillers and usually settles down quickly.

**Dry, sore mouth:** As your salivary glands make most of your saliva, you may find that you have a very dry mouth. This can begin 2 to 3 days into your treatment and can last a number of weeks. This can often make eating uncomfortable. It may help to drink fluids regularly and practise good mouth care. You may need to be prescribed artificial saliva by your doctor as well.

Radiotherapy and chemotherapy can also cause your mouth to get sore. This is called mucositis. Again good mouth care is important. You will be advised to clean your mouth with a soft toothbrush and use mouthwashes regularly.

**Skin redness:** Your skin may become red, dry, itchy and sore due to radiotherapy. This usually does not last long and is mild. You will be advised to try and reduce this by:

- Washing your skin gently
- Using a non-perfumed soap
- Using tepid warm water
- Patting your skin dry
- Using a mild non-perfumed moisturiser

**Diarrhoea:** Diarrhoea is a distressing symptom that can start within 48 hours of getting radiotherapy. Do tell your nurse if you are having diarrhoea. Medications may be given to stop it, if there is no infection present. You will be encouraged to keep your anal area clean and dry, as it can get sore at this time.

**Hair loss (alopecia):** If you have had chemotherapy, more than likely you will already have lost your hair. If you have a full head of hair before treatment, you will get some hair loss about 2-3 weeks after your radiotherapy is finished. You may find our factsheet on hair loss helpful. Please call the National Cancer Helpline on 1800 200 700 for more information on hair loss.

**Fatigue:** Fatigue is a side-effect of both chemotherapy and radiotherapy. You will find that you have less energy and are extremely tired after your treatment. You may find our booklet *Coping with Fatigue* helpful. Please contact the National Cancer Helpline on 1800 200 700 for a free copy.

**Risk of infection:** Your immune system is affected by chemotherapy and radiotherapy, which makes you more prone to picking up infections. After treatment, you will be nursed in a single room and observed very closely for any signs of infection. These will be treated immediately. You will be given more information on infection control by your nurse.

### ***Late, long-term side-effects***

**Sleepiness:** Sleepiness or somnolence is where you feel very drowsy, tired and need to sleep

constantly. This happens about 6 weeks after you have completed your treatment and may last from 2 to 6 weeks. It can be upsetting but it will pass.

**Cataracts:** Cataracts are a complication of total body irradiation. They can occur 6 months to 5 years after treatment. They can be corrected with small surgery to remove the cloudy film that develops over the lens of your eye.

**Pneumonitis:** This is inflammation of your lung tissue. Because your lungs are shielded during the radiotherapy, this side-effect is uncommon. It can occur from 6 weeks to 6 months after your treatment. You may experience a cough and shortness of breath at first. It is important to let your doctor know if these symptoms occur.

**Hormone problems:** A small gland called the pituitary gland is found within your brain. It controls many hormones in your body, such as growth hormones. These hormones affect muscle and bone strength. The pituitary gland is very sensitive to radiotherapy and, if treatment is given at a young age, it may affect future growth. However, as an adult, it is unlikely to affect your growth. This hormone will be checked by a blood test regularly.

Your thyroid gland is situated in your neck and also makes a hormone that helps with your body's metabolism. This hormone is called thyroxine. The thyroid gland can be affected by radiotherapy and become underactive as a result. You may then gain weight and feel that you have less energy. During your regular check-ups, blood tests will be taken to measure this hormone.

**Heart problems:** As your heart will receive some radiotherapy, you might have some heart problems in the future. Some chemotherapy drugs that you receive might also affect your heart.

**Infertility:** The testicles and ovaries receive radiotherapy during total body irradiation. The chemotherapy drugs used when preparing for your stem cell or bone marrow transplant will also affect them. Sadly, this will lead to permanent infertility. Do discuss this with your doctor before your treatment.

**Second malignancy:** People can have more than one cancer in their lifetime and these are not all caused by cancer treatments. However, the high doses of radiation and chemotherapy used before your transplant can cause a second cancer later in life. These cancers can include skin, mouth or lung.

### **How can I cope with total body irradiation treatment?**

When having treatment, it is common to feel upset, frightened or have difficulty adjusting to what is happening to you. If you are feeling low, tired, anxious or tearful at any point during or after your treatment, remember that you are not alone. There are many people who can help you. Try to let other people know how you feel, particularly your family and friends, so that they can support you.

It can help to discuss your feelings or worries with your nurse or medical social worker. A counsellor or the psycho-oncology team might also be helpful if you want to talk through your feelings in more depth over a period of time.

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### Useful websites

**Macmillan Cancer Support UK**  
[www.macmillan.org](http://www.macmillan.org)

**Cancer Research UK**  
[www.cancerhelp.org](http://www.cancerhelp.org)

**Cancer.Net**  
[www.cancer.net](http://www.cancer.net)

**Mayo Clinic**  
[www.mayoclinic.com](http://www.mayoclinic.com)

### FURTHER INFORMATION

For more information on total body irradiation or about cancer in general, call the National Cancer Helpline Freephone

**1800 200 700**

(Monday–Thursday, 9am–7pm; Friday 9am–5pm)  
or email [helpline@irishcancer.ie](mailto:helpline@irishcancer.ie) for confidential advice from our cancer nurse specialists.

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