



## Radiotherapy and its physics

### *Radiotherapy Practises Introduction Part One*

#### **Paul Rogers, Oncologist**

One in three people really will develop cancer, so most of us won't have to face it ourselves but it will affect one of our family, and having said that probably about one in four people will die from, from cancer. So these days with the aging population it is more likely that as we don't die from others things we may develop a form of cancer and there are various screening programmes that are active in the UK and are about to become active, looking at picking up cancers earlier, so many of our treatments in fact are not looking at treating cancers when they are quite late in a palliative non curative way, but treating them earlier in a curative way.

#### **Andrew Doggart**

My name is Andrew Doggart and I'm a radiotherapy physicist here at the Berkshire cancer centre. Radiotherapy may be defined as the management of malignant disease by the use of ionising radiation and in this tutorial you're going to see how different members of the team including oncologist, physicists and radiographers work together so that a patient can be treated using radiotherapy in a safe and effective manner. \_You've already seen Clinical Oncologist Paul Rogers. Here is Gill Wyatt one of our Therapy Radiographers. She plans treatment and treats cancer patients using high-energy X rays. \_Paul Whittard is head of the Radiotherapy physics section which provides the physics and technical support to the radiotherapy service.\_ Kim Hare is the Mould Room Technician responsible for making the equipment necessary for immobilising patients during radiotherapy treatment. \_You can hear more from these members of staff by clicking the link buttons.

Now let's go back to Paul Rogers for more background information on cancer treatment.

#### **Paul Rogers**

When someone comes with a diagnosis of cancer the first thing to do really is to stage the cancer, to find out really how best to treat it, and by stage I mean to find out whether the cancer is confined to one particular spot or whether it has spread in the different ways that it can do. And cancer can spread in one of two ways; either via lymphatic's to various lymph nodes usually adjacent to the primary tumour or via the blood, when a cancer may have metastasised to other parts of the body the lung, the liver, the bones or the brain. And these days generally speaking we perform a CT scan to assess that and maybe a bone scan as well. And once one has ascertained whether the cancer is confined then you know how best to treat the cancer. And there are three different modalities for treating cancer really. One is surgery, one is chemotherapy and the other is radiotherapy. Surgery and radiotherapy are the two local measures, they treat just where you are cutting or shining the X rays and those have the best chance of cure of cancers. Chemotherapy is a systemic treatment that goes round the whole body and therefore can either treat things once they have spread or help to prevent things from coming back elsewhere, so chemotherapy is generally not a curative thing up front, although it is for some tumours, and therefore the first and best treatment is usually surgery and then radiotherapy is the second best option as a general rule for curing cancers. Having said that there are some cancers where one would want to use radiotherapy in preference to surgery. For example, if someone has a tumour of the larynx, the voice box, to remove one's voice box has a big impact on life, obviously and communicating with the world, therefore if one can treat that with radiotherapy and preserve the organ, preserve the voice box, clearly that's preferable. And in early laryngeal cancer the cure rates from radiotherapy are ninety five percent so they're very, very good, as good as surgery. And other areas that are, if you like, equally as effective as surgery and therefore beneficial and organ sparing, would be prostate cancer, bladder cancer, to name some of the pelvic tumours and there is also a role in breast cancer, where you can remove perhaps a smaller amount of breast tissue. Gone are the days now where we have to remove the whole breast with a small breast cancer. You can remove the lump and then give some

postoperative radiotherapy to the breast to help prevent a recurrence in the breast. So the two do go together as well. Sometimes it is quite clear when, what treatment to advise patients to have, for example, one would advise radiotherapy to the voice box, the larynx, if one had an early laryngeal cancer, however, when you have a prostate cancer for example, which is one of the tumours I particularly treat, the patients do have a choice and sometimes its very hard to know the right treatment option for them. Some patients will know that in their own mind, if they've got a cancer they will want it out of their body and they will not be happy until it's gone, and those patients will generally choose surgery. For others the idea of major surgery and being off work for six weeks might be just too much or too intrusive particularly if it's a very, very early prostate cancer that was found almost by chance and is causing no symptoms and for them the idea of radiotherapy in one of the different forms of radiotherapy that we can give is a far more preferable option, so they don't have to take time of work or interrupt their lifestyles.