What Is Total Body Irradiation?
Radiation therapy uses high-energy rays (called x-rays) to help fight certain cancers. When radiation is given to the whole body, it is called total body irradiation (TBI). You cannot see, smell, or feel radiation, but you can hear the machine during treatment.

Why Is TBI Used?
TBI is part of the treatment in bone marrow and stem cell transplants. TBI can kill cancer cells. TBI can also weaken the immune system. This helps people who receive bone marrow or stem cells donated from someone else. The body does not reject these cells when the immune system is weaker.

How Is TBI Given?
TBI is given in a special room at Huntsman Cancer Institute (HCI). When the machine is on, only the person being treated may be in the room. The controls for the machine are outside the treatment room. Your doctors can see and hear you during your treatment with a camera and intercom system.

What Happens During TBI?
During TBI, you will either stand or straddle a padded device. Straps will be placed across your chest and abdomen so you will be secure. For the first half of the treatment, you will face the machine. For the second half of the treatment, your back will be turned toward the machine.

Lungs are sensitive to the effects of TBI. They cannot receive the same dose of radiation as the rest of the body. To protect the lungs, doctors place special shields made of thick metal in front of you during the treatment. If you move during the TBI, the lung shields will not protect the lungs; therefore, you should be very still during the treatment. Some people only need one TBI treatment. In this case, lung shields are not needed.

How Many Radiation Treatments Will Be Given?
Most people receive six or seven TBI treatments, but the number depends on the type of cancer you have, the type of transplant you receive, and your cancer care plan. Most often the treatments are given once a day. Sometimes they are given twice in one day, in the morning and the afternoon.

Before TBI
Meeting With the Doctor
Before your TBI treatments, you will meet with doctors at HCI. They will review your medical history and perform a physical exam. They will talk to you about the TBI and discuss possible side effects. If you agree with the treatment plan, you will be asked to sign a consent form. The visit takes about two hours.

What To Wear During TBI
• We suggest you wear sweat pants or pajama bottoms. The treatment room may be cold.
• We also suggest a gown or shirt that buttons. This helps your doctors see the chest and back to place the lung shield.
• Bring slippers to keep your feet warm.
• Do not wear any metal. This includes jewelry, glasses, and any metal on your clothing.

Treatment Planning (Simulation)
If you have more than one TBI, you will have a planning session called a simulation. This takes place in the Radiation Oncology clinic. Doctors will take x-rays of your back and chest to design special lung shields.

During simulation, small metal beads and rings will be taped to your skin as markers. The markers help your doctors properly place the shields. The simulation takes about 15-30 minutes. If you have only one TBI treatment, you will not have a simulation since lung shields are not necessary for one treatment.
Scheduling

The Blood and Marrow Transplant (BMT) team will make a schedule with the dates for admission, dates to give TBI, dates for chemotherapy, and dates for the re-infusion of the bone marrow or stem cells. Your oncology doctors will give TBI treatments according to this schedule.

TBI Treatments

The first TBI treatment takes the longest. On average you will be in the TBI room for an hour. Before the TBI begins, the staff will position you, check measurements, and adjust the lung shields. After the lung shields are placed, doctors take an x-ray to make sure they are placed correctly. (This will not happen if you have only one TBI treatment.)

Once everything is ready, all other people will leave the room and the radiation machine will be turned on. Most often, the front side is treated first. It takes about 20 minutes for each side. You can rest in a chair for a few minutes between sides.

Since the treatments are long, you may want to bring music or a DVD to pass the time. If you feel sick, tired, or need to use the bathroom, the treatment can stop at any time. Wave your hand and the radiation therapist will stop the machine at once and tend to your needs. Once you are ready to continue, the therapist will reposition you, adjust the lung shields, and restart the treatment.

When the TBI treatment is finished, you will go back to the BMT unit.

Side Effects of TBI During Treatment

Side effects can occur during the first TBI treatment. These include nausea, vomiting, diarrhea, fatigue, mouth sores, and mild suntan. Your nurses have drugs to help manage side effects. These symptoms will go away after TBI and chemotherapy treatments finish.

The effects of radiation on the skin depend on a number of factors:

- Number of treatments
- Total dose of radiation
- Prior sun exposure of the radiated skin
- Overall health

Radiation skin reactions occur gradually and may progress for a while after radiation treatments are complete. Most effects are temporary and resolve two to four weeks after radiation treatments end.

After a week or two of treatments, your skin will start to become dry. It may darken, turn pink to red, itch, or feel tender. You should take care of your skin from the first day of radiation, before you notice these changes.

Skin Care Guidelines

Here are some guidelines to help protect your skin:

- Wash skin gently with warm water. Do not scrub. Use your hand rather than a washcloth and pat dry with a soft towel.
- Use a mild soap that is free of perfumes or deodorants.
- Wear loose-fitting cotton clothes. Do not wear tight-fitting clothes that can cause friction.
- Avoid extreme heat or cold on the skin. Do not use heating pads, ice packs, or hot water bottles on the skin.
- Avoid exposing skin to the sun; it will be more sensitive. Use a PABA-free sunscreen with at least SPF 30 when outdoors, wear a wide-brimmed hat, and avoid tanning beds.
- Use only an electric razor if you shave.

The following suggestions can help you treat radiation skin reactions:

- Apply a moisturizing cream, lotion, gel, or oil to the skin. Choose products for sensitive skin, and avoid products with perfume or deodorant.
- If a product stings, stop using it.
- If your skin becomes tender or itchy, try using an over-the-counter one-percent hydrocortisone cream. If necessary, your health care provider may prescribe a steroid cream.

Short-Term Side Effects

After about two weeks, you will start to lose hair. It usually begins to grow back within three to six months after radiation treatment ends. Hair loss may be permanent and depends on the dose of radiation you receive.
Symptoms may go on after your last treatment. If you have questions or need help with a skin problem, ask your health care provider.

**Long-Term Side Effects**

TBI can cause side effects that may not show up for many years. These are called late effects. The most common late side effects are cataracts (clouding of the lens in the eye, which can affect vision) and hypothyroidism (low thyroid, which affects the body’s metabolism). TBI may also cause difficulties having future children. For more information about sexual health and fertility, contact the Robert B. and Linda B. Wiggins Wellness-Survivorship Center at 801-587-4585.

Your doctor will discuss each of these possible side effects so you will be aware of the long-term risks.