

Radiation Therapy

Radiation therapy (external beam radiation) is treatment with high-energy rays (or particles) that destroy cancer cells. Some women with breast cancer will need radiation, in addition to other treatments.

Depending on the stage of Breast Cancer and other factors, radiation therapy can be used in several situations:

- After a Lumpectomy, also known as breast-conserving surgery (BCS) to help lower the chance that the cancer will come back in the same breast or nearby lymph nodes.
- After a mastectomy, especially if the cancer was larger than 5 cm, if cancer is found in many lymph nodes, or if certain surgical margins, such as the skin or muscle, have cancer cells.
- **If cancer has spread to other parts of the body**, such as the bones, spinal cord, or brain.
- If you had a mastectomy and no lymph nodes had cancer cells, radiation will be focused on the chest wall, the mastectomy scar, and the places where any drains exited the body after surgery.
- If you had BCS, you will most likely have radiation to the entire breast (called **whole breast radiation**). An extra **boost** of radiation to the area in the breast where the cancer was removed is often given if there is a high risk of the cancer coming back. The boost is often given after the treatments to the whole breast have ended. It uses the same machine as the regular radiation.
- If cancer was found in the lymph nodes under the arm (axillary lymph nodes), this area may be given radiation, as well. Sometimes, the area treated might also include the nodes above the collarbone (supraclavicular lymph nodes) and the nodes beneath the breastbone in the center of the chest (internal mammary lymph nodes).

If you will need radiation therapy after surgery, it usually does not start until your surgery site has healed, which often takes a month or longer. If you are getting chemotherapy as well, radiation treatments are usually delayed until chemotherapy is done. Some treatments after surgery, like hormone therapy or HER2 targeted therapy, can be given at the same time as radiation.

Whole breast radiation

Radiation to the entire affected breast is called **whole breast radiation**.

- The standard schedule for getting whole breast radiation is 5 days a week (Monday through Friday) for about 6 to 7 weeks.
- Another option is **hypofractionated radiation therapy** where the radiation is also given to the whole breast, but in larger daily doses (Monday through Friday) using fewer treatments (typically for only 3 to 4 weeks). For women who have had breast-conserving surgery (BCS) and whose cancer has not spread to underarm lymph nodes, this schedule has been shown to be

just as good at keeping the cancer from coming back in the same breast as giving the radiation over longer periods of time. It might also lead to fewer short-term side effects.

Accelerated partial breast irradiation

After whole breast radiation or even after surgery alone, most breast cancers tend to come back very close to the area where the tumor was removed (tumor bed). For this reason, some doctors are using **accelerated partial breast irradiation** (APBI) in selected women to give larger doses over a shorter time to only one part of the breast (the tumor bed) compared to the entire breast (whole breast radiation). Since more research is needed to know if these newer methods will have the same long-term results as standard radiation, not all doctors use them. There are several variations on APBI, talk to your doctor if you have more questions and what is right for you.

Chest wall radiation

If you had a mastectomy and none of the lymph nodes had cancer, radiation will be given to the entire chest wall, the mastectomy scar, and the areas of any surgical drains. It is typically given every day, 5 days a week, for 6 weeks.

Lymph node radiation

Whether or not you have had BCS or a mastectomy, if cancer was found in the lymph nodes under the arm (axillary lymph nodes), this area may be given radiation. In certain cases, the lymph nodes above the collarbone (supraclavicular lymph nodes) and behind the breastbone in the center of the chest (internal mammary lymph nodes) will also get radiation along with the underarm nodes. It is typically given daily 5 days a week for 6 weeks at the same time as the radiation to the breast or chest wall is given.

Possible side effects of external beam radiation

The main short-term side effects of external beam radiation therapy to the breast are:

- Swelling in the breast
- Skin changes in the treated area similar to a sunburn (redness, skin peeling, darkening of the skin) Your health care team may advise you to avoid exposing the treated skin to the sun because it could make the skin changes worse. Most skin changes get better within a few months. Changes to the breast tissue usually go away in 6 to 12 months, but it can take longer.
- Fatigue

Long term side effects can include:

- Some women may find that radiation therapy causes the breast to become smaller and the skin to become firmer or swollen.

- Radiation may affect your options for breast reconstruction later. It can also raise the risk of problems with appearance and healing if it's given after reconstruction, especially tissue flap procedures.
- Women who have had breast radiation may not be able to breastfeed from the radiated breast.
- Radiation to the breast can sometimes damage some of the nerves to the arm.
- Radiation to the underarm lymph nodes might cause lymphedema.
- In rare cases, radiation therapy may weaken the ribs, which could lead to a fracture.

Brachytherapy

Brachytherapy, also known as **internal radiation**, is another way to deliver radiation therapy. Instead of aiming radiation beams from outside the body, a device containing radioactive seeds or pellets is placed into the breast tissue for a short time in the area where the cancer had been removed (tumor bed).

For certain women who had breast-conserving surgery (BCS), brachytherapy can be used by itself (instead of radiation to the whole breast) as a form of accelerated partial breast irradiation. Tumor size, location, and other factors may limit who can get brachytherapy.