

Chapter 6. Radiation Oncology

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The major two radiation options are external beam radiation therapy (EBRT) and brachytherapy. The decision as to which to use is dependent on a host of factors including the PSA, Gleason score, extent of disease, size of the prostate, current urinary symptoms, age of the patient, concurrent medical conditions and patient preference. In some situations, the treatment may include a combination of the two approaches.

EBRT is not a surgical procedure. There is risk of external radiation damage to the healthy tissue that is exposed to the radiation. Side effects that may occur during the radiation period include fatigue, skin redness in the treated areas, frequent and burning urination, diarrhea and rectal irritation or bleeding. These effects disappear soon after the radiation is complete.

When compared to radical prostatectomy, the risk of impotence is lower in the short term but as time goes on, there is a greater development of impotence. The incidence of incontinence is less with radiation than with radical prostatectomy, but during the radiation there can be a temporary increase in the sense of urgency and a decrease in the ability to control urination.

Brachytherapy is the other primary means of delivering radiation therapy. It is a popular option because the permanent seeds or the high dose rate (HDR) radiation source produce radiation only in a strictly confined region. Therefore relatively little radiation reaches or damages the surrounding healthy tissue or organs.

The following was taken from PAMF's prostate cancer Web site:
www.pamf.org/prostate/treatment/rad_treatment.html

Radiation Treatment

Initial Consultation

The initial consultation allows the radiation oncologist to get to know you and perform a physical exam. In addition, you may ask any questions that have not already been answered. At the consultation, the various treatment approaches will be discussed, and you may arrive at a decision about which treatment is best for you. Once the decision has been made, you will begin the treatment planning. This process will usually occur on another visit. Your written consent will be required to begin the treatment-planning process. A simulation session (acquisition of images needed to define the treatment target) will be scheduled if you decide that external beam radiation is the right option for you. In certain cases, a return visit to your urologist may be needed in order for the urologist to insert three gold markers into the prostate for targeting purposes. These markers are referred to as "fiducial marker seeds." The process of arranging and

scheduling external beam radiation will be discussed below.

Treatment Planning for External Beam Radiation

Treatment planning is a three-step process that usually takes about two weeks to complete.

1. Prostate Simulation

The simulation process provides your treatment team with the data to allow the construction of a highly individualized plan to treat your prostate cancer while minimizing the dose to normal adjacent structures. The process relies on a spiral computed tomography (CT) scanner to obtain a detailed digital dataset (images) of as many as 130 cross sections of the pelvic anatomy. This dataset is then used by your physicians to create a 3-D (virtual) model of the area to be treated, and requires about one week of planning time by the physics team.

The simulation is done for treatment-planning purposes only, and usually lasts for 45 minutes to one hour. In preparation for this simulation, you may be instructed to use a Fleet's enema prior to coming into the department in order to make sure that your rectum is empty. It is extremely important to lie as still as possible on the table because movement can alter measurements and increase simulation time. A cradle may be created to keep your legs comfortable and still during the procedure. This cradle or a similar immobilization device will be used daily for your treatment.

An urethrogram (image of the tube that allows passage of the urine from the bladder out through the prostate and then the penis) may be performed to help localize the prostate. Contrast solution is inserted into the penis and a temporary soft closure device is placed at the base of the penis to prevent the liquid from escaping during the CT. Patients may feel some pressure, but there usually is no associated pain. A small-caliber tube is also placed in the rectum to more clearly define the anatomy. Very rarely, patients will have some blood in their urine for a few days following the urethrogram. This will go away without treatment.

The CT scan is then performed with the contrast material in the urethra, bladder and rectum so that they can be properly identified on the images. Finally, three or four small black dots will be tattooed, one on each hip area and one or two in the pubic region. These permanent tattoos serve as landmarks for your upcoming radiation therapy. The tattoos aid in achieving accurate and consistent treatment set up during daily therapy. Some photographs will be taken for documentation purposes.

You should be able to drive to and from the simulation process. For the next two days, you should drink four to six glasses of water a day to minimize the risk of infection.

2. New-Patient Confirmation Films

You will be scheduled for a new patient time on the linear accelerator (the actual treatment machine). It takes approximately 30 minutes to take the X-rays confirming your treatment plan and position. Your actual radiation treatments will be started either the following day or the beginning of the next week.

*** Additional Films During Treatment**

Additional X-ray films are often taken during the course of treatment as part of planning procedures and to document the treatment.

Radiation Treatment

Radiation treatment for prostate cancer typically takes seven to nine weeks depending on the stage of disease. If a combination of external beam radiation and implant is used, the external beam radiation will take about five weeks. The implant may be done before or after the external radiation therapy. The interval between the implant and the external beam may vary, but it is usually scheduled two to six weeks apart in the case of permanent seeds. For high-dose rate (HDR) brachytherapy, the interval is usually about two weeks.

External beam radiation treatment is given Monday through Friday, except on holidays. The treatment takes about 15 minutes per day, and the radiation beam produced by the linear accelerator is only on for a few minutes. You will need to stay very still while the radiation is being administered. We request that you be treated with a full bladder, which will move some of the bladder out of the beam (also called the treatment field), potentially decreasing urinary side effects. You will not feel any discomfort from the actual beam.

In certain cases, your physician may have arranged for fiducial marker seeds to be placed in your prostate prior to the planning process. These markers are then visualized each day prior to your radiation treatment while you are on the linear accelerator. These seeds allow the therapists to see if there has been any motion of the prostate from day to day, and to aim the beams at the prostate with precision.

Regarding vitamins and supplements, avoid herbal supplements and high-dose antioxidants such as vitamin C, E, beta-carotene and selenium during radiation since these could theoretically interfere with the radiation's desired effect. However, a multivitamin (with no more than 100 percent of the RDA) and vitamins found in foods are OK. Spicy foods should also be avoided during radiation since these may cause rectal irritation.

One day each week, you will be asked to see one of our doctors after your treatment. This is an opportunity for the radiation oncologist to see how you are doing and for you to express any concerns or questions you may have. Friends, family or caregivers are welcome on this day if that is your preference. If there are problems, we are happy to see you any day of the week.

In general, side effects do not become apparent until about the second or third week of treatment. Most people can continue their daily activities, such as going to work and exercising, without any problems. The side effects of prostate radiation can be explained by the anatomy of the prostate in relation to other structures in close proximity. The prostate lies directly below the bladder and surrounds the urethra, which allows urine to pass from the bladder. The rectum is behind the prostate and the nerves that control

erections surround the prostate. Inflammation from radiation therapy affects these structures along with its therapeutic effect on cancer.

Below are some of the possible side effects of radiation.

Loose stools may occur in less than 5 percent of patients and almost always resolve after completing radiation. In general, we do not recommend significant change in your diet unless you notice a change in your bowel habits, although we do suggest you limit spicy foods. If the loose stools or diarrhea become a problem for you, we recommend decreasing dairy products and avoiding high-fiber foods such as fruits, vegetables and grains. If dehydration becomes an issue, increased fluid intake will help. For mild diarrhea that is bothering you and not helped dietary changes, you may take over-the-counter Imodium™. We also can prescribe a stronger anti-diarrhea medicine if needed.

Peri-anal skin irritation occurs in about 30 percent of patients but it is mild and self-limiting. A sample of a petroleum-based product called Aquaphor™ is usually supplied. Aquaphor may be applied after treatment and at night; however, do not apply up to three to four hours prior to treatment. It is prudent not to rub skin of the treatment area. We recommend that you avoid chlorinated swimming pools and hot tubs. The skin irritation usually heals completely after the treatment course is finished.

Proctitis is an inflammation of the rectum that causes some blood in the stools in approximately 5 to 10 percent of patients during and/or after treatment. It is usually mild, often related to pre-existing hemorrhoids and self-limiting. If this problem persists after radiation therapy, a consultation with a specialist may be scheduled to investigate the cause. About 1 to 2 percent of patients may require intervention if the symptoms persist.

Incontinence of urine and/or stool that is significant rarely occurs during or after radiation therapy.

Urinary changes that may occur acutely during radiation include increased urgency and frequency of urination, burning and trouble starting the stream (urinary hesitancy). If these become a problem, medications may be prescribed that will reduce the symptoms. These symptoms and the medicines are temporary. Rarely, there is blood in the urine that may become apparent after treatment. If it persists, an evaluation is indicated to be sure there is no other problem in the urinary system. If it does occur, it is usually also resolves completely.

Erectile dysfunction can either become apparent right away from hormonal treatment or appear several months later as an effect of radiation therapy. The risk of erectile dysfunction depends on your age, general medical condition, medications and your pre-treatment level of sexual functioning. In general, the risk of erectile dysfunction from radiation therapy alone is approximately 20 to 35 percent. Options for treatment are the same as described in the surgical section. They include medications and various kinds of assistance devices.

Semen volume will decrease or become absent at some period after radiation therapy because the prostate provides some of the fluid that comprises the ejaculate. If you are considering having children in the future, sperm banking is recommended prior to

undergoing treatment.

Fatigue may occur during the latter part of radiation, but it is usually not a significant problem for most patients. Usually, the tiredness will go away several weeks after treatment. Studies have shown that exercise during therapy results in less fatigue.

Uncommon complications of urinary blockage requiring a catheter or urethral stricture (urinary scar tissue) needing removal occur only rarely.

Follow-Up Care

After your radiation treatment, a follow-up appointment may be scheduled for you to be seen in four to six weeks. You may have a PSA test every four to six months. If possible, have your PSA test done one to two weeks prior to your follow-up appointments so the results are available ahead of time. PSA testing should be done at minimum intervals of every six months thereafter.

Brachytherapy

The two forms of brachytherapy performed for the treatment of prostate cancer are low-dose rate (permanent seed) and high-dose rate (HDR) brachytherapy.

Low-Dose Rate (LDR) Permanent Seed Brachytherapy

The implantation of permanent radioactive seeds in the prostate may be done either as the only treatment or it may be done in conjunction with a short course of external beam radiation. For patients who fall into the low risk group (PSA < 10, Gleason score \leq 6 and stage T1 or T2a (see page 16 for a review), seeds alone are usually considered sufficient treatment. Patients with more aggressive disease may require additional external beam radiation before the seeds.

In preparation for a seed implant, the patient first goes through a procedure called a trans-rectal ultrasound volume study. In order to do this study, the patient is instructed to take a low residue diet for two days and must perform an enema prior to the procedure. The patient is then brought into the outpatient clinic where he is placed in a similar position as the actual seed implant (on his back with his legs up in stirrups). No anesthesia is administered, although if the patient is anxious, a calming agent may be given orally. A urinary catheter will be placed into the penis, after cleaning the area and using a numbing jelly to ease any discomfort from the procedure. The rectal ultrasound probe, similar to the one that was used at the time of the biopsies of the prostate, is then inserted in the rectum, and images of the prostate are taken. No biopsy is performed. The procedure generally takes about 15 minutes. After the prostate pictures have been obtained, the probe and catheter are removed, and the patient goes home. The physician reviews the images, to determine the size and shape of the prostate and to make sure there is no interference of the pubic bone that would make the implant difficult to perform.

In cases where the prostate gland is very large or the opening under pubic bones is very narrow, the physician may decide that the prostate size has to be reduced before the

procedure can be performed. In that case, the patient will be given an injection of an agent called a LH-RH agonist, commonly referred to as “hormone therapy” or androgen deprivation. This treatment will temporarily drop the patient’s testosterone production, and allow the gland to shrink over the next several months. It will also cause the PSA to drop. The volume study will then be repeated in two to three months to see if there has been enough shrinkage to allow for an implant.

Once the prostate gland is the right size to allow for implant, the implant will be scheduled for an outpatient surgical procedure. The patient will come to the facility after once again having followed instructions regarding a specific diet and the use of enemas before the procedure. Either a general or a spinal anesthesia will be performed depending on the physician and patient preference. Once under anesthesia, the catheter and probe will be put back in place. The seed implant generally takes 30 to 60 minutes. About 20 to 30 very tiny needles will be inserted through the perineum (the space between the anus and scrotum) into the prostate under the guidance of both ultrasound and X-ray. This is done with extreme care to avoid the rectum, bladder and urethra.

As each implant needle is removed the tiny radiation sources (seeds) are left behind in the prostate. There are several different kinds of radiation sources, and they may be inserted with a special applicator (Mick), or they may be seeds embedded in strands of absorbable suture. These seeds are deposited throughout the prostate gland in an order determined by the physics plan based on the prior ultrasound volume study. The total number of implanted seeds ranges from 50 to 140. After the procedure is complete, the patient is observed in the postoperative recovery area, and the urinary catheter is removed. Once the patient can freely urinate, he is discharged home.

For the first four days, the patient is told to avoid heavy lifting so as to prevent bleeding. There is commonly some blood in the urine for the next several days, and there can be a painless black and blue (ecchymotic) area in the perineum, penis and scrotum that can last for a week or two. About four to seven days after the procedure, the patient will notice that his urinary stream may slow down and his urinary frequency may increase. If there is pain on urination, or if the stream decreases to the point of dribbling, the patient should call the physician immediately, since there is a small risk of blockage. Medications can be used to improve the urinary flow and occasionally the urinary catheter may need to be reinserted to let the inflammation resolve. These urinary side effects can last for several months after the procedure and are the result of the radiation effect. They usually decrease noticeably after one month.

For radiation safety purposes, the patient is instructed to keep young children off his lap for three months. He may have sexual intercourse but should use a condom for these three months in case one of the seeds comes out in the ejaculate. Sexual ability may be decreased for the first several months after the implant due to swelling associated with the implant, but there is no danger or risk in attempting to achieve an orgasm. The patient will be provided with documentation that he has a radioactive seed implant in case he is traveling and sets off a radiation monitor in any airport.

After three months, the radioactive seeds have lost most of their strength, and the swelling in the prostate goes down. At that point, the patient will begin having his PSA tested two to four times a year in follow-up.

HDR Brachytherapy

HDR can be used in combination with external beam or it can be given as the only treatment method (HDR monotherapy). The usual criteria for HDR monotherapy are PSA < 10, Gleason score 6 or 3+4 (not 4+3), and stage T1c or T2a (see page 16 for a review)). HDR may also be used as a salvage treatment for men whose cancers have recurred after radical prostatectomy, external beam or permanent seed implantation.

HDR brachytherapy is widely applicable and can be recommended under the following circumstances:

- As an alternative to radical prostatectomy, external beam or permanent seeds
- For any stage localized disease, stages T1 to T3b
- For cases with extra-capsular extension, seminal vesicle or perineural involvement
- With any PSA value with no evidence of metastatic disease
- With any Gleason score
- With prior transurethral resection of the prostate (TURP)
- For recurrent local disease after radical prostatectomy, external beam or permanent seed implants (salvage)

Procedure for HDR Brachytherapy

If the patient decides to proceed with HDR brachytherapy, a series of two implants will be scheduled one week apart. Arrangements for external beam radiation will be made in advance of the procedure, as needed. Prior to the implant, the patient will undergo orientation about the procedure and facilities, preoperative examination, and the needed preoperative clinical tests will be ordered. Written preoperative instructions and other information relevant to the procedure are provided in advance of the office visit.

On the day of the procedure, the patient goes to the operating room, where anesthesia is administered. Spinal anesthesia, which numbs the patient from the waist down and sedation are used the most often. The patient is positioned for the procedure with legs up in stirrups to provide access to the perineum (the space between the scrotum and anus).

The procedure is carried out under fluoroscopy, ultrasound, and cystoscopy (looking directly into the bladder with a scope) guidance. A template (a small thin plate) is used to guide the implant catheter into and around the prostate gland. The HDR technique is not limited by the pelvic anatomy or restricted to small prostate size. The implant catheters can be flared to encompass large prostates, perineural invasion, or extracapsular extension including seminal vesicle involvement that may be present. The pubic bone can sometimes interfere with the placement of rigid steel needles used in permanent seed implants, but using the HDR technique and the flexible implant catheters, the pubic bone poses much less of a problem. This flexibility often means that the patient *doesn't have to take pre-implant hormones* in order to shrink the gland.

Once the implant catheters are in position, the template is sutured to the perineum to stabilize the implant. A urinary catheter is placed in the bladder for urine drainage while the implant is in place and for visualization of the urethra during subsequent CT scans and dose calculations. After a brief stay in the recovery room, the patient is brought to the brachytherapy center for radiographic imaging (films and/or CT). Once the 3-DI images of the implant are obtained and downloaded into the treatment planning computer, a virtual image of the implant and surrounding normal anatomy is created. The computer is then used to develop a customized (for the individual patient and the actual implanted anatomy) set of instructions for the treatment delivery device, which is called the HDR remote afterloader.

After the physician has approved the treatment plan (a depiction of the implant and radiation dose profile), the patient is moved into the treatment area, where the implant catheters are connected to the HDR remote afterloader. Although the patient is alone in the treatment booth, he is constantly monitored via closed circuit TV and intercom. The patient will hear the afterloader click and whir as the source is directed into each of the flexiguides. A high intensity Iridium-192 radioactive source delivers the radiation dose in about 10 to 20 minutes. After the treatment, the source withdraws into the afterloader. There is no residual radiation for the patient at the conclusion of the HDR brachytherapy treatment.

Since HDR brachytherapy is given quickly, it is important to divide the dose into various sessions. Thus, the patient goes to an outpatient ward for an overnight stay. Although the patient cannot get up, there is freedom to move in the bed. The next day, one or two additional treatments are given depending upon if the patient will be receiving HDR monotherapy (three treatments) or HDR combined with EBRT (two treatments). In either case, the patient is usually discharged the same day after the completion of the final treatment. The subsequent treatments require much less time because the simulation and treatment planning procedures do not need to be repeated. However, a pre-treatment fluoroscopy is done to make certain that the implant hasn't moved during the night or to assist in making minor adjustments. After the second (or third) treatment, the template and treatment catheters are removed. The urinary catheter is removed, and the patient is checked to be sure he can urinate before going home.

In order to maximally preserve normal tissue structure and function, the dose of HDR brachytherapy is best divided into sessions. Therefore a second implant is performed approximately one week later following the same procedure as described above.

In cases where external radiation is used, it usually begins approximately two to three weeks after completion of the implants. This radiation is similar to the previously described external beam radiation, but has a shorter overall duration due to the brachytherapy.

Side Effects

The possible acute side effects of HDR usually last two to four weeks. These may include urinary frequency, urgency, dysuria (burning with urination), and in some cases, urinary retention. There may also be a change in bowel function characterized

by more frequent bowel movements. The perineum (the area where the implant was inserted) will be sore for a few days so activities like bicycle riding that put pressure on this area should be avoided. There is no incision to heal so recovery is usually rapid. Medications are prescribed to help alleviate these temporary symptoms. Long-term side effects for bowel function are unusual. Urinary symptoms are managed if they occur and may be related to underlying benign disease. It is important to work with both the implant specialist and urologist after the brachytherapy procedure. In general, it is important to avoid urinary procedures after brachytherapy without a careful discussion with your treatment team including both the urologist and a CET physician. Sexual function preservation is similar for all forms of radiation therapy and these issues are managed in the manner described elsewhere in this guide.

Follow-Up Care

Patients return one week after the second HDR brachytherapy procedure for a postoperative visit and then return for regular check ups every three to six months during the first year and then yearly thereafter. A PSA is obtained every three months for the first two years and then subsequently every six months.

Dietary Recommendations

Most patients will not require any major changes in their diets, unless the fields of radiation are intentionally large and designed to treat all the lymph nodes of your pelvis. In that case, the small bowels do get exposed to more radiation, and dietary modifications may be needed.

Information on fiber-restricted diet used with permission from the Radiation Oncology Department at Palo Alto Medical Foundation.

Why Low Fiber (Fiber Restricted) Diet?

Radiation therapy to the abdomen, pelvis, or rectum can sometimes cause side effects that can cause diarrhea-like symptoms, which can be well managed by promptly starting a low-fiber diet.

What is a Low-Fiber Diet?

The low-fiber diet is based on a well-balanced diet with special emphasis on those foods containing low amounts of fiber. **Fiber** refers to the structural parts of plant foods that are resistant to human digestion, such as fruits and vegetables (particularly skin and seeds), whole grains and cereals, and unprocessed bran.

Diet Guidelines

(from the National Cancer Institute’s Eating Hints for Cancer Patients)

Food Type	Allowed Items	Excluded Items
Beverages	Water, fruit-flavored drinks, carbonated beverages, coffee, tea*, milk drinks and	Prune juice, pear nectar

Food Type	Allowed Items	Excluded Items
Breads	<p>milk used in cooking (2 cups milk or milk products allowed per day, if tolerated). All others, except excluded items, no limitations</p> <p>* Your doctor may recommend decaffeinated coffee or tea</p> <p>French, Vienna, Italian, refined wheat, white, and rye breads without seeds; crackers; biscuits; French toast; plain hard crust; zwieback rolls</p>	<p>** Check with your doctor before drinking alcohol. Alcohol cannot be used safely with some medications.</p> <p>Breads, crackers, rolls, or cereals containing whole grain or graham flour; bran, seeds, nuts, or raisins; cornbread.</p>
Cereals	<p>All refined, cooked, or dry cereals, such as cream of wheat or rice and flaked or puffed cereals</p>	<p>All whole grain cereals made from prohibited flours or other foods; oatmeal; granola</p>
Cheeses	<p>Cottage, cream, American, Swiss, Muenster, or other mild cheese; 1 oz. may be substituted for 1 oz. milk</p>	<p>All others</p>
Eggs	<p>All except raw</p>	<p>Raw</p>
Fats/Oils <i>(amount depends on caloric needs)</i>	<p>Butter, oils, cream, dry cream substitutes, margarine, mayonnaise, shortenings, smooth salad dressings, sour cream</p>	<p>Salad dressing made with excluded foods; tartar sauce.</p>
Fruits	<p>Canned or cooked fruits without seeds, skins, or membranes: apples, applesauce, cherries, grapefruit, oranges, tangerines, peaches, pineapple, pears, fruit cocktail; Raw: ripe bananas, melon, grapefruit, oranges, tangerines; Juice: all except prune juice and pear nectar (2 servings allowed per day)</p>	<p>All other fruits; dried fruits; berries; figs; grapes with seeds, stewed prunes, prune puree; plums; pear nectar</p>
Meats & Poultry/ Meat substitutes	<p>Tender beef, ham, lamb, liver, poultry, or veal that is baked, broiled, or stewed; <u>Lean or low-fat</u> cold cuts and frankfurters</p> <p>Meat substitutes for 1oz. meat: 1 oz cheese 1/4 c cottage cheese</p>	<p>Fried meats and poultry, smoked or cured meats, cold cuts, corned beef, frankfurters, pastrami, sausage. Tough fibrous</p>

Food Type	Allowed Items	Excluded Items
	1/2 c tofu 1 oz soy protein 1 egg	meats with gristle (chuck and blade steak) Peanut butter, smooth or chunky; soy protein products containing whole grains (Vita burger)
Fish	Fresh or frozen fish without bones, canned tuna or salmon, cooked shellfish	All fried or smoked fish, sardines, herring
Legumes/Nuts	None	All dried legumes, lima beans, peas, nuts
Milk/Milk products <i>*some patients also benefit from avoiding milk products altogether (lactose-free diet)</i>	Buttermilk and chocolate, skin, low-fat, and whole milk, if tolerated; yogurt, plain, custard-style, with allowed fruits and without nuts (2 cups, including that used in cooking, allowed per day)	Yogurt containing fruit not allowed
Potatoes, rice, pasta	Boiled, creamed, mashed, and scalloped potatoes without skin; macaroni, noodles, white rice, spaghetti (1 serving potato allowed per day; all others, no limitation)	Potato skin, potato cakes, French fries, hash browns, potato salad, sweet potato, brown and wild rice, barley, hominy
Soups	Cream and broth based soups made with allowed foods	All other soups
Sweets	Honey, jelly, syrup, plain hard candy, molasses, marshmallows, gumdrops.	Jams, preserves, candies with fruits, coconut, raisins, nuts, candied fruits
Vegetables	Canned or cooked asparagus tips, green or wax beans, mushrooms, peas, pumpkin (no limitation on vegetable juices; 1 serving whole vegetables allowed per day)	All raw vegetables except iceberg or butter lettuce; canned or cooked vegetables not specifically allowed, such as the high fiber

Food Type	Allowed Items	Excluded Items
Miscellaneous	Ground or finely chopped herbs and spices, salt, flavoring extracts, catsup, chocolate, mild gravy, white sauce, soy sauce, vinegar	vegetable: beans, carrots, peas, spinach and other greens, beets All other spices and condiments, olives, pickles, potato chips, popcorn

Sample Meal Plan

This sample meal plan is a suggested basic guideline, which should be tailored to meet your individual needs. *If you are already following a special diet for another health problem, such as diabetes or high cholesterol, this meal plan may not meet all your nutritional needs. You and your primary doctor and registered dietitian should work together to develop your new plan to ensure that all of your caloric needs and requirements are met.*

Breakfast	Lunch	Dinner
1/2 cp strained fruit juice * 1 egg 1 slice white toast 3 tsp. butter or margarine Jelly <i>Snack</i> 1 cup milk ** 1 serving allowed cereal Sugar	1/2 cup soup *** 2 oz. meat, fish, or poultry 1/2 cup allowed vegetable 2 slices white bread or roll 1 serving allowed dessert <i>Snack</i> 2 slices white toast 2 tsp. butter or margarine Jelly or honey	5 oz. meat, fish, or poultry 1 cup milk ** 3 tsp. Butter or margarine 1 baked potato, without skin 1 serving allowed dessert 1/2 cup vegetable juice <i>Snack</i> 1/2 cup strained fruit juice 3 plain cookies

* 2 servings of fruit / juices allowed per day.
 ** 2 servings of milk allowed per day.
 *** Count as 1/2 cup milk if made with milk.

Summary

A fiber-restricted diet limits the amount of vegetables, fruits, cereals and grains that you can eat. It also limits to two cups per day the amount of milk and milk products, such as cream, yogurt and cheese that you can eat. Milk does not contain fiber, but it leaves a residue in the GI tract that can irritate the bowel and cause diarrhea and cramping. The diet also is helpful for the many cancer patients who have a hard time digesting the milk sugar, lactose. A fiber-restricted diet can be changed easily, depending on how you feel after eating certain foods. Good eating habits are important, including eating regular meals in a relaxed atmosphere. If larger fields of radiation are being used, or if you have

developed significant diarrhea from the radiation, use the diet in this handout as a guide and discuss any changes with your doctor or nurse.