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Male Fertility and Cancer

Cancer and its treatment can sometimes affect a man's ability to have children. Learn how cancer surgery and treatment can affect fertility, ways to help preserve fertility, and possible fertility options available after treatment.

- [How Cancer and Cancer Treatment Can Affect Fertility in Males](#)
- [Preserving Fertility in Males with Cancer](#)

Need Help?

How Cancer And Cancer Treatment Can Affect Fertility in Males

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prostate cancer cells. This surgery is called a **bilateral orchiectomy**. These males cannot father children unless they banked sperm before surgery. You can learn more in [Surgery for Prostate Cancer](#)⁸.

For men who have prostate cancer that has not spread beyond the prostate gland, surgery to remove the prostate gland and seminal vesicles is one of the treatment options. This is called a **radical prostatectomy**. The prostate and seminal vesicles are the body parts that together produce semen. Surgery removes the prostate gland and leaves men with no semen production and no ejaculation of sperm after the surgery. With sexual stimulation, men can still have orgasm, but no fluid comes out of the penis. Prostate surgery to remove the prostate also can damage the nerves that allow a man to get an erection, causing erectile dysfunction (ED). This means he might not be able to get an erection sufficient for sexual intercourse. You can learn more in [Surgery for Prostate Cancer](#)⁹

Even if a patient can get an erection, if there's no semen coming from the penis during orgasm, he cannot conceive a child through sex. The testicles still make sperm, but the tubes (vas deferens) that deliver sperm from the scrotum to the urethra are cut and tied off during removal of the prostate gland. This results in a blockage to the flow of sperm. However, even after removing the prostate gland, there still are ways to get sperm from the testicle. See Testicular sperm extraction and epididymal sperm aspiration in [Preserving Fertility in Men With Cancer](#) to learn more.

Bladder cancer surgery

Surgery to treat some bladder cancers is much like a radical prostatectomy, except the bladder is also removed along with the prostate and seminal vesicles. This procedure is called **radical cystectomy**.

Because this surgery removes the bladder and prostate gland, there is no semen production and no ejaculation of sperm after the surgery. With sexual stimulation, males can still have orgasm, but no fluid comes out of the penis. Surgery to remove the bladder also can damage the nerves that allow a man to get an erection, causing erectile dysfunction (ED). This means he cannot get an erection sufficient for sexual penetration. Get more information in [Bladder Cancer Surgery](#)¹⁰.

Even if you can get an erection, if there's no semen coming from the penis during orgasm, you cannot conceive a child during

Other surgeries

To learn more about the body parts, sex organs, and sex function discussed here, read [Sex and the Adult Male with Cancer](#)¹¹.

A few types of cancer surgery can damage nerves that are needed to ejaculate semen. They include removing lymph nodes in the belly (abdomen), which may be part of the surgery for testicular cancer and some [colorectal cancers](#)¹². Nerves can be damaged when lymph nodes are being removed, and this can cause problems with ejaculation. Sometimes surgery can permanently damage the nerves to the prostate and seminal vesicles that normally cause these organs to squeeze and relax to move the semen out of the body.

When these operations affect the nerves, semen is still produced, but it doesn't come out of the penis during orgasm (climax). Instead it can flow backward into the bladder (called **retrograde ejaculation**) or does not go anywhere. In cases of retrograde ejaculation, medicines can sometimes restore normal ejaculation of semen.

Fertility specialists can sometimes collect sperm from males using several types of treatments including electrically stimulating ejaculation (see Electroejaculation or sperm aspiration surgery in [Preserving Fertility in Men With Cancer](#)).

Radiation therapy

Radiation treatments use high-energy rays to kill cancer cells. Radiation that's aimed directly at testicles, or to nearby pelvic areas, can affect a male's fertility. This is because radiation at high doses kills the stem cells that produce sperm.

Radiation therapy for testicular cancer

Radiation is aimed directly at the testicles to treat some types of [testicular cancer](#)¹³ and might be used to treat [childhood leukemia](#)¹⁴. Young males with **seminoma** (a type of cancer of the testicle) may need radiation to the groin area after a testicle has been removed. The radiation is aimed very close to the remaining testicle, damaging it. Even when a man gets radiation to treat a tumor in his abdomen (belly) or pelvis, his testicles may still end up getting enough radiation to harm sperm production.

Sometimes radiation to the brain affects the hypothalamus and pituitary gland. The hypothalamus and pituitary gland work together to produce two important hormones

infertility can occur.

A male may still be fertile while getting radiation treatments, but the sperm may be damaged by exposure to the radiation. For this reason, it is important to find out how long you should wait to resume unprotected sexual activity or to try for a pregnancy. Your doctor will be able to consider your circumstances and give you specific information about how long you should wait.

You can get more details about this type of treatment in [Radiation Therapy](#)¹⁵.

Radiation for prostate cancer

Seed implants for prostate cancer (**brachytherapy**) do not give a large dose of radiation to the testicles, and many males will remain fertile or recover sperm production. However, it's important to be sure you understand important instructions to follow during and after brachytherapy, such as:

- Avoiding sexual intercourse, and for how long
- Using birth control, and for how long
- Limiting close contact with pregnant woman and children for a certain amount of time.

Radiation for prostate cancer from a machine outside the body is more likely to cause permanent infertility, even if the testicles are shielded. (See Radiation shielding in [Preserving Fertility in Men With Cancer](#))

Chemotherapy

During puberty the testicles start making sperm, and they normally will keep doing so for the rest of a man's life. Certain chemotherapy drugs given during childhood, however, can damage testicles and affect their ability to produce sperm. Certain types of chemotherapy later in life can also affect sperm production.

Cells start out as offspring of other cells that have divided. When cells are new, they are immature and not functioning fully. [Chemotherapy](#)¹⁶ (chemo) works by killing cells in the body that are dividing quickly. Since sperm cells divide quickly, they are an easy target for damage by chemo. Permanent infertility can result if all the immature cells in the testicles that divide to make new sperm (spermatogonial stem cells) are damaged to the point that they can no longer produce maturing sperm cells.

After chemo treatment, sperm production slows down or might stop altogether. Some

sperm production might return, but can take many years, and sometimes does not return at all.

Chemo drugs that are linked to the **risk of infertility** in males include:

- Busulfan
- Carboplatin
- Carmustine
- Chlorambucil
- Cisplatin
- Cyclophosphamide
- Cytarabine
- Cytosine arabinoside
- Dactinomycin
- Doxorubicin
- Ifosfamide
- Lomustine
- Melphalan
- Nitrogen mustard (mechlorethamine)
- Procarbazine
- Thiotepa
- Vinblastine
- Vincristine

Higher doses of these drugs are more likely to cause permanent fertility changes, and combinations of drugs can have greater effects. The risks of permanent infertility are even higher when males are treated with both chemo and radiation therapy to the abdomen (belly) or pelvis.

Some other chemo drugs, such as those listed here, have a **lower risk** of causing infertility in males:

- 5-fluorouracil (5-FU)
- 6-mercaptopurine (6-MP)
- Amsacrine
- Bleomycin
- Dacarbazine
- Daunorubicin
- Epirubicin

- Etoposide (VP-16)
- Fludarabine
- Methotrexate
- Mitoxantrone
- Thioguanine (6-TG)

Talk to your doctor about the chemo drugs you will get and the fertility risks that come with them.

Targeted therapy and immunotherapy

Targeted therapy and immunotherapy drugs attack cancer cells differently from standard chemo drugs. Little is known about their effects on fertility or problems during pregnancy.

Males taking thalidomide or lenalidomide have a high risk of causing birth defects in a fetus exposed to these drugs, which can stay in semen for a few months after treatment ends. Oncologists recommend that males and any sexual partner who is able to get pregnant use extremely effective forms of birth control, for example a condom for the man and a long-acting hormone contraceptive or IUD for the woman.

See [Targeted Therapy](#)¹⁷ and [Immunotherapy](#)¹⁸ to learn more about these cancer treatments.

Hormone therapy

Some [hormone therapies used to treat prostate](#)¹⁹ or other cancers can affect hormones that help to develop sperm. Sperm production and numbers can be lower. This can affect your ability to have a child. These drugs can also cause sexual side effects, such as a lower sex drive and problems with erections, while patients are taking them. The decrease in sperm production and the sexual side effects tend to improve once these drugs are stopped.

Bone marrow or stem cell transplant

Having a bone marrow or stem cell transplant usually involves receiving high doses of [chemo](#)²⁰ and sometimes [radiation](#)²¹ to the whole body before the procedure. In most cases, these procedures have the side effect of permanently preventing a male's ability to make sperm. This results in lifelong changes to fertility. (See [Chemotherapy](#)²² and [Radiation Therapy](#)²³ for more on these parts of the transplant process.) If you'd like

to learn more, see [Stem Cell Transplant](#)²⁴.

Hyperlinks

1. www.cancer.org/cancer.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fertility-and-sexual-side-effects/how-cancer-treatment-affects-fertility.html
3. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html
4. www.cancer.org/treatment/treatments-and-side-effects/treatment-types.html
5. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fertility-and-sexual-side-effects/how-cancer-treatment-affects-fertility.html
6. www.cancer.org/cancer/testicular-cancer.html
7. www.cancer.org/cancer/testicular-cancer/after-treatment/fertility.html
8. www.cancer.org/cancer/prostate-cancer/treating/surgery.html
9. www.cancer.org/cancer/prostate-cancer/treating/surgery.html
10. www.cancer.org/cancer/bladder-cancer/treating/surgery.html
11. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fertility-and-sexual-side-effects/sexuality-for-men-with-cancer/how-male-body-works-sexually.html
12. www.cancer.org/cancer/colon-rectal-cancer/treating/colon-surgery.html
13. www.cancer.org/cancer/testicular-cancer.html
14. www.cancer.org/cancer/leukemia-in-children.html
15. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html
16. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html
17. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/targeted-therapy.html
18. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy.html
19. www.cancer.org/cancer/prostate-cancer/treating/hormone-therapy.html
20. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html
21. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html
22. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html

23. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html
24. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/stem-cell-transplant.html

References

Agency for Healthcare Quality and Research (AHRQ). *Comparative effectiveness review: Management of infertility evidence summary*. 2019;AHRQ Pub. No.19-EHC014-1-EF.

Mitsis D, Beupin LK, O'Connor T. Reproductive complications. In Niederhuber JE, Armitage JO, Kastan MB, Doroshow JH, Tepper JE, eds. *Abeloff's Clinical Oncology*. 6th ed. Philadelphia, PA: Elsevier; 2020:665-675.

Moment A. Sexuality, intimacy, and cancer. In Abrahm JL, ed. *A Physician's Guide to Pain and Symptom Management in Cancer Patients*. Baltimore, MD: Johns Hopkins University Press; 2014:390-426.

National Cancer Institute (NCI). *Fertility issues in boys and men with cancer*. Accessed at <https://www.cancer.gov/about-cancer/treatment/side-effects/fertility-men> on January 31, 2020.

National Comprehensive Cancer Network (NCCN). *Clinical practice guidelines in oncology: Survivorship* [Version 2.2019]. Accessed at https://www.nccn.org/professionals/physician_gls/pdf/survivorship.pdf on January 31, 2020.

Nishimoto PW, Mark DD. Sexuality and reproductive issues. In Brown CG, ed. *A Guide to Oncology Symptom Management*. 2nd ed. Pittsburgh, PA: Oncology Nursing Society; 2015:551-597.

Oktay et al. Fertility preservation in patients with cancer: American Society of Clinical Oncology clinical practice guideline update. *Journal of Clinical Oncology*. 2018;36(19):1994-2003.

Patounakis G, Christy AY, DeCherney AH. Gonadal dysfunction. In DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2019:2133-2148.

U.S. Department of Health and Human Services, National Institutes of Health (NIH). *Fertility and infertility*. Accessed at <https://www.nichd.nih.gov/health/topics/infertility> on January 31, 2020.

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Preserving Fertility in Males with Cancer

Certain cancers and their treatment can affect fertility in males and females. When a person with cancer wants to have children after treatment ends, some planning is needed. Sometime this involves **fertility preservation**. Fertility preservation saves or protects eggs, sperm, or reproductive tissue so that a person can use them to have children in the future.

This information is for males with cancer. **If you are a gay man or transgender person**, please talk to your cancer care team about any needs that are not addressed here.

Why males with cancer might need fertility preservation

In males who were fertile before treatment and who get certain types of treatment, the body may not be changed or may recover naturally after treatment. In these men, it may be possible to keep or restore normal sperm production. Whether this happens depends on the patient's age, stage in life, type of cancer, type and dose of treatment, and other health problems he may have. Be sure to know if fertility problems are a risk based on your treatment plan and health status.

But for some males, this is not the case. Certain types of cancer surgery can remove organs needed for reproduction, and certain treatments might change hormone levels or cause DNA damage to sperm. This can result in some males being unable to father a child after treatment for cancer. In some cases, a male is not able to fertilize a female's egg (conceive a pregnancy). Or, sometimes there are sperm-related problems that affect the health of a pregnancy and cause it to not last long enough, meaning it might end in miscarriage. It's also possible for a child who is conceived by sperm with damaged (abnormal) DNA to inherit the abnormal DNA, sometimes resulting in serious and even life-threatening birth defects. Read more in [How Cancer and Cancer Treatment Can Affect Fertility in Males](#). Some men may choose to take steps that might

might be able to find a sperm bank yourself with an online search.

In sperm banking, a male provides one or more samples of his semen. Once the sperm bank gets the sample, they test it to see how many sperm cells it contains (this is the sperm count), what percentage of the sperm are able to swim (which is called motility), and what percentage have a normal shape (called morphology). The sperm cells are then frozen and stored. A sample can be provided by the following ways:

- **Ejaculation.** Semen collection done by masturbation is usually done in a private room at a sperm bank facility, or arrangements are made for the patient to bring a sample collected at home into the lab.
- **Electroejaculation.** Some males are unable to ejaculate due to stress, anxiety, or other psychological causes. Additionally, some young males who may have had no prior experience with masturbation might not be able to produce a semen sample. Other health conditions in adult males might cause the inability to ejaculate, too. For these patients, electroejaculation can be used to successfully stimulate the pelvic nerves that cause the release of sperm. The semen that is collected by an electroejaculation procedure can either be used immediately or cryopreserved for future use.
- **From urine.** Sometimes nerves that are needed to ejaculate semen or close the valve at the entrance to the bladder are damaged during cancer surgery or radiation treatment. When this happens, the male might still make semen, but it might not come out of his penis at orgasm. Instead, it might flow backward into his bladder (called **retrograde ejaculation**). Fertility specialists can try to collect sperm from the urine of these males and use these sperm to help achieve a pregnancy. These sperm can sometimes be placed into the female partner's uterus at the time of ovulation using a small flexible tube called a catheter.
- **Sperm extraction and aspiration procedures.** These procedures are options for collecting sperm from men who do not have sperm in their semen, either before or after cancer treatments. There are a few ways this can be done, including: percutaneous epididymal sperm aspiration (PESA), microsurgical epididymal sperm aspiration (MESA), testicular sperm extraction (TESE), and micro-TESE.

Limitations to sperm banking

It's important to know sometimes sperm banking might not be an option. Here are some examples of those situations:

- **Fast-growing cancers:** If you have a fast-growing cancer like [acute leukemia](#)² (AML or ALL), you may be too ill to produce semen samples before starting cancer treatment, and cancer treatment usually starts quickly for these leukemias. If you can manage it, having even one semen sample banked could allow you to have a biological child in the future.
- **Infectious diseases:** Many sperm banks do not accept samples from men who have HIV (the virus that causes AIDS) or hepatitis. There are many risks involved with this. But some sperm banks may have special storage areas for a higher storage fee.
- **Costs:** The average cost of storing sperm (about 3 samples) in a sperm bank is about \$1,500 to \$2,500 for 3 years. Insurance coverage may be available and banking costs vary greatly, so it's important to compare different centers. Many sperm banks offer financing and payment plans for people with cancer. If ejaculation is not possible and other ways to collect sperm are needed, costs will be higher.

Successes using frozen sperm

The success rates of infertility treatments using frozen sperm vary and depend on the quality of the sperm after it's thawed, as well as the health and age of the female who receives it. In general, sperm collected before cancer treatment is just as likely to start a pregnancy as sperm from men without cancer. It's important to stay hopeful because sperm banking has resulted in many pregnancies. Once sperm is stored, it's usually good for decades.

Keeping in touch with your sperm bank

It's important to stay in contact with the sperm bank so that yearly storage fees are paid and your address is updated. Some sperm banks will destroy and discard sperm samples when patients lose contact with them.

When you're ready to use stored sperm

Once a couple is ready to try getting pregnant, the frozen sperm can be sent to the fertility specialist working with the couple. Depending on tests to confirm the health of a female and the quality of the sperm, the thawed sperm can potentially be used. Some procedures include:

- **Intrauterine insemination (IUI)** in which the thawed sperm is inserted into a female's uterus using a long catheter during her most fertile time during a month. The fertility specialist works with the couple to figure out the best time to do the procedure.
- ***In vitro* fertilization (IVF)** and *in vitro* fertilization with intracytoplasmic sperm injection (IVF-ICSI) are more involved than IUI. A female takes hormones and her eggs must be retrieved. With IVF, they are put in a sterile lab dish with several thousand sperm. The goal is for one of the sperm to fertilize the egg. With IVF-ICSI, a single sperm is injected directly into an egg to fertilize it. In both procedures, if the egg is fertilized, the embryo can be frozen or put back into the female's uterus to achieve a pregnancy.

Radiation shielding

Patients receiving radiation therapy should talk with their cancer team about the risks of infertility with the radiation treatment and the length of time they will need to avoid unprotected sexual activity afterward.

Radiation treatment can cause infertility through the permanent destruction of the sperm stem cells in the testicle. Testicular tissue damage is unavoidable if both testicles need to be directly radiated. When the radiation is directed at other structures in the pelvic area, the x-rays can often scatter and thus result in indirect testicular injury.

Fertility may sometimes be preserved in these males by covering the testicles with a lead shield. You might hear this called **gonadal shielding** or **gonadal preservation**. If radiation is aimed at one testicle (as for some testicular cancers), the other testicle should be shielded if possible. Some boys with leukemia need radiation directly to both testicles to destroy the cancer cells. Shielding is usually not possible for these patients.

The cost of radiation shielding is usually included in the cost of your treatments.

If you are getting radiation near your testicles, your cancer care team may also advise you to avoid unprotected sex (intercourse) and to not try to achieve a pregnancy for a certain length of time after treatment ends. If you are getting radiation to the pelvic or genital area, it's best to talk to your doctor about options, including sperm banking, if you wish to avoid the waiting period.

Options for men who are not fertile after cancer treatment

Use of donor sperm

Using donor sperm (also called **donor insemination**) is a way for men who are infertile

Child-free living

Many couples, with or without cancer, decide they prefer not to have children. Child-free living allows a couple to pursue other life goals, such as career, travel, or volunteering in ways that help others. If you are unsure about having children, talk with your spouse or partner. If you are having trouble agreeing on the future, talking with a counselor or mental health professional may help you both think more clearly about the issues and make the best decision.

Hyperlinks

at <https://www.cancer.gov/about-cancer/treatment/side-effects/fertility-men> on January 31, 2020.

National Comprehensive Cancer Network (NCCN). *Clinical practice guidelines in oncology: Survivorship* [Version 2.2019]. Accessed at https://www.nccn.org/professionals/physician_gls/pdf/survivorship.pdf on January 31, 2020.

Nishimoto PW, Mark DD. Sexuality and reproductive issues. In Brown CG, ed. *A Guide to Oncology Symptom Management*. 2nd ed. Pittsburgh, PA: Oncology Nursing Society; 2015:551-597.

Oktay et al. Fertility preservation in patients with cancer: American Society of Clinical Oncology clinical practice guideline update. *Journal of Clinical Oncology*. 2018;36(19):1994-2003.

Patounakis G, Christy AY, DeCherney AH. Gonadal dysfunction. In DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 11th ed. Philadelphia, PA: Lippincott Williams &

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