



Fertility and Cancer

Highlights

Fertility describes the ability to conceive a biological child. Blood cancers and treatments affect fertility in males and females.

The risk of infertility caused by cancer and its treatment is based on several factors, including your type of cancer; the type, duration, and doses of treatment; and your age at the start of treatment.

Addressing fertility and sexual health is an essential part of cancer treatment and follow-up care.

Most cancer survivors who can conceive after treatment have normal pregnancies and healthy babies.

However, people with a blood cancer should talk with their oncologist about any potential risks they face regarding conception or pregnancy.

There are many ways to build a family, whether through natural conception, using assisted reproductive technology, or adoption. Survivors and people in treatment who want children should consider and discuss all options.

Lesbian, gay, bisexual, transgender, and queer (LGBTQ) survivors may have unique needs when it comes to fertility. Speak to your healthcare team if you have any questions.

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Introduction

Chemotherapy and radiation have some side effects that may last months to years after treatment has ended. One possible side effect is infertility, the inability to conceive a child without medical intervention.

This publication provides only general information about this topic. Speak with members of your healthcare team about the specific effects of your treatment and the fertility options that are available to you.



Cancer and Fertility

Not all cancer treatments affect fertility. The risk to your fertility depends on several factors, including:

- Your age at the time of diagnosis.
- The type and dosage of chemotherapy drug(s) you receive.
 - Alkylating agents—for example, cyclophosphamide, ifosfamide and procarbazine, along with the drug cisplatin—have the most significant effect on fertility. Other drugs are generally less toxic to sperm-forming cells and eggs, but can also cause infertility, especially when used as part of a combination of therapies.
- The location and dosage of radiation.
 - Exposure to the testes may destroy cells that form sperm. Exposure to the ovaries may destroy eggs. Exposure to the pituitary gland in the brain may cause changes in secretion of hormones that regulate puberty and fertility.
- The duration of treatment.
- Whether you received a blood or marrow stem cell transplantation, which is associated with a high risk of infertility.

- The type of cancer. Certain cancers cause decreased sperm counts. For example, patients with leukemia, Hodgkin lymphoma, and testicular cancer may have a low sperm count at the time of diagnosis.

Other medical issues unrelated to cancer can also impact fertility.

Possible Effects on Males

- Sexual dysfunction, that is, the inability to achieve or maintain an erection.
- Lower-than-normal testosterone production.
- Loss of sperm production, which may be temporary or permanent.
 - If sperm production recovers, it can take one to three years, or longer.

Analysis of a semen sample can indicate whether you are making sperm. This can be done after treatment is completed. Talk with your doctor about when to be evaluated.

Possible Effects on Females

- The ovaries are especially susceptible to damage during cancer treatment because they contain germ cells that cannot be regenerated after birth. When female babies are born, nearly one million follicles that contain eggs are present in their ovaries; females cannot produce new eggs. Therefore, the total effect of cancer treatment on fertility will depend on how many eggs remain after treatment has ended.

Chemotherapy protocols containing alkylating agents can be especially damaging to ovarian tissue, causing:

- Temporary or permanent disruption of the menstrual cycle.
- Premature ovarian insufficiency (POI), also called premature menopause. This is a loss of ovarian function in a female younger than 40. When POI is caused by cancer treatment, it is unlikely that a female will have subsequent menstrual periods or be able to become pregnant without medical intervention. Generally, POI is managed with hormone (estrogen and progesterone) replacement therapy.
 - Females with POI are encouraged to eat a healthy diet and exercise regularly to decrease the health risks of osteoporosis and heart disease. Calcium and vitamin D supplements for bone health may also be prescribed.
 - Females who retain a degree of ovarian function after treatment or those who restart menstruation may still develop POI and have trouble conceiving later in life. If you are at risk for POI, you may want to start a family early. If you are fertile after treatment but not ready to start a family, you may want to consider egg or embryo freezing (see page 4).

- Radiation to the pelvic area can cause damage to the uterus and increase the risk for infertility, miscarriage, or premature birth.
- Chemotherapy, hormonal therapy, and radiation may cause sexual dysfunction, including loss of desire, vaginal dryness, pain during intercourse, and inability to achieve an orgasm. These side effects may be temporary or permanent.
- Females who undergo cancer treatment as children tend to have fewer fertility problems than females treated during the teen or adult years, but they can still be at risk for infertility.
- Changes in your body or difficulty conceiving may or may not be related to the effects of your cancer treatment. Talk with your doctor if you have:
 - Irregular menstrual cycles
 - Hot flashes
 - Breast tenderness
 - Painful intercourse
 - Trouble getting pregnant
 - A history of miscarriages
 - Early or delayed onset of puberty (in children)
 - Any other questions or concerns

Options for Having a Family After Treatment

Many patients will be able to conceive naturally after cancer treatment. Patients are generally counseled to wait at least two years after treatment is completed before attempting conception. Check with your doctor to find out how long after treatment you should wait. If you are not able to conceive naturally, there are a number of other ways to build a family.

You may have discussed options to preserve your fertility before or during treatment with your healthcare team. If you did take steps to increase the chances of having children in the future, this will impact the options available to you following treatment.

Options for Males

- **Use of your frozen sperm.** Depending on the number of vials stored and the number and quality of the sperm specimens, there are two options for use of frozen sperm—artificial insemination and *in vitro* fertilization (IVF). Artificial insemination involves the injection of semen into part of the reproductive tract of a female partner (or surrogate) by a method other than sexual intercourse. Or, the female can undergo an *in vitro* fertilization (IVF) cycle to remove her mature eggs so they can be fertilized in the laboratory with the sperm. The embryos created are transferred to the female's uterus so pregnancy can occur.
- **Testicular sperm extraction (TESE).** If no sperm are present in the semen, this surgical procedure, performed under anesthesia, can be considered. The doctor removes pieces of tissue from the testes, which are then examined for mature sperm. If sperm are found, the male's female partner (or surrogate) can

undergo an IVF cycle to remove mature eggs so they can be fertilized in the laboratory with the sperm. Embryos are created and then transferred into the female's uterus.

- **Donor sperm.** Sperm donated by another male is used to produce a pregnancy through artificial insemination.

Options for Females

- **Use of frozen eggs or embryos.** If eggs were frozen, they will first be fertilized in the laboratory with a male partner or donor's sperm to create embryos. The embryos are then transferred to the uterus so that the female may be able to become pregnant.
- ***In vitro* fertilization (IVF).** If a female has a low egg count (called a low ovarian reserve), she may want to consider undergoing an IVF cycle to remove mature eggs so they can be fertilized in the laboratory with a partner or donor's sperm. The embryos created are transferred to the uterus.
- **Donor eggs.** Eggs donated by another female who undergoes an IVF cycle can be fertilized in the laboratory with a male partner's sperm. The embryos created are transferred to the female patient's uterus so pregnancy can occur.
- **Donor embryos.** Embryos are generally donated by couples who have undergone IVF for infertility. If these couples now have families, they may choose to donate their remaining embryos rather than discard them.
- **Surrogacy.** If you are unable to carry a child through pregnancy, you can arrange for another female (a gestational carrier) to carry the fetus for you. Embryos created with your eggs or donor eggs and your partner's sperm or donor sperm are transferred to her uterus.

Adoption

Adoption is also a choice for building a family after cancer treatment. In general, people who have been treated for cancer but are free of disease are eligible to adopt infants or older children. There are different kinds of adoption, including public adoption, private adoption and international adoption. Contact your provincial adoption agency to learn more.

If you are considering private or international adoption facilitated through a practitioner or licensed agency, it is helpful to ask them if they have worked with other cancer survivors, and if not, ask if they are open to working with you. You may need to talk to multiple agencies to find the best fit for you.

Other Reproductive Health Issues

Ethical and Religious Concerns. Fertility and reproduction in the context of a cancer diagnosis and treatment can raise a number of ethical, moral, and religious issues related to the welfare of both patients and their future children.

The decision-making process associated with these concerns may be accelerated by the need to start therapy. This can cause a great deal of anxiety for both patients and their families.

Some of the ethical issues related to fertility preservation that patients and their caregivers may have to consider include:

- Religious and cultural beliefs associated with fertility preservation.
- The use of experimental versus established fertility preservation therapies.
- The ability of minors to understand fertility issues and give consent to certain procedures.

- The future welfare of children created by assistive reproductive technologies.
- Decisions regarding posthumous reproduction (e.g., what to do with stored eggs, sperm or embryos, what to do with stored eggs, sperm, or embryos if the person in treatment does not survive).

These are all sensitive and complex subjects that will require the patient (and/or parent) to consult with not only the medical treatment team but with their family members and possibly with legal and spiritual counselors who can guide them, help them make decisions and plan accordingly. It may also be helpful to connect with others who are going through similar experiences through support groups and online forums.

Pregnancy After Cancer Treatment

If you are a female of childbearing age who has been treated for cancer and you are able to conceive, you will likely go on to have a low-risk pregnancy and healthy baby. Females should be able to become pregnant if treatment did not affect their ovaries or uterus, and there are no other medical issues that may impact fertility. Before you try to become pregnant, talk with your treatment team about your medical readiness for pregnancy. You may also want to have a fertility assessment by consulting with a doctor called a reproductive endocrinologist.

Generally, oncologists will advise you to wait to conceive until a period of time has passed after treatment. The timing will depend on your overall health after receiving cancer treatment and the risk of early cancer recurrence. If the treatment has caused late effects that might make pregnancy more difficult, it is recommended to consult a maternal-fetal medicine specialist prior to trying to conceive.



Even though some drugs used to treat cancer are not usually associated with infertility, it is generally not recommended to conceive a child or carry a pregnancy while taking such a medication. You should not stop medication without medical advice. If you are taking a drug to treat cancer, it is advised that you speak to your oncologist before trying to conceive or if you think you may be pregnant.

Health of Children of Cancer Survivors.

Most children born to cancer survivors are healthy. The percentage of babies with birth defects born to cancer survivors is similar to that of babies born to parents without a cancer history. When a parent is diagnosed with cancer, it does not mean that his or her child is at a greater risk for cancer. Very few cases of cancer are inherited (passed on from a parent to a child). You may want to ask members of your healthcare team if your cancer is a type that can be passed on to your children. If it is, you may want to ask for a referral to a genetic counselor.

Breastfeeding. Talk with the doctor about whether you will be able to breastfeed after treatment. If you have had radiation to the breast area, or certain breast surgeries, your ability to produce milk may be affected.

Some medicines should not be used while you are breastfeeding. Tell your healthcare team if you are starting or re-starting treatment and you are breastfeeding.

Birth Control and Sexually Transmitted Infections. If you are sexually active in a heterosexual relationship, it is important to use birth control throughout your treatment and for a period of time after treatment ends. Some drugs can be very harmful to an unborn child and may cause birth defects. Pregnancy during cancer treatment or immediately after treatment ends may also not be safe for the mother.

Males who are receiving cancer treatment and whose partners are pregnant should wear condoms during sex. Chemotherapy can be excreted in semen and it is possible that exposure could cause fetal abnormalities.

Even if you believe you cannot become pregnant or father a child, you are still at risk for sexually transmitted infections (STIs). It is important to protect yourself from STIs. A barrier method of contraception is recommended. Condoms, female condoms, film and dental dams help protect against STIs. Oral contraception (birth control pills) do not protect against STIs.

If, during cancer treatment, your white blood cell or platelet counts become too low, your doctor may advise you to abstain from sex until the blood cell counts return to normal levels because of an increased risk for infection or bleeding. Ask your healthcare team for more information.

Talking With Members of Your Healthcare Team

Ask your oncology team about the fertility effects of your treatment. You can also ask for a referral to a fertility specialist to help you understand and explore your options. Some questions you may want to ask are:

- What are the chances the treatment has affected my fertility?
- Have other people been able to get pregnant or father a child naturally after receiving this treatment?
- Can you recommend a fertility specialist that I can speak with?
- How will I know if treatment has affected my fertility? Are there any tests I can take?
- If I have a period of infertility after treatment, should I have my fertility status re-evaluated? If yes, how soon should I have a follow-up evaluation?
- Is pregnancy safe for me? How long should I wait after treatment ends to try to get pregnant?
- Are there any risks to my future children based on the type of cancer I have and the treatment I received?

Learning that you have cancer-treatment-related infertility may bring up feelings of sadness, anger, or grief. Some people find it helpful to talk about this. Consider asking your healthcare team the following questions:

- Can you suggest a local support group of people who have been through the same challenges?
- Can you recommend a mental health specialist I can speak with?

Talking With a Partner or Spouse

If you are already in an established relationship, you may want to discuss future plans of parenthood and options related to fertility with your partner.

In addition to affecting fertility, cancer treatment can also affect sexual function in both males and females. You both may need to prepare for changes to your intimate relationship and learn to work through them. Talk to your doctor about any changes you experience related to your sexual health. You may even wish to ask for a referral to a sex therapist.

People react to difficult situations, such as a cancer diagnosis and treatment, differently. Throughout your cancer journey and as a cancer survivor, your partner may be your biggest source of practical and emotional support. Your partner may also have a difficult time coping. Either way, your relationship will probably change. If you hit a rough patch, it may be beneficial for you and your partner to do couples counseling. Ask your healthcare team for resources and recommendations.

You and your partner may find it helpful to attend a support group. There are support groups for people with cancer and their families. There are also support groups for people facing infertility. Your healthcare team and The Leukemia & Lymphoma Society of Canada can help you access local or online support resources.

Dating and Fertility

Dating and new relationships can be challenging no matter your situation. When and how you tell someone about your cancer diagnosis and fertility status is your choice. Some people prefer to tell a potential partner early in the relationship to clear the air. Others prefer to wait until they trust the person. The timing of when you discuss cancer and fertility with your potential partner will likely depend on a number of factors, such as the seriousness of your relationship or whether you or your potential partner already have children from prior relationships. There is no right or wrong way or time to tell someone about your cancer history or fertility status.

Before talking about your diagnosis, you may want to take time to consider how much you would like to disclose about your diagnosis and impact of treatment on your sexuality and fertility. It may also be helpful to practice what you would like to say in advance. That way, you can try to anticipate questions and plan your answers.

If the person reacts negatively, that is not your fault. People have different histories and understandings of cancer. You may be

able to explain what it means to have a cancer diagnosis. For example, clarifying that cancer is not contagious can help dispel a specific concern right away. People also have different desires for their future. It is good to discuss these topics so you can find a partner with similar family plans.

Financial Concerns

Fertility treatments can be expensive, but some portions may be covered by your provincial health plan. It is important to have discussions around costs early on to see if you are eligible for any coverage or reimbursement.

Some questions you may want to ask your health care team include:

- Does my provincial health care plan cover fertility preservation before cancer treatment?
- Are there any portions of the treatment that would not be covered by my provincial health care plan?
- Does my provincial healthcare plan cover infertility treatments after cancer treatment? If yes, are there any conditions for coverage?

Acknowledgement

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