

Fertility

No. 23 in a series providing the latest information for patients, caregivers and healthcare professionals

Highlights

- The term “fertility” is used to describe the ability to bear children. Some cancer treatments affect fertility in males and females.
- Risks for fertility problems include a patient’s age at the time of treatment and the type and length of treatment.
- It is important to talk with members of your oncology team about the fertility effects of your treatment, or your child’s treatment. This is information you need to know before treatment begins, if possible.
- There are family planning options that may help you, or your child, preserve the ability to have children in the future. Some options require actions that need to be taken before treatment; other options involve actions during or after treatment.
- Sperm cryopreservation is cited by the American Society of Clinical Oncology (ASCO) as the fertility preservation method with the highest likelihood of success for male cancer survivors. Embryo freezing is the method with the highest likelihood of success for female cancer survivors.
- Most childhood cancer survivors who can conceive after cancer treatment—as well as women of childbearing age who have been treated for a blood cancer and are able to conceive—have normal pregnancies and healthy babies. However, patients should talk to their oncologists about any potential risks they might face regarding conception or pregnancy.
- Even if an individual is infertile, it does not mean he or she cannot contract any sexually transmitted infections. So, practicing safe sex is necessary. For more information about sexuality and intimacy, please see The Leukemia & Lymphoma Society’s online education programs, *Sexuality and Intimacy in Cancer Survivorship* and *Cancer Survivorship for Young Adults*, at www.LLS.org/survivorship.

Introduction

Information for Parents of Childhood Cancer Patients

Chemotherapy and radiation can cause side effects, long-term effects and “late effects” (effects that become apparent months or years after treatment has ended) in boys and girls, including infertility. As the parent of a child who has leukemia or lymphoma, you are thinking about your child’s well-being, treatment and survival. You may not be thinking about whether or not your child can one day become a parent. However, knowing about possible fertility effects of treatment now may help you take steps to plan for the future. You can also read more about other late effects in the Society’s free fact sheet, *Long-Term and Late Effects of Treatment for Childhood Leukemia or Lymphoma*.

This fact sheet can help you understand how disease and treatment can affect fertility. It presents

- Some of the ways that treatment for myeloma, leukemia, lymphoma, myelodysplastic syndromes, or other types of blood cancer might affect fertility.
- Ideas for steps you can take before, during or after treatment to preserve the ability to have children in the future.
- Suggestions for talking with your oncology team about fertility.
- Other resources that can offer you support.

This fact sheet only provides general information. Speak with members of your oncology team about the specific effects of your treatment or your child’s treatment.

Cancer: Diagnosis, Treatment and Fertility

Not all cancer treatments affect fertility. However, some drug treatments and radiation therapies can. Some fertility effects may last for a short time; others may be permanent.

Your risks for permanent or temporary infertility (not being able to conceive a child) depend on several factors, including

- Age at the time of diagnosis and treatments
- The type and dosage of drug(s) and/or the location and dosage of radiation—for example, blood or marrow stem cell transplantation is associated with a high risk for infertility
- The length of time that treatment is needed.

The patient’s diagnosis, independent of treatment, is usually not a risk factor for infertility. However, Hodgkin lymphoma is associated with low sperm count, which has been reported in about two out of every three patients.

Possible effects of treatment on males and females

Some fertility effects are specific to males or to females. Others may affect both.

Some chemotherapies and radiation therapies can affect the endocrine system. The endocrine system is made up of glands and cells that control growth, sexual development, sleep, hunger and the way the body uses food. Some treatments can trigger changes to this system that may affect puberty and fertility. Prepubescent children are affected more often than older children or adults by changes to the endocrine system as it relates to physical development and growth, including sexual development.

Possible effects on males

- High doses of radiation to the brain and certain chemotherapies can affect sperm production.
- Alkylating agents—for example, cyclophosphamide or procarbazine—have the most significant effect on fertility. Other drugs are generally less toxic to sperm-forming cells, but may also cause infertility, especially when used as part of various combination medication therapies.
- Higher doses of radiation may end sperm production permanently.
- If radiation reaches the testicles, sperm production may be affected for a while but could later return to normal levels. The effects of chemotherapy on sperm production may also be temporary. Individuals with temporary infertility should be reevaluated periodically. Patients and their doctors can discuss how often the patient should come back for follow-up evaluations.
- Radiation can affect testosterone levels. This side effect can either delay or speed up puberty. It can also cause impotence.

A note to parents: Talk with your son’s doctor if your son seems to be going through puberty early (before age 13) or late (after age 15). The doctor may want to prescribe medicine to assist with the hormone balance. You can also talk with your son’s doctor about one day performing a semen analysis to learn if his body is making sperm.

Possible effects on females

- Some chemotherapies may delay menstruation.
- Some females who receive cancer treatment have premature ovarian failure (POF), also called premature menopause. The term “premature ovarian failure” describes a stop in normal ovarian functions in a woman younger than 40 years. Unlike menopause, this is not a natural occurrence. When POF is caused by cancer treatment, it is unlikely that a girl or woman will have subsequent menstrual periods or have the ability to become pregnant naturally. Generally, POF is managed with hormone replacement therapy, including estrogen and progesterone and sometimes also testosterone. Girls and women with POF are encouraged to eat a healthy diet and exercise regularly (aerobics and weight training) to decrease the health risks of osteoporosis and heart disease. Supplements or medications for bone health may be prescribed. At this point, there is no treatment to restore fertility for someone diagnosed with POF. Medications can be prescribed to assist with managing POF and regulating hormones.

- Radiation to the pelvic area can cause damage to the uterus, increasing the risk for infertility, miscarriage, spontaneous abortion or premature birth.

Females who receive cancer treatment as children tend to have fewer fertility problems than females treated during the teen or adult years.

A note to parents: Talk with your daughter's doctor if she enters puberty early (before age 8). The doctor may want to prescribe drugs to delay development. If your daughter does not enter puberty by age 15, she may have POF, or her delayed puberty could be due to other causes.

A note to women: In all women, changes take place during the reproductive cycle. It is important to talk with your doctor to learn if these changes are due to normal cycle occurrences or if they are the result of disease or treatment. Talk with your doctor if you have

- Irregular menstrual cycles
- Hot flashes
- Breast tenderness
- Painful intercourse
- Trouble getting pregnant
- A history of miscarriages
- Any other questions or concerns.

Family-planning Options

Once you have spoken with your doctor about whether the treatment can affect fertility, you may want to know more about family-planning options. The options depend on several factors, including

- The patient's age at the time of diagnosis and treatment
- The type of cancer
- The type of treatment
- The patient's family planning objectives.

Adoption is a good option for some individuals after cancer treatment. In general, people who have been treated for cancer but are free of disease are eligible to adopt infants or children, but policies vary from one area to another. For further information, you may want to contact national organizations such as Fertile Hope and Resolve, listed in *Resources*, beginning on page 10.

Options for Males

Before treatment

- **Sperm banking.** Patients can donate sperm cells, which can then be frozen (called “sperm cryopreservation”) and stored for later use (after puberty only). The fertility preservation option with the highest likelihood of success for males is sperm cryopreservation.

During treatment

- **Radiation testicular shielding.** If possible, the doctor puts external shields over the patient’s pelvic area to protect it from the effects of radiation.

Before or after treatment

- **Testicular sperm extraction (TESE).** The doctor removes tissue from the testicle. Any sperm cells found in the tissue can be removed and used right away or frozen for later use (sperm cryopreservation). While extraction can be done before or after puberty, in prepubescent boys TESE is still considered an experimental procedure.
- **Testicular tissue freezing.** Freezing the cells is called “testicular tissue freezing.” The use of frozen testicular cells has not yet resulted in pregnancy; therefore, it is still considered an experimental technique, and further research is needed.

After treatment

- **Donor sperm.** Sperm can be donated for the patient’s use by a fertile donor and used to produce a pregnancy through artificial insemination.

Options for Females

Before treatment

- **Ovarian tissue freezing.** Part of the ovary (or the entire ovary) is removed and frozen for later use (after puberty only). This is still an experimental approach to fertility preservation.
- **Ovarian transposition.** A doctor surgically moves the ovaries away from the radiation field to minimize exposure and radiation damage.
- **Embryo freezing.** Mature eggs are removed, fertilized with sperm from your partner or a donor, and then frozen and stored (after puberty only). Embryo freezing is the option with the highest likelihood of success for females. Egg stimulation and harvesting for the creation of an embryo to freeze typically takes at least three to four weeks.
- **Egg freezing.** Mature eggs are removed, frozen and stored without being fertilized with sperm (after puberty only). Egg freezing is less effective than embryo freezing. It is considered to be an experimental procedure.

During treatment

- **Ovarian shielding.** If possible, the doctor puts external shields over the site of the ovaries to protect them from radiation to the abdomen.
- **Gonadotropin-releasing hormones (GnRHs).** This medication is used during chemotherapy. It may help lessen fertility damage. This is an experimental approach to fertility preservation.

After treatment

- **Embryo freezing.** Mature eggs are removed, fertilized with sperm from your partner or a donor and then frozen and stored (after puberty only).
- **Egg freezing.** Mature eggs are removed, frozen and stored without being fertilized with sperm (after puberty only).
- **Ovarian tissue freezing.** Part of the ovary (or the entire ovary) is removed and frozen for later use.

Both egg freezing and ovarian tissue freezing are experimental techniques and are currently under study.

Females who are fertile after treatment but not ready to become pregnant may want to consider embryo freezing, egg freezing or ovarian tissue freezing because they may be at risk for POF.

Some other after-treatment options

- **Donor embryos.** This option enables a woman to become pregnant with a donated embryo. She probably would not be genetically related to the child.
- **Donor eggs.** A woman can receive donated eggs that have been fertilized with her partner's sperm.
- **Surrogacy.** For a woman who is unable to carry a child, there are different types of surrogacy arrangements, depending on whether the woman is fertile or infertile. A traditional surrogate is usually a woman who becomes pregnant through artificial insemination with the sperm of the male partner in the couple who are the intended parents of the child. The surrogate provides her egg, carries the pregnancy and is the genetic mother of the baby. A gestational carrier is a healthy woman who receives an embryo that was created by the intended parents. Women who are interested in this option should get more information from a fertility specialist.

Pregnancy

Most women of childbearing age who have been treated for cancer and are able to conceive (are fertile) can go on to have normal pregnancies and healthy babies. Women should be able to become pregnant if treatment did not affect the ovaries or uterus. Before you try to become pregnant, talk with your oncologist about your medical readiness for pregnancy. You may also want to consult with an obstetrician for a fertility assessment.

Even though some drugs used to treat cancer, such as imatinib (Gleevec®), are not usually associated with fertility loss, they are not recommended to be taken by women who are pregnant. However, patients should not stop medication without medical advice. A woman who is taking imatinib or any other cancer drug should consult her oncologist before trying to conceive or if she thinks she is pregnant.

Breastfeeding

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

Some medicines should not be used while you are breastfeeding. Talk with members of your healthcare team if you are starting treatment and are breastfeeding.

Birth Control and Sexually Transmitted Diseases

If you are sexually active (having sex), it is important to use birth control until your treatment is over, or sometimes for a period of time after treatment ends. Some drugs can be very harmful to an unborn child and may cause birth defects.

Even if you know you cannot become pregnant or father a child, you are still at risk for sexually transmitted diseases (STDs). It is important to protect yourself from STDs. A barrier method of contraception is recommended. Ask your healthcare team members for more information.

Talking With Members of Your Oncology Team

It is important to talk with members of your oncology team about the fertility effects of your treatment, or your child's treatment. You need to have this information before treatment begins, if possible. The American Society of Clinical Oncology (ASCO) recommends that patients who are interested in fertility preservation consider their options as soon as possible to maximize the likelihood of success. Your oncology team members might not be able to answer all your questions, but they can refer you to fertility specialists who will help you understand and explore your options.

As you consider your treatment and fertility options, you may want to also talk with

- A genetic counselor
- An obstetrician-gynecologist or urologist
- A reproductive endocrinology specialist.

Cancer-treatment-related infertility may be associated with emotional distress, so counseling may also be beneficial for some individuals.

Some questions that you may want to ask are:

- What are the chances the treatment will affect my [or my child's] fertility?
- What can we do to protect fertility before treatment begins, during treatment or after treatment ends?
- How will I know if treatment has affected my [or my child's] fertility?
- Have other people been able to get pregnant or father a child after receiving this treatment?
- Can you recommend a fertility specialist that I can speak with?
- Can you suggest a local support group of patients or parents who have been through the same challenges?
- Can you put me in touch with patients or parents who have already completed this treatment?
- If I have a period of infertility after treatment, should I have my fertility status re-evaluated in the future?
If yes, how soon should I have a follow-up evaluation?

Will Children of Cancer Survivors Get Cancer?

Most children born to cancer survivors are healthy. The number of babies with birth defects born to cancer survivors is similar to that among children born to parents without a cancer history.

When a parent gets cancer, it does not mean that his or her child is at risk for cancer. Very few cases of cancer are inherited (passed on from a parent). You may want to talk to members of your healthcare team about whether your cancer is a type that can be passed on to your children.

To help you when you go to your next office visit and talk with your oncology team, you may want to

- Keep a journal or notebook and write down the questions you want to ask your doctor
- Bring a family member or friend
- Ask your doctor to use models or drawings when talking about your body; these can help you understand the information.

Talking With Other People

If you want to start dating, or you have just begun to date, you may be wondering how to tell someone that you have or have had cancer. It is important to be informed on the impact your treatments may or may not have had on your fertility, along with your options. There is no right or wrong way to tell someone about your cancer history.

Whether you are the patient, partner or parent, it can be helpful to seek the support of other people. You can find support from other cancer survivors, friends, family members and support groups. Your healthcare team and The Leukemia & Lymphoma Society can help you contact local or online support resources.

Financial Health Matters

Hospitals, doctors and medicine are expensive. It is a good idea to find out if your healthcare coverage will pay for fertility-treatment-related expenses and how much it will pay. Insurance coverage for cancer treatment-related infertility is not common. However, if your plan covers infertility treatment in general, you may be able to appeal for reimbursement.

Some questions that you may want to ask are:

- Does my plan cover infertility treatments? If yes, what are the conditions for coverage?
- Does my plan pay for visits to fertility specialists? How much will the plan pay and how much will I pay?
- Do I need to use a doctor from a list of doctors [also called a network] in order to receive insurance coverage?
- Do any visits to be pre-authorized [approved by the insurance company before the patient sees the doctor]? Do I need to complete claim forms or other paperwork?
- What is my copayment [the amount of money you pay] for the services needed?

Financial aid

If you need help paying your medical bills, contact

- Your hospital financial office
- Local community agencies
- The Leukemia & Lymphoma Society
- Fertile Hope (see *Resources*, beginning on page 10).

Resources

The Leukemia & Lymphoma Society

The Leukemia & Lymphoma Society is the world's largest voluntary health organization dedicated to funding blood cancer research, education and patient services. The Society has a national Information Resource Center (IRC) and chapters throughout the country and in Canada.

Callers may speak directly with an Information Specialist at the IRC, Monday-Friday, 9am–6pm EST, at (800) 955-4572. To contact an Information Specialist, click on Live Help on the Society's Web site (10am–5pm EST) or email us at infocenter@LLS.org. Information Specialists can answer general questions about diagnosis and treatment options, offer guidance and support and assist with clinical trial searches for leukemia, lymphoma and myeloma.

To find the Society chapter nearest you, visit our Web site at www.LLS.org or contact

The Leukemia & Lymphoma Society
1311 Mamaroneck Ave.
White Plains, NY 10605
Information Resource Center
(800) 955-4572
www.LLS.org

The Society provides fact sheets and booklets that can be ordered via the 800 number or through the Free Materials section at www.LLS.org.

American Fertility Association

(888) 917-3777
www.theafa.org
Provides information about infertility treatments, reproductive and sexual health and family building options including adoption and third-party solutions

American Society for Reproductive Medicine

(205) 978-5000
www.asrm.org
Provides information and expertise in reproductive medicine, including infertility, menopause, contraception and sexuality

Cancer Hope Network

(877) 467-3638
www.cancerhopenetwork.org
Provides support, information and hope to people with cancer and their families

Fertile Hope

(888) 994-HOPE (994-4673)

www.fertilehope.org

Provides reproductive information, fertility preservation financial assistance, support and hope to cancer patients whose medical treatments present the risk of infertility

International Premature Ovarian Failure Association

(703) 913-4787

www.pofsupport.org

Provides community, support and information to women who have premature ovarian failure

LIVESTRONG/The Lance Armstrong Foundation

(512) 236-8820

www.livestrong.org

Provides practical information and tools through advocacy, public health and research

People Living With Cancer

(888) 651-3038

www.plwc.org

The patient information Web site and phone number of the American Society of Clinical Oncology (ASCO), providing oncologist-approved information to help individuals and families make informed healthcare decisions

Resolve

(703) 556-7172

www.resolve.org

A national infertility organization that promotes reproductive health for men and women experiencing infertility or other reproductive disorders

References

Krebs L. What should I say? Talking with patients about sexuality issues. *Clinical Journal of Oncology Nursing*. 2006;10:313-315.

Lee SJ, Schover LR, Partridge AH, et al. American Society of Clinical Oncology recommendations on fertility preservation in cancer patients. *Journal of Clinical Oncology*. 2006;24:2917-2931.

Schover LR, Brey K, Lichtin A, Lipshultz LI, Jeha S. Oncologists' attitudes and practices regarding banking sperm before cancer treatment. *Journal of Clinical Oncology*. 2002;20:1890-1897.

Simon B, Lee SJ, Partridge AH, Runowicz CD. Preserving fertility after cancer. *CA: A Cancer Journal for Clinicians*. 2005;55:211-228.

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