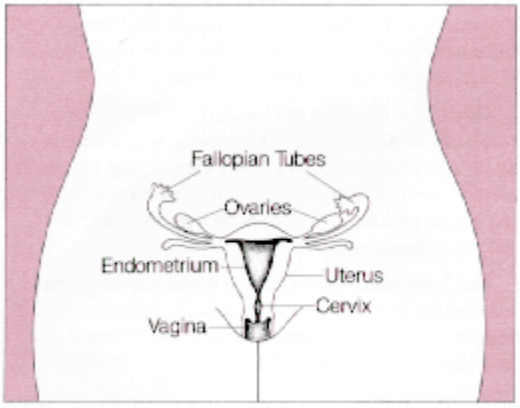
BAPTIST MD Anderson Cancer Center

Fertility Options for Women Diagnosed with Cancer

Answers to Common Questions

How does cancer treatment affect fertility?

For women, fertility is being able to become pregnant and carry a pregnancy to a live birth. Infertility is being unable to become pregnant after trying for six months to a year.



This picture shows the uterus, cervix, and other parts of a woman's reproductive system.

Cancer treatments may cause infertility. Some treatments damage the ovaries or uterus; others may affect a woman's health during pregnancy. Infertility may be temporary or permanent.

How do women become pregnant?

Ovaries produce eggs. The hormones that signal the menstrual cycle (periods) are also made by the ovaries. After a girl is born, a group of eggs start to grow and develop each month. The eggs do not become fully mature until a woman goes through puberty. At puberty, her body will start making female hormones. One egg each will mature each month.

The egg grows in a small bubble on the surface of the ovary, called a follicle. When the egg is ready, the follicle opens up and the egg is swept into the fallopian tube.
The cervix is the entry to the uterus. Sperm cells enter through the cervix. The sperm swim up through the uterus to meet the egg in one of the fallopian tubes. If a sperm fertilizes the egg, an embryo forms and begins to grow. The embryo travels down the tube and implants in the wall of the uterus. The embryo grows into a fetus inside the uterus.

Each month, if a woman does not become pregnant, the lining of the uterus breaks down. This results in monthly menstrual bleeding (periods). If she gets pregnant, the lining helps nourish the pregnancy.

Why is the uterus important?

The uterus is where the baby grows during pregnancy.

What is menopause?

A woman is born with all of the eggs she will ever have. The egg supply decreases over time. As a woman passes her mid-30s, her egg supply decreases more rapidly. Menopause starts when there are only approximately 1,000 eggs left. Her periods will stop. She will no longer be able to become pregnant. The average age of menopause is 51. Some women reach menopause at an earlier age.

What is ovarian failure?

Ovarian failure happens when the ovaries stop making hormones and producing eggs. When this happens, a woman will no longer have periods.

How does surgery affect fertility?

Surgery is a common treatment for cancers of the ovary and uterus. Both ovaries and/or the uterus may be removed. If this happens, a woman will be infertile. If both ovaries are removed menopause is permanent. Without a uterus a woman cannot become pregnant.

How does radiation affect fertility?

Radiation to the Ovaries

Radiation to the pelvic area may damage the ovaries. If the ovaries only get a small dose of radiation, and a woman is young, her periods may start again. However, some of the eggs in the ovaries will have been destroyed by the radiation. Her "ovarian reserve," (the number of eggs left in her ovaries), will be smaller. She may go into permanent menopause at a younger age than normal.

Radiation to the Brain

Radiation to or near the brain can affect a woman's fertility. The hypothalamus and pituitary gland are parts of the brain that control hormone production. Treatments to these areas can change a woman's period.

Radiation and the Uterus

Radiation to the pelvis may damage the uterus. This is especially true if the treatment was given as a child or teen. The uterus will not grow to full size. It will not be able to stretch to make room for a growing baby. Radiation also reduces some of its blood supply.

If a woman does get pregnant, she will be at risk of having a miscarriage, a premature baby or a baby that does not grow to a healthy birth weight.

How does chemotherapy affect fertility?

Chemotherapy can damage ovaries. The amount of damage depends on the type and dose of the medicines she receives. Some of the medicines most likely to cause infertility include: carboplatin, ifosfamide, cyclophosphamide, busulfan and nitrogen mustard.

The younger a woman is when she has chemotherapy, the more likely she is to continue to have periods. However, if too many eggs are destroyed a woman may have permanent menopause.

Many women over age 35 reach permanent menopause after chemotherapy. Women who have high-dose chemotherapy to prepare for a stem cell or bone marrow transplant are at the highest

risk for permanent premature menopause. Once menopause is permanent, a woman is unlikely to become pregnant.

Do any cancer treatments spare fertility?

Doctors try to spare fertility when possible. The following are examples of treatments that have a smaller impact on a woman's fertility.

- Conservative surgery for certain types of ovarian tumors, where doctors remove a part of or only one ovary (instead of removing both ovaries)
- Conservative surgery for early stage cervical cancer, where a portion of the cervix (conization) or just the cervix (trachelectomy) is removed (instead of removing the entire uterus)
- Milder combinations of chemotherapy for Hodgkin lymphoma
- Surgically moving ovaries out of radiation treatment area

Will I be fertile after treatment?

It is hard to predict what will happen. The risk of infertility depends on:

- Age
- The number of eggs in the ovaries before beginning cancer treatment
- The kind and amount of chemotherapy medicines
- The part of the body where radiation is directed
- The dose of radiation

How will I know if I am fertile after cancer treatment?

Having periods might be a sign of fertility. However, some women will get pregnant after cancer treatment without having a period. Other women will have periods but still cannot get pregnant. If you are taking birth control pills, it is difficult to know if you are fertile or not.

What tests may I need?

A reproductive endocrinologist (an infertility specialist) can do blood tests for hormones and take ultrasound pictures of the ovaries. These tests can estimate a woman's chance of getting pregnant.

Hormones tested may include Follicle-stimulating hormone (FSH), Estradiol, and Anti-Müllerian Hormone (AMH). FSH is made by the pituitary gland. It tells the ovaries to make follicles. A high FSH suggests ovarian failure. Estradiol is the hormone produced by the ovarian follicles. AMH is made directly in the ovaries. It is a good predictor of a woman's' ovarian reserve. Ultrasound pictures can show the size of the ovaries. These pictures can also show the number of follicles.

Testing hormone levels and counting follicles can give us some idea of a woman's fertility status. However, this does not allow us to predict whether or not a woman will become pregnant.

Should I use birth control?

If you do not want to become pregnant, it is important to use birth control even if you are not having periods. For example, you might use an IUD (intrauterine device) or condoms. Some

types of cancer treatment, such as an ostomy, can interfere with hormonal methods of birth control, like the pill. Women who have had breast cancer are usually advised to use non-hormonal methods of contraception. Be sure to let your doctor know about your cancer history when discussing birth control options.

What are options for preserving a woman's fertility?

Fertility preservation involves freezing embryos, eggs, or ovarian tissue before cancer treatment. The frozen tissue is available later to conceive a child.

What is embryo freezing?
The most widely available and successful way of preserving fertility before treatment is embryo freezing. Hormones are taken to stimulate the ovaries to ripen multiple eggs at once. Then the eggs are removed in a minor, outpatient surgery.

Using an ultrasound image, the fertility specialist guides a needle through the upper vagina into each follicle on the surface of the ovary, "harvesting" the egg inside. Once eggs have been removed, they can be fertilized in the lab with the sperm. Eggs that fertilize and start to form embryos are frozen and stored for future use. This process is called in vitro fertilization (IVF).

What is egg freezing?
Egg freezing is another successful way to preserve fertility before cancer treatment. It is a newer procedure, so the success rates are slightly less than those seen with embryo freezing.

Hormones are taken to stimulate the ovaries to ripen multiple eggs at once. Then the eggs are "harvested," just like they are with IVF. However, the eggs are frozen immediately instead of being inseminated with sperm.

Why would a woman choose to freeze eggs?
A frozen embryo belongs to both the woman and the man who provided the sperm. The male may be a spouse, boyfriend or unknown donor. This may become an issue if the relationship changes. For example divorce, break-ups and new unions may all impact future use of frozen embryos. Frozen eggs belong only to the woman. Some women may choose to freeze eggs because they have moral or religious objections to freezing embryos.

What is ovarian tissue freezing?
Some women have small pieces of ovarian tissue surgically removed and frozen. Each piece contains hundreds of unripe eggs. The tissue is placed back into the body after treatment is completed. It can grow a new blood supply and begin to ripen eggs and produce hormones, which can make it possible for a woman to become pregnant.

Ovarian tissue freezing is experimental. There is a risk that cancer cells in the ovary could be put back in the woman's body, especially with cancers like leukemia or lymphoma.

Using Hormones to Create a Temporary Menopause during Cancer Treatment

Using medicines to protect fertility is experimental. This treatment is based on the idea that a

"quiet" or non-functioning ovary may be damaged less by chemotherapy. The data from research studies are mixed; some studies show that it works while others do not.

How long can eggs, embryos and tissue be frozen?

Once frozen, ovarian tissue, embryos or eggs can be stored indefinitely.

How much does IVF cost?

IVF costs about $12,000-$15,000. Hormone shots can add another $1,500- $5000.

In most states, IVF is not covered by insurance. IVF may be covered for women who are infertile. It is hard to get coverage for fertility preservation, because at that time the woman is not infertile. You should talk with your insurance company. Ask if they cover infertility tests and treatment. It is best to talk with them right away. A letter from your cancer doctor explaining the need to preserve fertility before your treatment may help.

There are financial assistance programs available. They can help decrease the costs of medicines and fertility procedures.

Is it safe to undergo IVF after breast cancer?

During normal IVF, the levels of estrogen increase. Estrogen can help some cancers grow. Cancer doctors may have concerns that increased levels of estrogen could worsen these cancers. However, hormone levels are only high for a few weeks. Women who have cancers that may be affected by high levels of estrogen can take additional medicines that stop estrogen levels from getting as high as they do with regular IVF.

After cancer treatment, how long should I wait before trying to get pregnant?

Doctors typically tell women to wait two years. The first two years is when patients are at highest risk of having their cancer return. Since eggs exposed to chemotherapy or radiation treatment may suffer damage, this also allows enough time for this damage to be repaired. Each person's situation is different. Please talk to your doctor before trying to become pregnant.

Does pregnancy after cancer cause it to come back?

No. Current research suggests that pregnancy after cancer treatment does not cause the cancer to return.

Will my children be healthy?

People who have had cancer have the same birth outcomes as the general population. Your child will have no additional birth or developmental risks.

Some cancers (about 5-10 percent of all cancers) have a strong genetic factor. This means there is an increased chance of other family members getting cancer. If you have a family history of cancer, you may want to talk with a genetic counselor.

In what other ways can I become a parent?

Adoption is one way to become a parent.

Women who have damaged ovaries can sometimes carry a pregnancy with:

- An egg supplied by a donor, or
- With a donated embryo

Women with stored eggs or embryos may choose to have another woman, a gestational carrier, to carry and give birth to her baby.

Resources:

- LIVESTRONG fertility website: http://www.livestrong.org/we-can-help/fertility-services/#
- The American Society for Reproductive Medicine Patient Website: ReproductiveFacts.org
- Loren AW, Mangu PB, Beck LN, Brennan L, Magdalinski AJ, Partridge AH, Quinn G, Wallace WH, Oktay K; American Society of Clinical Oncology. Fertility preservation for patients with cancer: American Society of Clinical Oncology clinical practice guideline update. J Clin Oncol. 2013 Jul 1;31(19):2500-10.

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