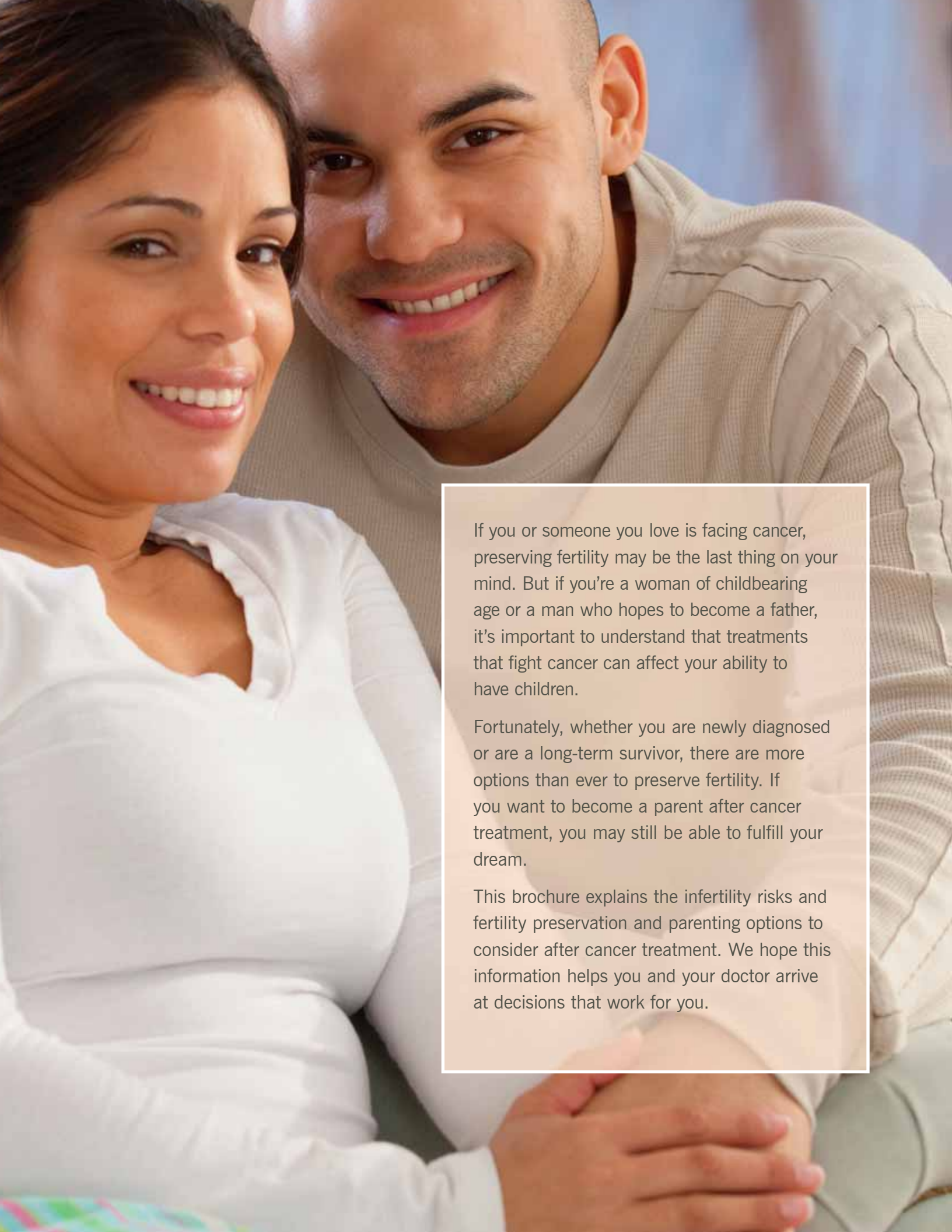




Cancer and Fertility

Planning for Parenthood
After a Cancer Diagnosis





If you or someone you love is facing cancer, preserving fertility may be the last thing on your mind. But if you're a woman of childbearing age or a man who hopes to become a father, it's important to understand that treatments that fight cancer can affect your ability to have children.

Fortunately, whether you are newly diagnosed or are a long-term survivor, there are more options than ever to preserve fertility. If you want to become a parent after cancer treatment, you may still be able to fulfill your dream.

This brochure explains the infertility risks and fertility preservation and parenting options to consider after cancer treatment. We hope this information helps you and your doctor arrive at decisions that work for you.

Cancer and Fertility

Cancer and its treatments affect the body, including the reproductive system, in different ways. Chemotherapy, radiation and surgery can all be toxic to the ovaries and testicles.

In general, the higher the dose and the longer the treatment, the greater the chance for reproductive problems. Other risks depend on age, type of drugs used, the area receiving radiation and additional factors.

Talk to your oncologist about how treatments may affect fertility. It's best to consider options for preserving fertility early when planning treatment.

Factors that Influence Fertility

Blood and Marrow Transplant (BMT)

Prior to receiving a blood or marrow transplant, patients are treated with high-dose chemotherapy and radiation to destroy cancer cells. Side effects of this life-saving therapy occur when normal cells in the body are also destroyed by the treatment. Cells in the male and female reproductive system fall into this category, and BMT survivors might suffer temporary or permanent damage affecting future fertility.

Cancer Diagnosis

Cancer itself can cause infertility. Testicular cancer and Hodgkin's disease can produce low sperm counts in some men even before treatment begins.

Chemotherapy

Chemotherapy can be damaging to sperm and eggs. Chemotherapy drugs in the alkylating class are the most detrimental to fertility. Platinum-based and other chemotherapy drugs can also cause damage. Individual factors such as age, type of drug(s) and total dose may also affect the risks of becoming infertile.

Radiation Therapy

Radiation therapy can impair the reproductive system. Radiation to the brain may affect fertility by damaging areas that control hormone production. Radiation therapy aimed at or near the pelvic area can directly affect the testicles or ovaries, causing infertility.

Cancer Surgery

Surgery that removes part or all of the reproductive system can impair or even eliminate fertility. If cancer involves the testicles, ovaries, uterus, cervix, or nerves and lymph nodes in the abdomen and pelvis, talk to the surgeon. Ask how surgery may affect fertility or the ability to establish or maintain a pregnancy.

Men

Infertility occurs when men can no longer make sperm, when the sperm count is low or when sperm have been damaged by cancer treatment. After intensive or prolonged treatment, sometimes very few sperm — or no sperm at all — are found in the semen.

Options for Preserving Fertility

Sperm Banking

Sperm banking is a simple, proven way to try to preserve fertility before cancer treatment. Sperm can be frozen and stored (cryopreserved) for future use. Samples can be collected daily or every other day. Banking may be worthwhile even if the sperm count is low or if only one deposit is made. Advanced reproductive technologies require only a few sperm to achieve pregnancy. Sperm can remain safely frozen indefinitely.

Testicular Tissue Freezing

Men who have no sperm present in their semen can have a surgical procedure to remove small pieces of testicular tissue. This tissue is examined for sperm at the time of surgery. Testicular tissue containing sperm can be frozen and used to obtain sperm for future fertilization. An advanced technique, intracytoplasmic sperm injection (ICSI), requires just one sperm for fertilization.

Radiation Shielding

If there is a chance that radiation will affect fertility, it's important to request radiation shielding (protection) from the radiation oncologist. Covering one or both testicles with lead-lined shields also reduces risks of damage when radiation is delivered to the lower abdomen or pelvis.

Testing Fertility After Treatment

A semen analysis is a simple test a male fertility specialist can perform after treatment to check for sperm production. The results will be helpful in choosing the best parenthood options. When or if fertility will return is uncertain. It may take a couple of years or may happen sooner. Since the likelihood and timing are uncertain, anyone who is not ready to become a father should consider using some form of birth control.

Options for Parenthood After Treatment

Natural Conception

Many cancer survivors have children after treatment. Natural conception can occur when a semen analysis is in the normal or near-normal range. However, men should talk to their oncologist about when to start trying to have children. Radiation and chemotherapy may affect the genetic material in sperm-producing cells, and damage may take a year or so to repair.

Assisted Reproduction

Assisted reproduction is an option when sperm counts are low, when sperm quality is poor or when sperm are absent in the semen. Consulting a reproductive specialist may be worthwhile. Banked sperm can be used to impregnate a partner through in vitro fertilization (IVF). If sperm have not been banked, male fertility specialists may be able to extract sperm from testicular tissue. Sometimes only a single sperm is needed to establish a pregnancy.

Donor Sperm

If no sperm are present in the semen or testicular tissue, sperm donation programs allow men to select anonymous donors whose traits and characteristics most closely match their own.

Adoption

Adoption agencies may look at medical history or require a letter from the doctor about a prospective parent's health. It is wise to select an agency that is open to working with cancer survivors.



NextGen® Home Sperm Banking

Cleveland Clinic's NextGen® Home Sperm Banking service allows men to collect semen samples in the privacy of their homes rather than going to a fertility lab. Specimens are shipped in a specially designed container to the Cleveland Clinic Andrology Laboratory and Reproductive Tissue Bank on our main campus.

The NextGen Home Sperm Banking kit offers a safe and reliable way to store semen samples and to preserve fertility for the future. For further information, call 866.9BANKIN or 866.922.6546.

A pregnant woman with dark skin is shown from the side, wearing a teal-colored dress. She is gently holding her pregnant belly with both hands. She is wearing a gold ring on her finger and a gold bracelet on her wrist. The background is plain white.

Women

Infertility occurs when women can no longer produce mature eggs or when another condition prevents them from establishing or maintaining a pregnancy. Women are born with a certain number of eggs in their ovaries. Some or all of these eggs may be damaged or destroyed by cancer treatments. Because women do not grow new eggs, the loss of eggs can cause infertility and premature ovarian failure.

Premature ovarian failure, or early menopause, is the loss of fertility before age 40. Some women go into early menopause and become infertile immediately after cancer treatment. Some women regain their fertility after cancer treatment. Other women resume having their periods but go into early menopause because of damage to their egg supply.

Options for Preserving Fertility

Embryo Freezing and Egg Freezing

Embryo freezing is a proven, successful method for preserving fertility. Because it requires sperm, this is an option for women who are married, who have a committed partner or who are willing to use donor sperm.

Egg freezing is a newer option for women who are not yet ready to start a family. Although embryo freezing is more efficient, egg freezing allows women to preserve eggs for future fertilization with a partner's or donor's sperm. The process of retrieving and freezing eggs or embryos takes from two to six weeks.

Ovarian Shielding and Ovarian Transposition

Ovarian shielding and ovarian transposition are two techniques that can minimize exposure of the ovaries and eggs to radiation during cancer treatment. This may reduce risks of damage and help preserve fertility. Ask the radiation oncologist about options for protecting the ovaries when radiation is delivered to the abdomen.

Ovarian Tissue Freezing

Although it is experimental, ovarian tissue freezing is an option for women who cannot wait two to six weeks to begin treatment. It is also an option for women who cannot undergo hormonal stimulation to retrieve eggs or embryos for freezing. Ovarian tissue is surgically removed and frozen until chemotherapy and/or radiation therapy is completed. The thawed tissue is then transplanted into the pelvis. There, it may function well enough to release an egg that may make its way into the fallopian tube for normal fertilization. Eggs from the transplanted tissue may also be removed for in vitro fertilization (IVF).

Suppressing Ovarian Activity During Chemotherapy

Some studies indicate that suppressing ovarian activity during chemotherapy, while controversial, may lessen the treatment's negative impact on fertility. The benefits of medications that suppress ovarian activity, which are called gonadotropin-releasing hormone agonists, are being studied. Ask an oncologist or reproductive endocrinologist about this alternative.



Testing Fertility After Treatment

Women may still be fertile if their periods continue without assistance after cancer treatment. A reproductive specialist can estimate the number of eggs that remain, using hormone tests and ultrasound.

Options for Parenthood After Cancer

Natural Conception

Natural conception may be possible for women who remain fertile after treatment. Many women can get pregnant naturally after cancer treatments.

Egg and Embryo Banking

Embryo, egg or ovarian tissue freezing can be considered by women who complete cancer treatment if they are concerned about going into early menopause but are not ready to start a family.

Donor Eggs and Embryos

If no healthy eggs remain in the ovaries after treatment, donor eggs or embryos can be fertilized with a partner's or donor's sperm. Women may select eggs from anonymous donors whose traits and characteristics most closely match their own. Donor embryos are available from couples who have extra embryos after completing their families. In either case, transfer of the embryo into the uterus makes parenthood possible for women who go into early menopause.

Gestational Surrogacy

If pregnancy is unsafe or impossible after cancer treatment, a surrogate can carry a patient's baby in her womb. Because gestational surrogacy laws vary from state to state, it is important to understand them. A cancer patient's eggs can be fertilized with a partner's or donor's sperm. The resulting embryo can then be implanted in the surrogate. Donor eggs or embryos may also be used.

Adoption

Adoption agencies may look at medical history or require a letter from the doctor about a prospective parent's health. It is wise to select an agency that is open to working with cancer survivors.

Fertility-Sparing Surgery

Today, many surgical procedures can preserve fertility when gynecologic cancers are diagnosed. It's important to ask surgeons about fertility-sparing options.



Safety of Having Children After Cancer

Current studies suggest that:

- Pregnancy after cancer will not reduce a woman's chance of survival (i.e., will not trigger a cancer recurrence), even after breast cancer.
- Radiation to the uterus will increase the risk of miscarriage or premature birth.
- The stress of pregnancy may worsen undetected damage to a woman's heart or lungs from cancer treatment.
- Sperm cells exposed to chemotherapy or radiation may suffer genetic damage that repairs itself one to two years after treatment.
- Exposing eggs to chemotherapy or radiation may result in genetic damage that may repair itself within six months if the exposure is low.
- The incidence of birth defects in the general population is 2 to 3 percent. The incidence appears to be similar among children born after one parent has cancer treatment: It is no higher than 6 percent, and probably lower.
- No unusual cancer risks have been identified in the children of cancer survivors. (The only exception is when a genetic cancer syndrome, such as inherited retinoblastoma, is involved.)

To date, research has been reassuring. However, the number of pregnancies and births studied after cancer treatment remains small. Larger studies could reveal additional health risks. Please consult your medical team if you are considering conception and pregnancy after cancer treatment.

Fertility Preservation in Children

When a child is diagnosed with cancer, fertility preservation is usually not the primary concern, however pediatric cancer treatment can affect fertility. Children who have experienced puberty have similar options to adults. Options are more limited for children who have not experienced puberty. Prepubescent females may be eligible to undergo ovarian tissue freezing or ovarian transposition procedures. Prepubescent males do not have a standard treatment at this time, however there may be experimental treatments available.

Frequently Asked Questions

Thinking about fertility before cancer treatment begins is important in understanding your options when you are ready to become a parent. The following questions will be helpful when talking to the medical team about the effects of cancer treatment on fertility.

Suggested questions:

Will cancer treatment have any short- or long-term side effects on my reproductive system?

Is infertility a possible side effect of treatment?

Are there alternative ways to treat this cancer that reduce the risks of damage to my reproductive system?

What are my options for preserving fertility before, during and after treatment?

Would any of these options make my treatment less effective?

After treatment, how will I know if I am infertile or fertile?

If treatment results in infertility, what are my options for becoming a parent?

How long after treatment should I wait before trying to conceive?

Questions for women:

Will I enter premature menopause after treatment?

If I become menopausal after treatment, is it likely to be temporary or permanent?

To learn about the many options available for preserving fertility, ask your oncologist to refer you to a reproductive specialist. Social workers, religious advisers, psychologists and other cancer survivors may also be able to help you with your fertility choices.



Cleveland Clinic Fertility Center's Open Group on Facebook

The Cleveland Clinic Fertility Center has an open Facebook group that offers interaction with physicians, nurses, embryologists and others who deal with fertility issues. Members stay up to date on infertility diagnoses, treatments and procedures, and get support. Visit clevelandclinic.org/FertilityFacebook.

**For more information about our
staff**, including complete profiles,
visit clevelandclinic.org/infertility.

Cleveland Clinic Fertility Specialists

Cleveland Clinic fertility specialists are available to consult with individuals and couples at these Northeast Ohio locations:

Locations

Beachwood Fertility Center

Beachwood Family Health and Surgery Center
26900 Cedar Road, Suite 220 South
Beachwood, OH 44122
216.839.3150

Cleveland Clinic main campus

Ob/Gyn & Women's Health Institute/A81
9500 Euclid Ave.
Cleveland, OH 44195
216.444.6601

Richard E. Jacobs Health Center, Avon

33100 Cleveland Clinic Blvd.
Avon, OH 44011
440.695.4000

Cleveland Clinic Andrology Laboratory and Reproductive Tissue Bank

Men interested in banking sperm can either order a NextGen® Home Sperm Banking kit or schedule a convenient consultation or appointment at our:

Andrology Laboratory and Reproductive Tissue Bank

East 105th Street and Carnegie Avenue/
Desk X11

Cleveland, OH 44195

216.444.8182 or 800.223.2273, ext. 48182

(Weekday and Saturday appointments available)

Cleveland Clinic Center for Male Fertility

Specialists at these Center for Male Fertility locations are available to assist men and their oncologists in preserving fertility potential:

Locations

Beachwood Family Health and Surgery Center

26900 Cedar Road, Suite 220 South

Beachwood, OH 44122

216.444.5598

Cleveland Clinic main campus

9500 Euclid Ave., Q10

Cleveland, OH 44195

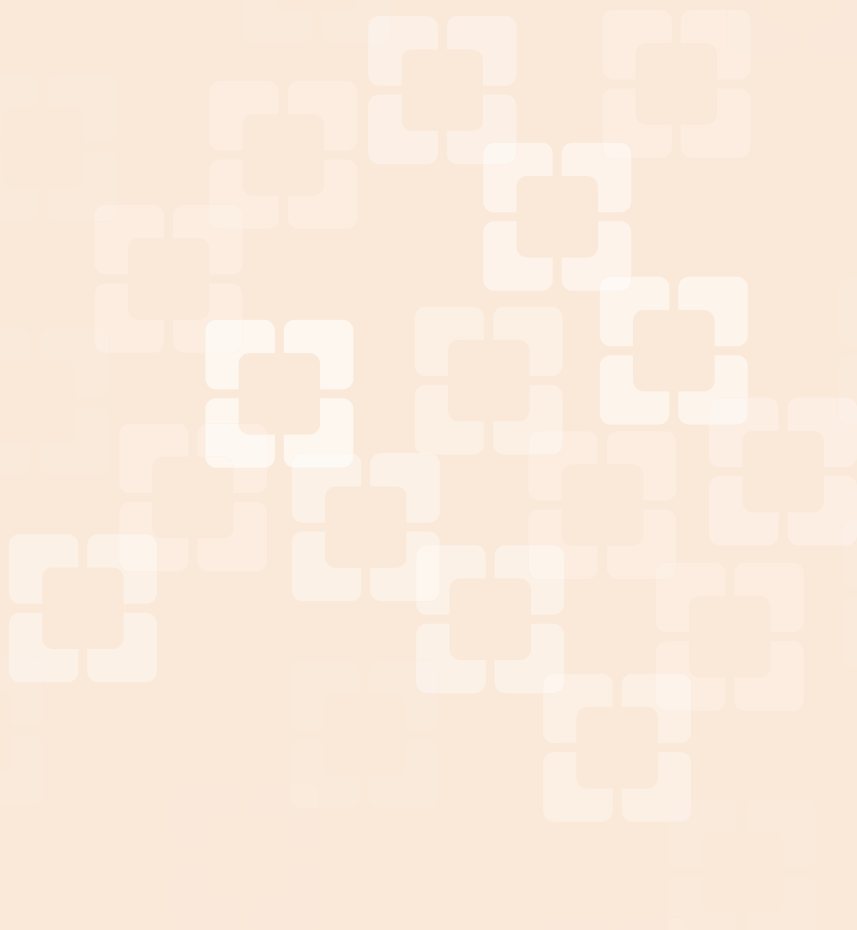
216.445.4473

Richard E. Jacobs Health Center, Avon

33100 Cleveland Clinic Blvd.

Avon, OH 44011

440.695.4000





Every life deserves world class care.

9500 Euclid Ave., Cleveland, OH 44195

Cleveland Clinic Cancer Center provides complete cancer care enhanced by innovative basic, genetic and translational research. It offers the most effective techniques to achieve long-term survival and improve patients' quality of life. The Cancer Center's more than 450 physicians, researchers, nurses and technicians care for thousands of patients each year and provide access to a wide range of clinical trials. Cleveland Clinic Cancer Center unites clinicians and researchers based in Taussig Cancer Institute and in Cleveland Clinic's 26 other clinical and special expertise institutes, as well as cancer specialists at our regional hospitals, health centers and Cleveland Clinic Florida. Cleveland Clinic is a nonprofit academic medical center ranked as the No. 2 hospital in the country by *U.S. News & World Report*, where more than 3,500 staff physicians and researchers in 140 specialties collaborate to give every patient the best outcome and experience. clevelandclinic.org

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18-CNR-646