

a nonprofit organization



Cancer & Fertility

Fast Facts for Ob/Gyns



information • support • hope

table of contents

introduction	1
role of the obstetrician-gynecologist	
• cancer screening and diagnosis	2
• referring to a cancer specialist	2
• counseling your patient	3
• the importance of early referral for fertility preservation	4
• pregnancy and children after cancer	5
cancer-related infertility	
• risks	6
• options	8
value of fertility to patients and survivors	12
how can we help you?	13

Fertile Hope has provided this information for educational purposes only. Fertile Hope does not provide medical or professional services. Fertile Hope does not endorse, promote or recommend any of the services or procedures referenced herein. The information should not be relied on to suggest a course of treatment; nor should it be used by a patient in place of a visit, call or consultation with a qualified healthcare provider. Fertile Hope disclaims any implied guarantee about the accuracy, completeness, timeliness or efficacy of any information provided herein.

introduction

Each year, approximately 140,000 Americans under the age of 45 are diagnosed with cancer. Cancer survival rates are higher than they have ever been, and overall, patients under the age of 45 now have a 77% survival rate. At the same time, there are more fertility preservation options for these patients than ever before. So while cancer treatments can be permanently sterilizing, young adults are surviving and the reproductive community is providing great hope for parenthood after cancer.

Major cancer organizations including the President's Cancer Panel and the National Cancer Institute have recognized that, as survivorship increases, the need to address the long-term consequences of cancer treatment, including infertility, also increases. As evidenced by the 2006 release of the American Society of Clinical Oncology's (ASCO) Recommendations on Fertility Preservation in Cancer Patients (www.asco.org), the cancer community has recognized the need to provide information about the reproductive risks associated with cancer treatments. One vital aspect of informing patients of their risks is the timing of the delivery of that information. ASCO recommends informing a patient of their risks as early in treatment planning as possible, which helps patients take advantage of the full range of available options.

As a clinician on the front lines of cancer screening and diagnosis, you are in a position to assess the value of future fertility and encourage a timely discussion of treatment-related infertility. The purpose of this booklet is to provide you with an overview of cancer and fertility, including a woman's risk of infertility due to her cancer treatment, as well as her fertility preservation and post-treatment parenthood options.



role of the obstetrician-gynecologist

cancer screening and diagnosis

As an obstetrician-gynecologist, you play a major role in screening women for gynecologic and breast cancers. Through the course of routine exams or as a result of a woman having specific symptoms, obstetrician-gynecologists most frequently diagnose cancers of the cervix, uterus, ovary, peritoneum, fallopian tube, vulva, and vagina. During a routine visit you may also perform a clinical breast exam, refer the patient for mammography, and make a diagnosis of breast cancer.

It is precisely during this early stage of detection and diagnosis that a woman is most fully able to consider and access the fertility preservation options that are available to her.

referring to a cancer specialist

Per the referral guidelines of the Society of Gynecologic Oncologists (www.sgo.org), it is likely that at some point you will refer your patient to a gynecologic oncologist for further evaluation, treatment, and management of her cancer. Similarly, if a diagnosis of breast or another type of cancer is made, your patient will be referred on to the appropriate cancer specialist.

Ideally then, the oncologist will abide by the ASCO guidelines for fertility preservation. The guidelines assert that as part of the informed consent process, oncology healthcare professionals should implement the following:

- Discuss infertility as a potential risk of therapy as early in treatment planning as possible with patients treated during their reproductive years

- Be prepared to discuss possible fertility preservation options
- Refer patients to appropriate reproductive specialists and psychosocial providers
- Answer basic questions about whether fertility preservation options decrease the chance of successful cancer treatment, increase the risk of maternal or perinatal complications, or compromise the health of offspring

counseling your patient

While the treating oncologist should discuss fertility risks in the normal course of consultation and evaluation, it is more likely that a patient will initiate this conversation with her oncologist if she has received information from you about the importance of fertility preservation before beginning any cancer treatment. Unfortunately, studies show that this topic often goes unaddressed by the oncology team, for a variety of reasons. Your expertise of the reproductive system coupled with early contact with the patient means that you are in an important position to prepare the patient for this discussion with her oncology team, and also to direct her to preservation options if desired.

“Creating hope is part of what I do...what this profession does. However, it becomes more meaningful, more enduring, more profound, when dealing with a cancer patient. They are the patients you always remember and admire.”

-Reproductive Endocrinologist

the importance of early referral for fertility preservation

Once diagnosed, patients generally have a short period of time in which they will be able to consult with a fertility doctor and/or undergo fertility preservation techniques. For example, many patients have a hiatus of only two to six weeks between surgery and adjuvant therapy, which may be a good time for fertility preservation. Others may have even less time and, therefore, may not be eligible for standard fertility procedures. Even in these cases patients must be triaged and counseled in an expedited fashion to afford them their full range of fertility preservation options. Whatever amount of tissue and/or gametes that can be preserved in this window prior to cancer treatment may represent the patient's only reserve of genetic material.

pregnancy and children after cancer

You are also likely to be on the front lines of decision-making for long-term survivors who return to you after cancer treatments and want to explore their family-building options. The following information may be relevant and helpful to you in these discussions.

- While data are limited, current studies indicate that pregnancy does not cause cancer recurrence (even after breast cancer)
- Eggs and sperm exposed to chemotherapy and/or radiation may suffer genetic damage; this appears to be repaired within six months (eggs) to one year (sperm)
- An increased risk of miscarriage is only a concern for a small percent of patients who had radiation to their pelvic area or fertility-sparing gynecologic surgeries

- Long-term heart or lung damage from treatment may complicate the ability to safely carry a pregnancy; patients should ask their oncologist about the need for an echocardiogram or a high-risk obstetrician before becoming pregnant
- There is no evidence that a history of cancer or cancer therapy increases the occurrence of birth defects or cancer in offspring (except in the case of hereditary genetic syndromes)
- Patients with genetic cancers, including BRCA 1 and 2, may be able to use pre-implantation genetic diagnosis (PGD) to screen embryos and avoid passing on the gene



cancer-related infertility

risks

While cancer itself does not appear to affect fertility in women, cancer treatments pose a variety of reproductive risks including **immediate infertility**, **premature menopause**, and **compromised ability to carry a pregnancy** due to uterine or cervical damage. Factors determining the likelihood of reproductive damage include: drug type and dosage; radiation location and dosage; patient's age and pubertal status at the time of treatment; and pre-treatment fertility (which is often unknown).

Chemotherapy and **radiation** can damage or destroy oocytes and follicles, which can cause either immediate **menopause** or **premature menopause** a few years after treatment completion. Many patients who return to menstruation after the completion of treatment believe erroneously that their reproductive capacity has not been affected. The possibility of premature menopause should be discussed with these patients. In addition to oocyte damage, new research shows that chemotherapy and radiation may also affect ovarian blood vessels and stromal function.

Surgery to remove **reproductive organs** such as the ovaries, fallopian tubes, uterus and/or cervix will impair the ability to become pregnant and/or carry a baby. **Radiation** can damage the uterus and increase the risk of **miscarriage** or **low birth-weight**. Survivors who received pelvic radiation may be advised to consider consulting a high-risk obstetrician before becoming pregnant.

To better understand the level of risk associated with various cancer treatments, please consult the chart on page 7.

risk of amenorrhea from chemotherapy and radiation treatments for cancer

The following table represents a compilation of both clinical experience and the published research on the impact of common cancer treatments on menstruation. Generally, studies have not focused on other measures of reproductive capacity, such as hormone levels or follicle counts which may more accurately reflect reproductive capacity.

Degree of Risk	Treatment Protocol	Common Usage
High Risk >80% of women develop amenorrhea post-treatment	Whole abdominal or pelvic radiation doses ≥ 6 Gy in adult women Whole abdominal or pelvic radiation doses ≥ 15 Gy in pre-pubertal girls ≥ 10 Gy in post-pubertal girls TBI radiation doses CMF, CEF, CAF x 6 cycles in women 40+ Cyclophosphamide 5 g/m ² in women 40+ Cyclophosphamide 7.5 g/m ² in girls < 20 Alkylating chemotherapy (e.g., cyclophosphamide, busulfan, melaphan) conditioning for transplant Any alkylating agent (e.g., cyclophosphamide, ifosamide, busulfan, BCNU, CCNU) + TBI or pelvic radiation Protocols containing procarbazine: MOPP, MVPP, COPP, ChIVPP, ChIVPP/EVA, BEACOPP, MOPP/ABVD, COPP/ABVD Cranial/brain radiation ≥ 40 Gy	Multiple cancers Wilms' tumor, neuroblastoma, sarcoma, Hodgkin lymphoma Bone marrow transplant/stem cell transplant (BMT/SCT) Breast cancer Multiple cancers Non-Hodgkin lymphoma (NHL), neuroblastoma, acute lymphoblastic leukemia (ALL), sarcoma BMT/SCT BMT/SCT, ovarian cancer, sarcoma, neuroblastoma, Hodgkin lymphoma Hodgkin lymphoma Brain tumor
Inter-mediate Risk ~30-70% of women develop amenorrhea post-treatment	CMF or CEF or CAF x 6 cycles in women 30-39 AC in women 40+ Whole abdominal or pelvic radiation 10-<15 Gy in prepubertal girls Whole abdominal or pelvic radiation 5-<10 Gy in postpubertal girls Spinal radiation ≥ 25 Gy	Breast cancer Breast cancer Wilms' tumor Wilms' tumor, neuroblastoma Spinal tumor, brain tumor, neuroblastoma, relapsed ALL or NHL
Low Risk <20% of women develop amenorrhea post-treatment	AC in women 30-39 CMF, CEF, or CAF x 6 cycles in women under 30 Non-alkylating chemotherapy: ABVD, CHOP, COP AC (anthracycline, cytarabine) Multi-agent therapies	Breast cancer Breast cancer Hodgkin lymphoma, NHL Acute myeloid leukemia (AML) ALL
Very Low/ No Risk Negligible effect on menses	MF (methotrexate, 5-FU) Vincristine (used in multi-agent therapies) Radioactive Iodine	Breast cancer Leukemia, Hodgkin lymphoma, NHL, neuroblastoma, rhabdomyosarcoma, Wilms' tumor, Kaposi's sarcoma Thyroid cancer
Unknown Risk	Paclitaxel, docetaxel (Taxanes used in AC protocols) Oxaliplatin Irinotecan Bevacizumab (Avastin) Cetuximab (Erbix) Trastuzumab (Herceptin) Erlotinib (Tarceva) Imatinib (Gleevec)	Breast cancer Ovarian cancer Colon cancer Colon, non-small cell lung Colon, head & neck Breast cancer Non-small cell lung, pancreatic Chronic myeloid leukemia (CML), gastrointestinal stromal tumor (GIST)

options

The most proven and successful method of **fertility preservation** for women is **embryo freezing**. Cancer patients who have concerns about using IVF hormones, are single, or do not have time to undergo standard IVF to create embryos may want to look into experimental options.*

For women with hormone-sensitive tumors who do not want to undergo ovarian stimulation with standard IVF medications, protocols using alternative medications such as tamoxifen and aromatase inhibitors to limit hormone exposure may be considered.

Patients who are single or do not have a male partner to provide sperm for the creation of embryos may want to think about **egg freezing**.*

Patients who do not have time for ovarian stimulation may also want to consider experimental options such as **in vitro maturation*** or **ovarian tissue freezing***, procedures that can be performed fairly quickly. In vitro maturation involves retrieving immature oocytes and then maturing them in vitro. Once matured, the oocytes can either be frozen or fertilized to create embryos and then frozen. Ovarian tissue freezing involves the removal, sectioning and freezing of the cortex of an ovary. The ovarian strips can be transplanted later to restore hormonal function and for use with IVF.

Post-treatment, patients should undergo **fertility testing** to assess their reproductive status. Patients should not rely on the return of menses as an indication of fertility, and the risk of early menopause should be thoroughly discussed. Patients who either are at high risk of premature menopause or show signs of reduced fertility may want to consider fertility preservation after cancer treatment if they are not ready to start a family before menopause is likely to occur.

For those patients who are **infertile** or who are **unable to carry a pregnancy**, options such as **donor eggs**, **donor embryos**, **surrogacy** and **adoption** should also be presented as options for motherhood. While data is limited, pregnancy after cancer does not appear to cause recurrence, even in patients who have hormonally sensitive tumors.

In addition, aside from hereditary genetic syndromes and in utero exposure to chemotherapy, there is no evidence that a history of cancer, cancer therapy, or fertility interventions increase the risk of cancer or congenital abnormalities in the progeny of survivors.

Please see the chart on pages 10-11 for more detail on the available reproductive options for women, including experimental procedures.

*The American Society for Reproductive Medicine (ASRM) recommends that all experimental procedures be offered under IRB protocol.



female reproductive options

female reproductive options

OPTION	Embryo Freezing	Egg Freezing	Ovarian Tissue Freezing	In Vitro Maturation	Radiation Shielding of Gonads	Ovarian Transposition		Radical Trachelectomy	Ovarian Suppression	Donor Embryos	Donor Eggs	Gestational Surrogacy	Adoption
MEDICAL STATUS	Standard	Experimental	Experimental	Experimental	Standard	Standard		Standard	Experimental	Standard	Standard	Standard	Standard
DEFINITION	Harvesting eggs, in vitro fertilization and freezing of embryos for later implantation	Harvesting and freezing of unfertilized eggs	Freezing of ovarian tissue and reimplantation after cancer treatment	Harvesting immature eggs and maturing them in the laboratory	Use of shielding to reduce scatter radiation to the reproductive organs	Surgical repositioning of ovaries away from the radiation field		Surgical removal of the cervix with preservation of the uterus	Medication used to suppress ovarian cycling	Embryos donated by a couple	Eggs donated by a woman	Woman carries a pregnancy for another woman or couple	Process that creates a legal parent-child relationship
PUBERTAL STATUS	After puberty	After puberty	Before or after puberty	After puberty	Before or after puberty	Before or after puberty		After puberty	After puberty	After puberty	After puberty	After puberty	After puberty
TIME REQUIREMENT	10-14 days from menses Outpatient surgical procedure	10-14 days from menses Outpatient surgical procedure	Outpatient surgical procedure	2-10 days Outpatient surgical procedure	In conjunction with radiation treatments	Outpatient procedure		Inpatient surgical procedure	In conjunction with chemotherapy	Varies; is done in conjunction with IVF	Varies; is done in conjunction with IVF	Varies; time is required to find surrogate and implant embryos	Varies depending on type of adoption
SUCCESS RATES	Approximately 20-33% per transfer; varies by age & center Thousands of babies born	Approximately 21.6% per embryo transfer 500+ live births	Case reports of two live births	Up to 30% per embryo transfer	Only possible with selected radiation fields and anatomy	Approximately 50% due to altered blood flow and scattered radiation		No evidence of higher cancer recurrence rates in appropriate candidates	Unknown; conflicting results reported Larger randomized trials in progress	Unknown; higher than that of frozen embryo IVF transfers	40-50%	Similar to IVF—approximately 30%	N/A
COST	Approximately \$12,000/cycle; storage fees & pregnancy costs additional	Approximately \$12,000/cycle; storage fees & pregnancy costs additional	\$12,000 for procedure; storage fees & reimplantation costs additional	Approximately \$5,000	Generally included in cost of radiation	Unknown; may be covered by insurance		Generally included in the cost of cancer treatment	\$500/month	\$5,000-\$7,000 (in addition to costs for IVF)	\$5,000-\$15,000 (in addition to costs for IVF)	\$10,000-\$100,000	\$2,500-\$35,000
TIMING	Before treatment	Before treatment	Before treatment	Before treatment	During treatment	Before treatment		During treatment	During treatment	After treatment	After treatment	After treatment	After treatment
SPECIAL CONSIDERATIONS	Need partner or donor sperm	May be attractive to single women or those opposed to embryo creation	Not suitable if high risk of ovarian metastases Only preservation option for pre-pubescent girls	Does not require standard ovarian stimulation Only a few centers offer this technique	Expertise required Does not protect against effects of chemotherapy	Expertise required		Limited to early stage cervical cancer Offered at a limited number of centers	Does not protect from radiation effects	Donor embryo available through IVF clinics or private agencies	Patient can choose donor based on various characteristics	Legal status varies by state	Medical history often a factor

value of fertility to patients and survivors

Although patients may not know to bring up the topic of infertility, evidence to date suggests that it is important to them:

- Fertility preservation is of great significance to many people diagnosed with cancer
- Although cancer survivors can become parents through options such as adoption and third-party reproduction, most prefer to have biological offspring
- There is an increased risk of emotional distress in those who become infertile because of their cancer treatments

"No one should be deprived of one of the most joyous experiences in life because they didn't get available information at a critical time."

-Heidi, 39, Ewing's Sarcoma



how can we help you?

Fertile Hope is a national, nonprofit organization dedicated to providing reproductive information, support and hope to cancer patients and survivors whose medical treatments present the risk of infertility. We deliver the following programs free of charge to patients, survivors and healthcare professionals across the country.

Patient Education Materials

View, print or order our diverse portfolio of educational materials free of charge anytime.

Online Cancer & Fertility Referral Guide

Use our new online referral guide to find local and national listings for fertility clinics, sperm banks, adoption agencies and more.

Sharing Hope Financial Assistance Program

Apply for reduced-cost sperm banking and fertility preservation treatments using our incredibly fast process.

Risk and Options Calculators

Take information about fertility risks and parenthood options to the next level with these customizing tools.

Survivor Stories

Share your story or be inspired by those who have experienced cancer and fertility challenges in their own lives.

Professional Education

Schedule a presentation in your community or order our educational materials for oncology and reproductive healthcare professionals.

Live:On Kit

Order one of our revolutionary new kits that allows patients to bank their sperm from home or the hospital.

Hope Uncorked Wine Tasting Kit

Host a wine tasting party and support Fertile Hope with our signature Hope Uncorked wine tasting kit.

Hotline

Call us toll free Monday - Friday 9-5 EST at (888) 994-HOPE or email fertilehope@fertilehope.org.

Website

Visit www.fertilehope.org, the most comprehensive source of information on cancer and fertility.

information • support • hope

This booklet is made possible through the support of FIRST RESPONSE®.



about FIRST RESPONSE®

FIRST RESPONSE®, the experts in women's at-home diagnostics for 25 years, and the #1 pregnancy test brand now answers life changing questions at any point in a woman's reproductive cycle:

Am I Fertile?

FIRST RESPONSE® Fertility Test is the first at home fertility test created just for women. It helps determine your ability to get pregnant in one easy step—with 95% accuracy.

Am I Ovulating?

FIRST RESPONSE® Daily Ovulation Test has a full month's supply of test sticks, taking the guesswork out of knowing the 2 days you're most likely to get pregnant.

Am I Pregnant?

FIRST RESPONSE® Pregnancy Test is sensitive enough to tell you whether you're pregnant 5 days before your missed period.*

Knowing sooner is important. The sooner a woman knows she is pregnant, the sooner she can take better care of herself and her developing baby. Visit www.FirstResponse.com for additional information.

* FIRST RESPONSE® can detect the pregnancy hormone as early as five days before the day of your missed period (four days before day of expected period).


fertileHOPE
fertility resources for cancer patients

P.O. Box 624 New York, NY 10014
888 994.HOPE tel 212 242.4570 fax www.fertilehope.org

© Fertile Hope 2009