# Cancer Treatment and Fertility

If you've been diagnosed with or treated for cancer, you might already be thinking about fertility preservation options or find yourself worrying whether you will still be able to conceive after you finish treatment. Studies suggest no known evidence of an increased risk of recurrence with pregnancy. However, there is still the possibility of a reduced chance of falling pregnant due to the effects of long-term treatment.

The choice to try for children is personal to everyone, depending on your circumstances and diagnosis. Here are a few things to consider when making this decision: your current age, the stage and type of your cancer, your treatment regime and if you will be undergoing ongoing treatment

Deciding to have children after breast cancer may feel daunting and confusing. To help you better understand your options, this article will discuss the effects of breast cancer treatment on fertility and which options you may have for fertility preservation. As always, it is recommended that you speak with your medical professional to ensure you are making the best decision for yourself and your family.

**How does treatment affect fertility?**
When you are diagnosed with breast cancer, there will be treatment options to consider, some of which will put a temporary or permanent hold on your ability to conceive. For a premenopausal woman, undergoing chemotherapy will often mean that you will experience a temporary absence of your menstrual period–commonly referred to as chemotherapy-induced amenorrhea.

In most cases, a regular period should return a few months to a year after treatment is finished. However, there are some instances where a young woman's menstrual cycle may never return, leaving her in permanent menopause. In this resource, you will find the different types of treatment and each of their effect on fertility.

**When can I start trying for a family?**
In many cases, pregnancy after breast cancer is safe for bub and mum, but medical teams suggest that you wait at least 2-3 years until the completion of all treatments before trying to conceive. In doing so, any damaged eggs will have time to move through the body, allowing yourself adequate time to heal and recover, making it the optimal environment for the baby to grow and thrive. Some specialists may also suggest waiting up to 5 years to ensure you are at less risk of recurrence.

## Specific Cancer Treatments and Their Potential Effects

### Radiotherapy

Radiation therapy uses x-rays to damage or kill cancer cells in order to prevent them from growing and multiplying. It can be delivered either externally via beam radiation or given internally. The risk of infertility as a direct result of radiotherapy will vary depending upon the area being treated and the dose.

External or internal radiotherapy given to the pelvic area for gynaecological cancers can stop the ovaries producing hormones and can result in temporary or permanent menopause. Radiotherapy can also have negative effects on the uterus, where treatment to the pelvic area can also increase the risk of miscarriage, premature birth and lower birth weights.

### Surgery

Surgery that removes parts of, or all of, the reproductive organs including the ovaries, fallopian tubes, uterus and cervix, can cause infertility.

### Removal of the Uterus and Cervix (Hysterectomy)

A hysterectomy is usually the method used to treat gynaecological cancers, such as cancer of the cervix, ovary, uterus, and endometrium and sometimes, cancer of the vagina. Following a hysterectomy, you will be unable to fall pregnant and periods will stop.

### Removal of the Ovaries (Oophorectomy)

If both ovaries are removed (bilateral oophorectomy) and you have not yet been through menopause, you will be put into surgical menopause. You will no longer have periods or be able to become pregnant naturally.

If a woman tests positive for the BRCA gene mutation, her treatment plan may include an oophorectomy to reduce further risk.

Although this will leave the woman permanently unable to conceive, this does not mean she cannot bear children. In this case, a woman could consider egg or embryo donations in the future and should still be able to carry her child full-term successfully. Alternatively, a woman may have had the chance to freeze her own eggs prior to the oophorectomy. This may offer an opportunity to use those eggs herself, or via a surrogate.

**Chemotherapy**

You may be advised that chemotherapy is the necessary treatment option following surgery. Chemotherapy is used to destroy cancer cells that may have spread throughout your body and can subsequently impact your fertility by:

- Partially damaging healthy eggs
- Affecting the overall function of the ovaries
- Reducing quality and number of eggs, making fertilisation difficult

As women, we are born with a fixed number of eggs and are unable to make more, so protecting them prior to commencing treatment is something women need to consider.

The effects of chemotherapy are entirely dependent not only upon your age, but also the specific type of drug used. For some women, this means they are able to fall pregnant easily following treatment, however some may have trouble conceiving. Women who are older already have fewer eggs, so by the end of treatment may unfortunately be left with nothing.

Although not every woman will experience menopause while undergoing chemotherapy, chemotherapy can lead to:

- Premature permanent menopause – where periods do not return after chemotherapy;
- Temporary menopause – periods may stop for a year or more; and
- Early onset (permanent) menopause – even if periods do return, menopause happens up to seven years earlier than if there had been no chemotherapy.

Menopause is reached when the number of potential eggs drops below a certain amount. Chemotherapy reduces this number meaning that menopause is more likely to occur at an earlier age than it would without this type of treatment, typically 5-10 years earlier.

**Trastuzumab (Herceptin)**

Herceptin is usually used for up to a year following a breast cancer diagnosis and treatment, however, it is not believed to reduce an individual's fertility. If your breast cancer contains extra copies of the HER2 gene, Herceptin helps to reduce your risk of the cancer coming back.

This targeted therapy encourages the body's immune system to help fight off and destroy cancer cells and reduces the cancer cell's ability to divide and grow.

While the effects of Herceptin on pregnancy are unknown, it is best to avoid falling pregnant whilst on Herceptin. For more information relating to this particular treatment, it is best to speak directly with your medical team.

**Hormone (Endocrine) Therapy**

Hormone therapies for cancer treatment are not known to cause menopause. However, because hormone therapy can continue for up to 10 years following a breast cancer diagnosis, fertility will decline during this time. Generally, the older a woman is when she starts endocrine therapy, the lower her fertility will be once treatment is complete.

While it is possible to have a break from hormone treatment to try for a baby, there is only emerging evidence to suggest that this may be a safe thing to do. If you wish to explore this option whilst on hormone therapy, it is best to speak directly with your oncologist to consider what updated research is available to weigh up the pros and cons.

The majority of breast cancers are dependent on the ovarian hormones, oestrogen and progesterone, which can stimulate cancer cell growth and are called hormone receptor-positive breast cancers.

Hormone therapy is advised for women who have this type of breast cancer to block the effects of oestrogen in the body. Drugs include tamoxifen, aromatase inhibitors such as exemestane or letrozole, and GnRH agonists such as Zoladex.

Tamoxifen is considered a selective anti-oestrogen option that can halve the risk of cancer returning if taken consistently for 5-10 years and can also treat those with an increased risk of breast cancer due to gene mutation or family history. Women taking tamoxifen should not use hormonal contraception or pursue pregnancy as it can cause birth defects.

Zoladex is an injectable option that suppresses the ovaries and brings on temporary menopause. It can be given at the same time as tamoxifen, and some studies indicate that it has been known to further reduce the risk of breast cancer recurrence. Menstrual periods will stop temporarily whilst on Zoladex.

Recent research has shown the combination of an aromatase inhibitor with a GnRH agonist will help to reduce the risk of cancer returning in certain premenopausal women and is something that should be considered and discussed with your oncologist.

## Fertility Preservation *Before* Treatment

When you are first diagnosed with breast cancer, you may feel there is so much overwhelming information to remember. Though the priority will be on your treatment plan and survival, the future ability to bear children will also be a naturally occurring worry for many; this is perfectly normal, and you are not alone!

Onco-fertility is a relatively new medical field that provides options for fertility preservation. Advances in this area include assisted reproductive technology, such as vitrification (fast freezing), means we can preserve eggs, embryos, ovarian tissue, sperm and testicular tissue for future use. This is known as medical fertility preservation. Fertility preservation is about reproductive planning.

You may feel unsure and perhaps, unprepared about what to ask your Oncologist or Fertility Specialist regarding preservation after a breast cancer diagnosis. Here are our top five questions that may be helpful:

1. Do I need to start treatment immediately, or can I go over my options for preservation?
2. What is my best option for fertility preservation based on my diagnosis and treatment plan?
3. How does my age affect my fertility?
4. How successful are the different preservation methods?
5. Will my treatment still be effective if I stop Tamoxifen temporarily to start a family?

Having children after breast cancer may come with a few additional challenges, but it is absolutely possible for many. Every woman is different in how they respond to treatment, their cancer diagnosis, and their entire journey's effect on their fertility. If you have any specific questions or concerns, please speak with your Oncologist, fertility specialists, and treatment team to ensure you are comfortable and empowered with all the information you need to make the best decision for yourself and your family.

In many situations, you will have time to decide which fertility preservation option you'd like to use before starting treatment. However, some will take the 'wait and see' approach and start treatment immediately, taking the risk of permanent infertility or decreasing the chances of falling pregnant in the future. Below are some ways you can preserve your fertility before treatment.

### The 'I'll Just Wait and See' Approach

You may select to simply go ahead with cancer treatment, waiting it out to see if your fertility will be impacted. While there is no right or wrong choice here, this approach may lead to disappointment later if a family is something you've always dreamt of.

Different chemotherapies have a different impact on your ovaries, and some may trigger menopause. Choosing this option to manage your fertility means acknowledging the risk and accepting menopause may happen as a result of your treatment. If menopause does occur as a result of your treatment, it is highly unlikely that you will be able to achieve a natural pregnancy. However, there remain some options available should you still wish to consider becoming a parent including adoption or fostering or donation of an embryo from another couple, or an egg from another woman, or using your previously frozen eggs if you have had a chance to do so.

### IVF – Egg and embryo freezing before chemotherapy

In Vitro Fertilisation, IVF, is a laboratory procedure done before the start of treatment that involves removing the healthy eggs from a woman's ovaries. Eggs can be frozen for future use. Or, eggs can be fertilised with sperm. Once this is done, the embryo/s can be frozen and stored until the woman is ready to start trying for children. Our tips for this process are:

- Chat with your health care professionals such as your GP or your oncologist. Ask them about your fertility status and how your cancer treatment may affect it.
- Ask for a referral to a Fertility Specialist
- If you feel like you need someone to chat to who can relate to your situation, join our online support groups to talk to people in a similar position.
- When visiting your GP, oncologist or fertility specialist, come with a list of questions and concerns. You have enough on your mind so take the time to write down what you're confused about so you don't forget to ask.
- Always rely on health care professionals for answers.
- Find out which fertility specialists in your area have a specialty in cancer.
- For more information, visit: ivf.com.au

**Questions about IVF, egg & embryo freezing For Your GP, Oncologist or Fertility Specialist**

1. How many eggs will be retrieved and what does this mean? How are the eggs retrieved? How much will it cost?
2. How do hormone injections work?*
3. Are there any side effects?
4. How long does the process take?
5. What are the chances of the embryo being viable after thawing?
6. What are the chances of successful pregnancy after embryo implementation?

*It is important to note that IVF does include the use of hormones, and for some women, this can include large doses, which may stimulate certain cancer types. That said, there is no supporting research to suggest that IVF itself increases the chance of breast cancers growing or coming back. It is recommended that women do however avoid exposure to high levels of hormones. New ovarian stimulation regimens have been developed in an attempt to try and prevent high oestrogen levels during IVF, however, it is best to discuss this directly with your fertility specialist based on your own personal situation.

**Steps Involved in IVF, egg and embryo freezing**

1. **Stimulation of ovaries through the use of hormones** – this will be done throughout self-injections, allowing for an increased number of mature eggs to be collected at the end of the cycle. During this process, you will also have regular blood tests to measure hormone levels, helping determine the best time for collection.
2. **Egg collection** – involves a minor surgical procedure usually done under sedation or general anaesthesia.
3. **Egg freezing** – eggs can be frozen at this stage for future use.
4. **Insemination & fertilisation** – here, mature eggs are selected. They are then combined with the sperm for fertilisation. In this step, the sperm is also tested for quality to ensure the best results.
5. **Embryo culture & freezing** – the embryo will now develop in a dish for 5 days in a special solution designed to help them grow. If the woman is immediately ready for pregnancy, this embryo can be placed straight into the uterus or womb. Otherwise, embryos can be frozen and stored for future use.
6. **Embryo transfer (post-treatment)** – once the woman is ready, the frozen embryo will be thawed and transferred via a procedure similar to a Pap smear. Though most of the originally frozen embryos will survive the freezing process, there is a possibility that some may not. In this instance, the woman may be required to repeat Step 1 to stimulate additional egg production.

*If you choose to proceed with IVF, it may delay the start of your cancer treatment by 2-3 weeks, so it is important to speak to your fertility specialist and doctor to help make the best decision for you.

**Side Effects of IVF**

There are still no known long-term effects on overall health from IVF, and studies show no increased risk of breast cancer recurrence.

Commonly reported side effects may include:

- Soreness or bruising on the injection site
- Bloating
- Breast tenderness
- Hot flushes
- Fatigue
- Mood swings
- Allergic reactions – skin itching or redness at the injection site
- Pelvic inflammation
- Emotional stress
- Ectopic pregnancy, after an embryo transfer
- Possibility of multiple births, though single embryo transfer is recommended
- Cost of IVF

IVF costs vary per clinic and available Medicare / Private Health Fund reimbursements. It's best to contact your nearest clinic for accurate quotes and speak to your healthcare provider about your eligibility for rebates.

**IVF Clinics in Australia**

There are many incredible IVF centres across Australia that are led by fertility specialists, nurses, scientists, and counsellors, all providing excellent care, IVF education and resources.

A few of the top fertility clinics in the country include:

- Monash IVF
- IVF Australia
- Melbourne IVF
- Westmead Fertility Centre
- Genea Fertility
- Hunter IVF
- City Fertility

## Common Questions Associated with IVF and Cancer Diagnosis

**1. Will IVF delay my cancer treatment?**

IVF can delay the beginning of cancer treatment such as chemotherapy by at least two weeks. If IVF is an option you are considering, it is incredibly important to discuss the possible impact of delaying treatment with your oncologist and medical team. For most women, delaying cancer treatment by a few weeks is unlikely to impact your prognosis.

**2. Where do I go to access IVF?**

IVF is available in various clinics across Australia. Some are listed above. For a full list of accredited clinics, visit the Fertility Society of Australia.

**3. What are the costs involved?**

Costs can vary and are dependent upon where in Australia you are located. Before starting this process it's important to discuss with your nearest clinic what the cost estimates will be, and if you are available for any reimbursements available through Medicare or your private health fund. It is also worth exploring with your doctor if there are any grants or programs available that you may be eligible for to cover the cost of some or all of your treatments.

**4. Are there any legal issues I need to be aware of?**

The largest legal issue to be aware of is access to your embryos in the future. If you and your partner develop the embryo, you are both legally entitled to the embryo. Therefore, permission from both you and your partner is required for the embryos to be used in the future. With this in mind, it is important to consider future possibilities, including a relationship breakdown, illness, natural conception etc., and what will then happen to the unused embryos. A way to navigate this issue is to use some of the eggs to create embryos and freezing some, or all, eggs without fertilization.

**5. Are there any side effects from IVF treatments?**

IVF can be a physically and emotionally draining process but serious side effects from treatment are uncommon. However, it is important to be aware that on the very rare occasion some complications may arise including:

- Medication-related side effects - Fertility drugs are generally very safe, and side effects are minimal, however, these can include mood swings, headaches, nausea, hot flushes, bloating and stomach pain. In rare cases, some women may have a serious reaction to the drugs. Your fertility clinic should work closely with you to monitor for side effects and treat any problems. Your doctor can speak with you about more information about these side effects.

- Complications during the egg collection process - This could include a very small risk of bleeding or infection.

- Long-term effects on your baby - Though rare, children conceived by IVF are at a slightly increased risk of premature birth. and birth abnormalities.

- Your own health - Another long-term impact of IVF to consider is your own health. While research here remains unclear, it is well-reported that IVF does not increase the likelihood of cancer recurring.

**6. What does the success of IVF look like?**

The success of an IVF process is generally linked to the age of a woman. For instance, a woman aged 40 years or younger, will generally have anywhere from five to 15 eggs collected at one time. From an average of 10 eggs collected, there are usually 1-3 embryos subsequently formed and frozen, of which approximately 85-90% will survive thawing and can be transferred into the womb. More than half of the eggs collected for IVF will be fertilised and subsequently frozen, of which approximately 65-70 per cent will survive thawing and then be reinserted into the womb. From here, it is expected that anywhere from 25-60 percent of embryos transferred will result in a healthy pregnancy. The outcomes of IVF are also reliant upon the number of eggs initially collected and the quality of these eggs.

## Egg Freezing (Cryopreservation)

The egg-freezing process involves the harvesting of unfertilised, mature eggs for cryogenic freezing. This may be an option if you are not in a position to create embryos with a long-term partner.

Similar to the IVF process, your ovaries are stimulated with hormones to form mature eggs, that are subsequently collected and frozen. When you are ready to use the eggs, they are thawed and fertilised before being implanted.

Pregnancy rates that use frozen eggs have greatly improved, and achieve near the same success as fresh eggs. In a standard simulated cycle, between 5 and 15 eggs are generally collected, with approximately 80-90 per cent of eggs surviving the freeze and thawing process. From here, a similar rate of around two embryos per 10 eggs are formed for transfer to the womb, with the hope that between 25-60 per cent of embryos transferred result in a baby. However, the outcomes of this are dependent upon the quality and number of eggs collected in the initial phase.

As with IVF, there will be a delay in commencing treatment for cancer if you opt for the egg freezing route, as it again takes at least two weeks to stimulate the ovaries for egg collection.

Breast cancer is potentially impacted by ovarian stimulation so it is best to discuss this option with your fertility and oncological team to determine the impact this may have on your treatment. The side effects of egg freezing are similar to that of the IVF process.

## Ovarian Tissue Freezing (Cryopreservation)

This is a newer technique that is considered no longer experimental and involves an operation to remove some ovarian tissue. In younger patients, this usually results in the removal of a large number of immature eggs.

Following the tissue removal, the tissue is frozen and stored until it can safely be returned to the patient. It is believed that new blood vessels will start to grow and establish once the transplanted tissue is returned, producing hormones that will help ripen the eggs.

If this happens, the IVF process may be used to help mature, collect and fertilise the eggs, or alternatively, it may be possible to mature the ovarian tissue itself in the laboratory to produce mature eggs for IVF.

Freezing ovarian tissue has similar implications to egg freezing with some tissue not surviving the thawing process. It is also important to note that there may be an increased risk of transmitting cancer cells back into the body and that removing some of the ovaries may reduce fertility outcomes should it return naturally following cancer treatments.

## Fertility Preservation *During* Treatment

For some women, their breast cancer diagnosis requires immediate chemotherapy, which doesn't leave time to preserve fertility before starting treatment. Here is what most medical teams may offer you if you have already begun treatment:

### Ovarian Suppression

Ovarian suppression during chemotherapy for hormone receptor-negative breast cancer (HER negative) is thought to help protect the ovaries and improve the chances of protecting fertility during treatment.

It involves using a drug known as GnRHa – gonadotropin-releasing hormone analogs, such as Zoladex, or goserelin. This drug blocks the hormone signals to the ovaries telling them to develop and release the eggs, "shutting down" the ovaries temporarily during chemotherapy.

Research indicates that in pre-menopausal women, this option in combination with chemotherapy can in fact protect fertility, while GnRHA used whilst on chemotherapy is thought to also reduce the chance of cancer returning and improve the survival of patients with this type of breast cancer.

Ovarian suppression does not impact the commencement of cancer treatments; however, it can be costly, and it is important to discuss the benefits and risks to you based on your personal situation.

### Side Effects of Ovarian Suppression

Women may experience similar side effects as those going through menopause, such as:

- Night sweats
- Irritability
- Mood swings
- Hot flushes
- Fatigue
- Nausea
- Decrease in libido

### IVF Post-Cancer Treatment

For cancer patients who have completed treatment but are struggling with infertility, a new cycle of IVF may be an option. For more information on IVF look above under the heading “Fertility Preservation Before Treatment à IVF.”

IVF can be a safe and effective option for cancer patients who have completed treatment and are now in remission. However, it is important to discuss the potential risks and benefits of IVF with your doctor before proceeding.