

Elective Egg Freezing

Information for women considering their future fertility options.



ABOUT THIS BOOKLET

Merck Healthcare thanks the many individuals, couples and Australian healthcare professionals, including fertility specialists, specialist nurses and psychologists who shared their knowledge and expertise during the production of these booklets.

Important notice: The information provided in this booklet does not replace any of the information or advice provided by a medical practitioner and other members of your healthcare team. Your doctor will determine the best medications and course of action for you based on your requirements and circumstances.

Prescription medicines have benefits and risks. Use all prescribed medicines strictly as directed by your doctor and raise any questions or concerns with them before, during or after using them. If you experience side effects consult your doctor.

Medication availability and funding criteria may differ between Australia and New Zealand.



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INTRODUCTION^{1,2}

The reasons women choose to freeze their eggs are many and varied, but generally it is because they might like to have a child or children one day and they don't know exactly what life has in store for them.

While women are most fertile in their 20's, it may not be practical or possible to have a baby at this time. Completing education, building a career, building financial security, finding a partner, or even overcoming personal health challenges such as cancer or accidents, can cause delays in trying to conceive a child.^{1,2}

A woman is born with all the eggs she will ever have, and from around the age of 35 onward the quality and quantity of her eggs begins to decrease year on year.²

While there are options for medically assisted reproduction post the age of 35 that do not involve using frozen eggs, it is important to be aware that such treatments may require the use of donor eggs.²

If you are not ready, or if your circumstances may not allow you to have children now, and you are looking for a way to increase your chances of conceiving a child at a later stage of life, fertility preservation options such as freezing your eggs, may be an option for you.¹



IS EGG FREEZING RIGHT FOR ME?^{1,3}

Understanding your fertility is really important and should guide your decision making about freezing your eggs.

Your general practitioner can work with you, or refer you to a specialist for a fertility assessment.² This assessment typically involves a physical examination, blood tests to measure your hormone levels (e.g. an Anti-Mullerian Hormone [AMH] test), and maybe a pelvic ultrasound.³

Depending on your circumstances, egg freezing may be an option.

How do I choose a fertility specialist?¹

Choosing a fertility specialist is a personal decision. Your doctor may make a recommendation, you may have a recommendation from someone you know, or found a specialist from your own research.

To help in your decision making, you may consider meeting with more than one fertility specialist and asking questions such as these;

- Based on my personal circumstances, what is my chance of having a baby if I freeze my eggs?
- How many eggs should I store in order to have a good chance of becoming pregnant later in life?
- How many patients that you have cared for have frozen their eggs?
- How many patients who attend this clinic have frozen their eggs?
- What is the pregnancy success rate following egg freezing for patients you have cared for, and for those who have attended this clinic?
- What are the costs involved in egg freezing and storage at this clinic?

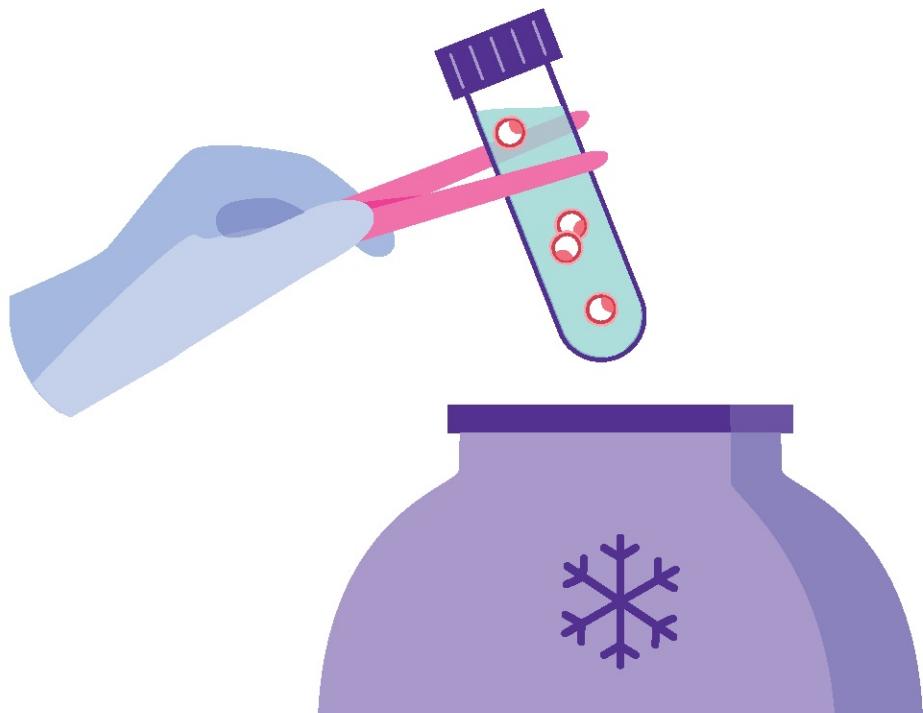
WHAT IS FEMALE FERTILITY PRESERVATION?¹

In order to increase the probability of becoming pregnant later in life, there are two main ways a woman can preserve her fertility.

1. Egg freezing¹

In reproductive medicine, eggs are called oocytes. As such, egg freezing is also referred to as oocyte cryopreservation.

Because egg quality and quantity decrease from around the age of 35, unfertilised eggs can be collected or retrieved during the natural menstrual cycle at a younger age and frozen for use at a later date.



2. Embryo freezing¹

An egg that has been fertilised with sperm and is about a week old is called an embryo.

After eggs have been collected, they can be fertilised with sperm immediately and then frozen when they reach the the blastocyst stage of development.

This option may be beneficial for women who have a partner, or for those women undergoing medically assisted reproduction using donor sperm as it provides the option to have additional children who are genetically similar.



THE FEMALE REPRODUCTIVE SYSTEM^{4,5}

To discuss elective egg freezing, it is important to understand the structure of the female reproductive system.

The uterus^{4,5}

Central to the female reproductive system is the uterus, a small pear-shaped organ that is capable of increasing to many times its size to house a growing foetus during pregnancy.

The uterus has two main sections, the body and the cervix (or neck).

The lining of the uterus is called the endometrium. The endometrium thickens during the menstrual cycle to prepare for pregnancy, and if pregnancy does not occur the endometrium sheds in what is commonly referred to as a period.

The ovaries^{4,5}

Women are born with all of the eggs (oocytes) that they will ever have. Oocytes are stored in microscopic sac-like structures called follicles in the ovaries, which are located on either side of the uterus.

Generally, during each menstrual cycle one matured follicle releases an oocyte into the nearby fallopian tube. Interestingly, the ovaries typically take it in turns to release an oocyte each month.

In addition to storing oocytes, the ovaries also release hormones to encourage follicles to mature and for the endometrium to thicken.

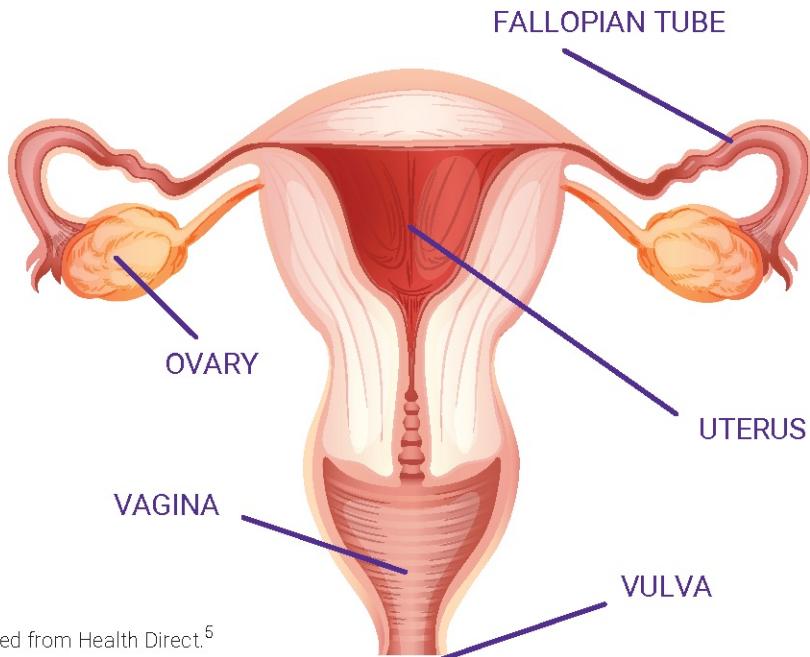
The fallopian tubes^{4,5}

Ending in finger-like shapes called fimbriae, the fallopian tubes hover over the ovary and provide a pathway for the oocytes to the uterus. Each tube is about 10cm in length.

The vagina and vulva^{4,5}

The canal leading from the outside of the body to the cervix which provides a pathway for sperm to enter and a baby to exit, is called the vagina. The external opening of the vagina is surrounded by the vulva (clitoris and labia) which provide the vagina with lubrication and protection.

THE FEMALE REPRODUCTIVE SYSTEM



Adapted from Health Direct.⁵

OVULATION AND THE MENSTRUAL CYCLE^{4,5}

The menstrual cycle involves cyclical hormonal activity which enables a woman's body to prepare for a possible pregnancy. An average cycle is 28 days in length, however, for some women their cycle may be shorter or longer.^{4,5}

All cycles, regardless of their length consist of three phases; follicular, ovulatory and luteal. Below is an explanation of each stage with approximate timings based on an average 28-day cycle where ovulation would typically occur on or around day 14.⁴

Follicular phase: days 1 to 13⁴

On day one of the menstrual cycle the endometrium starts to shed and a period begins.

Over the following approximate 13 days, gonadotropin releasing hormone (GnRH) is released from the hypothalamus, a gland in your brain which controls the body's hormone system. The GnRH encourages the pituitary gland (another gland at the base of the brain) to release follicle stimulating hormone (FSH) and luteinising hormone (LH). FSH and LH then encourage one ovary to select 10 to 20 immature eggs (oocytes) for maturation.

GnRH also encourages the endometrial lining of the uterus to thicken.

At the end of this phase, one egg will be selected as the dominant or most mature egg to be released at ovulation.

Ovulatory stage: around day 14⁴

Typically a single egg is released into the Fallopian tube each cycle. In order to be fertilised, this egg needs to be met by sperm in the Fallopian tube 12 to 24 hours after ovulation.

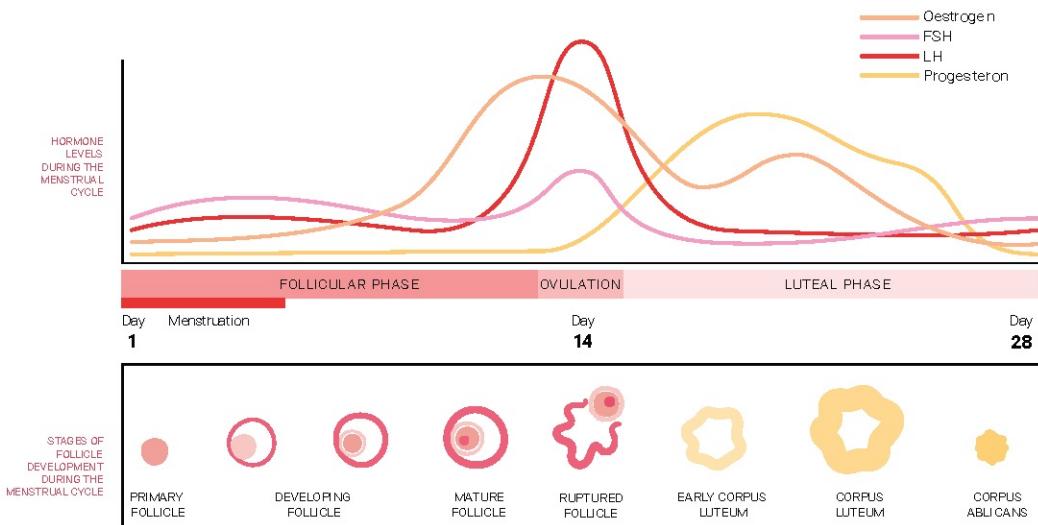
Occasionally, more than one egg can be released. Should this happen, there is a possibility of a multiple birth of non-identical siblings.

Luteal stage: days 15 to 28⁴

The egg, fertilised or unfertilised, is propelled along the fallopian tube and arrives in the uterus around day 19, about 5 days after ovulation.

Additionally, after the egg is released, a cyst develops on the ovary from the remnants of the follicle, this is called the corpus luteum. The corpus luteum releases a hormone called progesterone which plays an important role in preparing the uterus for potential pregnancy.

If fertilised, the egg will attempt to implant itself into the endometrium. If unfertilised the egg passes and is shed during a period.



Adapted from Boron et al⁴

THE EGG FREEZING PROCESS⁶

Egg freezing, also known as oocyte cryopreservation is generally a three-step process:⁶

1. Ovarian stimulation (hormone stimulation),
2. Egg collection (egg retrieval or oocyte pickup), and
3. Egg freezing (vitrification).

1. Ovarian stimulation⁶

Hormones control the maturation of ovarian follicles and the release of a mature egg (oocyte) during each menstrual cycle.

Because not every egg collected for freezing will result in a pregnancy, and a medical procedure is required to collect eggs, the first step in the egg freezing process is to stimulate the ovaries so that they release multiple eggs during the cycle.

To stimulate the ovaries, hormone medications are typically selfinjected for 10 to 12 days. Generally, these medications come in a device that looks like a pen with a very fine needle that is inserted just under the skin. Training and support for using these medications is provided by the health care team.

Sometimes the ovarian response to the hormone medication may be monitored using blood tests and a transvaginal ultrasound.

While health advice varies depending on personal circumstance, generally during ovarian stimulation women can go about their daily lives and there is no need to alter regular activity.

2. Egg collection⁶

Following ovarian stimulation, a final hormone injection is required to encourage the mature follicles in the ovaries to release the eggs. Commonly referred to as 'the trigger', the timing of this injection is important and will be carefully coordinated with the date of the egg collection procedure.

The egg collection procedure is a short day-procedure, during which woman can choose light sedation or a general anaesthetic. Using ultrasound imaging for guidance, the doctor inserts a long fine needle with a tube attached called a catheter into the vagina and through the vaginal wall to access the ovaries. Once at the ovary, each mature follicle is carefully punctured to aspirate (suck out) the egg inside. Formally this procedure is called a transvaginal needle aspiration procedure.

A few days of rest following the procedure is typically recommended.

3. Egg freezing⁶

Each egg collected is assessed in real-time by an embryologist, a scientist specialising in the development and care of embryos. If the egg is mature and healthy, it will be frozen using a process called vitrification. After freezing, the eggs are labelled and stored for use at a later date.

Frozen eggs can be moved from one storage facility to another if requested, though there is usually a fee involved in this process.



HOW MANY EGGS ARE NEEDED?^{7,8}

Not every egg (oocyte) collected will result in the birth of a baby.

Some may be damaged during freezing or thawing, others may not fertilise or not grow after fertilisation, and some may not be chromosomally normal.⁷

Three contributing factors to the probability of achieving the birth of a live baby following oocyte freezing are;⁷

- The woman's age at time of freezing,
- The number of eggs stored, and
- The number of IVF cycles the woman chooses to undertake.

The number of eggs that can be collected in a single cycle depends on the woman's age and their individual response to the hormone stimulation. Data suggests that women achieve an average of 7 to 13 eggs in a cycle, with the number being highest in women aged under 35 and then decreasing with increasing age.⁷

Overlaying the number of eggs that are collected in an individual cycle, is the number of eggs required to provide an 80% chance of a live baby being born. This target number of eggs will increase with age, and may mean that eggs need to be collected from more than one cycle.⁸

When focusing on a target number of eggs it is important to remember that safety is the first priority. High doses of hormones can have side effects, particularly a condition called Ovarian Hyperstimulation Syndrome (OHSS) which can require hospitalisation.⁸

Finally, it is important to remember that egg quality is often more important than the number of eggs collected.⁸

HOW ARE FROZEN EGGS USED?⁹

If and when a woman decides to attempt a pregnancy using her frozen eggs, she will need to consult a doctor who specialises in medically assisted reproduction or what is commonly referred to as IVF. This may be the specialist who oversaw her egg freezing, or a different specialist at a different clinic.

Where possible, the medical team will work with the woman's natural menstrual cycle and;

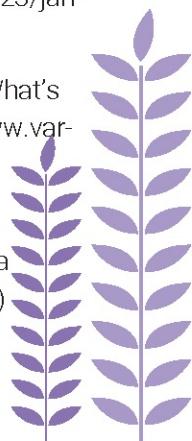
- Defrost an oocyte.
- Collect and prepare a sperm sample from the woman's partner or sperm donor.
- Combine the egg and the sperm together in a petri dish in the laboratory and monitor to see if fertilisation occurs and an embryo forms.
- Transfer the resulting embryo into the woman's uterus via a procedure that is similar to a pap smear and generally does not require any anaesthesia.

Depending on the woman's overall age and health status at the time she wishes to attempt pregnancy, this process may involve use of additional hormone therapy.



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