



# Male infertility

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This leaflet contains general information about male infertility. If you have any specific questions about your individual medical situation you should consult your doctor or other professional healthcare provider.

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# Male infertility

## What is male infertility?

Male infertility means not being able to father children. Infertility is the inability of a sexually active, non-contracepting couple to achieve spontaneous pregnancy in one year. If the cause of the fertility problem is found in the man, this is male infertility. Male infertility is found in approximately half of all childless couples. These men have abnormal semen analysis.

### Male infertility has several causes:

- Hormonal problems
- Genetic disorder or chromosome defects
- Problems with sperm production (as a result of varicocele – enlarged veins above left testicle)
- Difficulties with erection or ejaculation or other problems in genital tract
- Infection of urogenital tract
- Problems with the immune system
- Cancer

The tests and treatments vary depending on the cause of infertility.

In most cases of male infertility, either the semen is unable to reach the egg (obstructive) or the semen quality is poor (non-obstructive). In 30-40% of patients, no male factor is found (idiopathic/unexplainable male infertility). The most common causes of male infertility and their treatments are discussed.

## Diagnosis of male infertility

Your doctor will take your medical history, examine your abdomen, penis and testes, sometimes also the prostate. Then you may have ultrasound (echo scan) of your scrotum, semen analysis, blood test or even urine analysis.

## Medical history

The medical history is a conversation with your doctor. The doctor will try to determine whether any lifestyle factors could affect your fertility. The interview might focus on different known causes:

- Thyroid disease
- Diabetes
- Erectile dysfunction
- Occupational or behavioural hazards such as working with pesticides
- Exposure to extreme heat
- Stress
- Current smoking or exposure to smoke during pregnancy
- The use of cannabis and alcohol, steroids, opioids, or androgens
- Prior surgery in the genital region
- Infections
- Trauma in the genital area
- Descent of the testicles at birth/ in childhood

Some medications can also affect male fertility:

- Heart conditions: non selective beta blockers, thiazides, calcium channel blockers, digitalis, antiarrhythmics
- Antidepressants: tricyclic antidepressants, selective serotonin reuptake inhibitors (SSRI)
- Hormonal therapy: antiandrogens
- Painkillers and antipyretics: Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Antiepileptics and neuroleptics
- Antihistamine
- Antimycotics

## Physical examination

The doctor will examine the male genitalia. This is done by looking at the genitals and then using a hand to feel them. Any abnormalities will be noted, such as lumps in the scrotum. In addition, your height and weight will be measured.

Body mass index can affect:

- Erectile function
- Sexual hormone regulation
- Scrotal temperature
- Semen quality



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## Hormone blood tests

Hormones circulate in the blood stream. They can be taken from a vein with a simple blood sample and can give information about the function of the testicles. Other blood tests can show your doctor other diseases that can affect your fertility. Some typical blood tests may be run:

- Both gonadotropins: follicle-stimulating hormone (FSH) and luteinizing hormone (LH)
- Prolactin
- Inhibin B
- Testosterone
- Sexual hormone binding globulin
- Thyroid hormones
- Cholesterol levels
- Blood glucose
- Tests for renal function and liver disease

## Semen analysis

Your semen might be collected by ejaculating into a sterile container. The semen is then analysed at a laboratory. Not having an ejaculation for 2–5 days before semen collection can provide a better sample for more precise semen analysis. A short time between collection and analysis also helps the accuracy of the test. Semen quality can change within days. Having at least two (or more) tests will give a clearer result. The lab will assess the amount of semen and its colour, odour, and thickness. A microscope study will show the number of sperm cells and their health in the semen. Signs of infection can also be seen. What is normal for semen is described in the norms of World Health Organisation (called WHO 5). Current standards come from 2010.

## Ultrasound

Ultrasound can be used to examine the tissue of the testicles and epididymis. It may show enlargement, cysts, calcifications or tumours. If there is low semen volume and obstruction of genital tract is suspected, a transrectal ultrasound (TRUS) is needed.

## Urine sample and urethral swab

A urine test and/or a urethral swab can be done to rule out any infections in the urogenital tract.

## Testicular biopsy

In case of non-obstructive azoospermia (NOA), when there is no or hardly any spermatozoa in ejaculated semen and there is no evidence of blockage in the genital tract, a biopsy is needed. It is called TESE (Testicular Sperm Extraction). If the spermatozoa are found and your genetic tests are normal, it can be used in assisted reproduction technologies (ART).

## Genetic testing

In case of low sperm count a karyotype analysis is made. A karyotype is a complete set of chromosomes in an individual man. Normal karyotype for man is 46, XY, meaning that there are 22 pairs of autosomal chromosomes (44 pieces) and one pair of sex chromosomes. Males have one X and one Y sex chromosome. If the karyotype is not normal, it may influence fertility. Abnormal sexual chromosomes can also cause low levels of testosterone. Klinefelter syndrome (47,XXY) is the most common sexual chromosome abnormality. In some patients, this condition can cause characteristic features like long limbs, small firm testicles, and female-type hair distribution.

In some men, a genetic testing of Y chromosome is needed. Based on all examination findings, a specialist in Urology or Andrology will decide if you need genetic testing, and which tests should be done.

## Causes of male infertility

Obstructive azoospermia (OA) is a situation when there is lack of spermatozoa in semen and post-ejaculate urine as a result of obstruction. The volume of semen may be smaller.

The path of the sperm cells can be obstructed in several places:

- In the testicles, where sperm cells are produced
- In the epididymis, the tube that carries sperm from the testicle to the vas deferens
- In the vas deferens, the tube that transports sperm from epididymis to the prostate
- In the ejaculatory duct (final part of vas deferens), caused by cysts or inflammation
- Due to functional problems such as lack of contractions

The most common causes of obstruction are infections (for example, gonorrhoea, chlamydia, prostatitis, tuberculosis), birth defects (congenital disorders), or trauma to the genitalia. Treatment depends on the amount of obstruction. Semen can be collected by biopsy from the testicle or the epididymis. Surgery on the vas deferens can restore the pathway.



## Cystic fibrosis

Cystic fibrosis (CF) is the most common genetic disorder in white persons, and a small number of white men have CF mutations. These men might lack the vas deferens on both sides. This means that sperm cells cannot mix with the ejaculate, so the ejaculate will not include any sperm (azoospermia). To achieve pregnancy, sperm must be collected directly from the testicles or epididymis by a biopsy. In the case of CF as the cause of male infertility, the female partner should also be genetically tested for CF. Two carrier parents have a 50% chance of having a child with CF (carrier means that there is a gene defect on one chromosome, from one parent and there are no symptoms of a disease. In CF there should be a gene defect on mother's and father's chromosome for a child to suffer from CF).

## Vasectomy and vasectomy reversal

Vasectomy is a surgical procedure of cutting the vas deferens and stopping the spermatozoa flow in the vas deferens to make the man infertile. This procedure is permanent and is considered irreversible. In some cases it can be reversed, but the chance of success depends on when the vasectomy has taken place.

## Varicocele

It is a common disease of enlarged veins above the testes that drain blood from the testes. Enlarged veins cause that the testicle is overheated and sperm production may be negatively affected. If you have varicocele and pain or infertility or hypogonadism a specialist in Urology may offer you varicocelectomy (surgical repair of varicocele).

## Hypogonadism

A normal level of testosterone is needed for optimal sperm production in the testes. Please see the hypogonadism chapter.

## Cryptorchidism

It is the absence of one or both testes in the scrotum. It is the most common genetic abnormality of male genitalia. At one year of age nearly 1% of all full-term male children have cryptorchidism. The majority of undescended tests are corrected in early childhood and in adolescence. When you are adult, a specialist in Urology will examine your testes, hormones and semen and will take individual decision whether to treat it. Treatment is surgical.

## Infections of genital tract

Infections of male urogenital tract are curable causes of male infertility.

- Urethritis – infections of urethra
- Prostatitis – infections of prostate acute and chronic
- Orchitis – infection of the testes
- Epididymitis – infection of epididymis

A urology / andrology specialist may examine your semen, swabs or culture and prescribe medication.

## Testicular cancer

It is the most common cancer in White men aged 15-40 years, and affects 1% of infertile men. Cancer causes decreased semen quality. Semen cryopreservation before orchidectomy is recommended. Treatment of cancer may cause further decrease in semen quality and decrease in testosterone production. A urologist will offer a life-long follow up for this men.

## Testicular microcalcifications

Microcalcifications can be found inside the testes in up to 9% men having ultrasound of the scrotum for any reason. They are common in men with cancer, cryptorchidism, infertility, hypogonadism and varicocele. Your Urologis will offer a follow up and in some patients may offer a testicular biopsy if you have calcifications and any other problem mentioned above. A self-examination is also recommended for this men.

## Problems with ejaculation

In some cases, the ejaculate cannot reach the urethra. The man might not be able to ejaculate, it might be delayed, or the semen might go into the bladder (retrograde ejaculation). Causes can be psychological, physical (for example, nervous system dysfunction after surgery or trauma), or related to medication use. Treatment options include medication and physical stimulation.

## Semen cryopreservation

Sometimes, semen must be collected for fertility treatment. Several procedures are used, depending on the problem.

If none of the procedures are an option for you, semen from donors can be used to achieve pregnancy. However, regulations regarding sperm donation vary between countries. Cryopreservation is the storage of biological material at sub-zero temperatures [e.g., - 80 or -196°C].



Cryopreservation is used to postpone cell ageing and cell death. This process stops cell metabolism by freezing. The semen sample is collected in a sterile container. The cryopreservation process starts immediately after the sample is made. When the sample is needed, the sample is thawed in a water bath at 37 degrees Celsius for 10 minutes. Not all semen samples survive thawing.

Indication for storage:

- Before potentially sterilizing chemotherapy or radiotherapy for cancer
- Before surgery that might interfere with fertility
- For men with progressive decrease in semen quality
- For men with paraplegia when sperm have been obtained by electro-ejaculation or obtained by penile vibratory stimulation;
- For men with psychogenic anejaculation, after sperm have been obtained either by electro-ejaculation or a sperm retrieval procedure;
- After gonadotropin treatment has induced spermatogenesis in men with hypogonadotropic hypogonadism;
- For men with NOA

***For more information please visit:  
[patients.uroweb.org](http://patients.uroweb.org)***



# Glossary of terms

## **Azoospermia**

The absence of sperm in a semen sample

## **Biopsy**

Removal of a small piece of tissue from the body

## **Chemotherapy**

Use of chemicals or drugs to treat disease

## **Chlamydia**

A sexually transmitted disease that, if untreated, can damage a woman's reproductive system

## **Congenital disorder**

A malformation existing at birth

## **Cryptorchidism**

A condition in which one or both testicles do not descend into the scrotum

## **Cryopreservation**

Preservation of cells by freezing at extremely low temperatures

## **Cystic fibrosis**

A congenital disorder that, among other things, can affect development of the vas deferens

## **Epididymis**

The tube that carries sperm from the testicle to the vas deferens

## **Follicle-stimulating hormone (FSH)**

A hormone that stimulates the growth and sexual development of the body, including the reproductive system (for example, sperm cells and eggs)

## **General anaesthesia**

Use of drugs to suppress sensation while asleep

## **Gonorrhoea**

A sexual transmitted disease caused by bacteria creating discharge from the urethra

## **Hormones**

Proteins that stimulate specific functions of an organ or tissue

## **Hormone therapy**

Supplementation of sex hormones using pills, injections, or topical applications

## **Infertility**

The inability to cause pregnancy

## **Local anaesthesia**

Use of drugs to suppress sensation in a specific body part while awake

## **Luteinizing hormone (LH)**

A hormone that stimulates egg production in women and sexual hormone production in men

## **Male infertility**

The inability of a man to father children

## **Malignant cells**

Cells that grow in an abnormally fast, uncontrolled way, suggesting cancer

## **Obstructive infertility**

Infertility caused by the semen being unable to reach the egg

## **Non-obstructive infertility**

Infertility caused by poor semen quality

## **Prostate**

A gland that produces ejaculatory fluid in men

## **Prostatitis**

An (painful) inflammation of the prostate gland

## **Radiation therapy**

Treatment with x-rays or radioactive materials

## **Retrograde ejaculation**

Ejaculate goes into the bladder rather than out the urethra

## **Scrotum**

The sack that hangs below the penis and contains the testicles

## **Semen**

The penile ejaculate that carries sperm cells

# Glossary of terms

## **Semen analysis**

A test that evaluates the quality of the semen

## **Testicle**

The male sexual gland contained in the scrotum. It produces male sexual hormones and sperm, the male reproductive cells.

## **Testicular sperm extraction (TESE)**

Biopsy of the testicles to retrieve sperm cells

## **Tuberculosis**

A bacterial infection that can affect all tissues and is characterised by creating nodules

## **Ultrasound**

A test that uses high-frequency sound waves to capture live images from inside the body. It is performed outside the body (non-invasive) and does not require any preparation.

## **Urethra**

In men, the tube that carries urine and semen out of the penis.

## **Varicocele**

Enlargement of the veins that drain blood from the scrotum, similar to varicose veins in the legs

## **Vas deferens**

The duct where the sperm cells are mixed with the semen for ejaculation

## **Vasectomy**

A surgical procedure that interrupts the pathway of the sperm from the testicle to the vas deferens, causing infertility



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