

What You Need to Know

Facts about male infertility

This handout explains what causes male infertility, how it is diagnosed, and possible treatments.

Infertility is defined as not being able to conceive, even after 1 year of regular intercourse without using birth control. A couple may want to consider being evaluated sooner than 1 year if they have concerns about their fertility or if either partner has a known risk factor for infertility.

Examples of risk factors are advanced female age or a male with a history of *undescended testicles* (the testes do not move into the scrotum). Most times, we recommend that both partners be evaluated at the same time so that any treatment can be done as soon as possible.

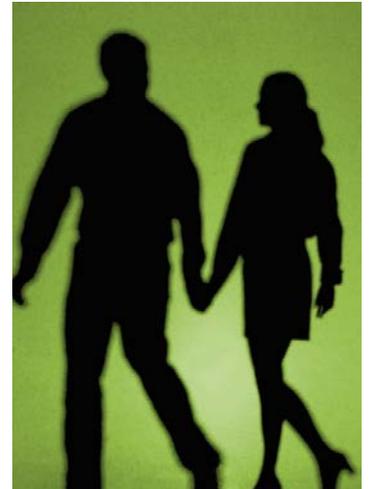
About 15% of couples (15 out of 100) are infertile. Of these couples, 20% are infertile because of the man's condition only. A condition the man has is also a factor in another 30% of infertile couples, but it is not the only reason for infertility in these couples.

Male infertility is usually diagnosed by finding abnormal semen during testing. But, other issues can cause infertility, even when the man has normal semen.

Causes of Infertility

There are different causes of male infertility. Infertility should be evaluated by a urologist who specializes in male reproductive health. Some causes of male infertility can be diagnosed and reversed (or improved) with surgery or medicines. Other causes can be diagnosed but not reversed.

Rarely, the cause of infertility or an abnormal semen analysis is unknown (*idiopathic*). Sometimes, these men may respond to *empiric therapy* (treatment before a firm diagnosis is reached) to improve the chances of conception.



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Reasons to Be Evaluated

A male infertility evaluation can identify:

- **Reversible causes** of male infertility and possible treatment. The goal of treatment will be to allow the couple to conceive through intercourse, or using as little technology as possible.
- **Irreversible causes** that may respond to treatment with *assisted reproductive technology* (ART) using the man's sperm.
- **Diseases** that may be causing infertility that can be treated.
- **Genetic causes** of infertility that may be passed on to children.
- **Irreversible conditions** where the man's sperm cannot be retrieved. These couples may want to think about using donated sperm or adopting a child.

What to Expect During Your Evaluation

Medical History and Physical Exam

Your infertility evaluation will start with a complete reproductive, medical, and surgical history. Your doctor will ask you about:

- How long you have been trying to conceive
- How often and when you usually have intercourse
- Your sexual health
- Other paternity or fertility treatments you have tried
- Your childhood illnesses and development
- Illnesses and infections you have had
- Medicines you take
- Surgeries or traumas you may have had
- Exposure to potential *gonadal toxins* (things that can harm testes), such as heat, radiation, chemical solvents, or pesticides

During your physical exam, your doctor will assess your body: your build, hair distribution, breast development, and external genitalia. Your doctor will pay special attention to the size and consistency of your testicles and the structures inside your *spermatic cord* (the series of long tubes that connect the testicles to the body). These structures include the *vasa deferentia* (main ducts) and possible enlarged veins (*varicoceles*).

Semen Analysis

A *semen analysis* test is the most important way to evaluate a man's infertility. For this test, you will collect a sample of your semen to be

analyzed at a laboratory that specializes in semen testing. Most times, an appointment is needed for this. A semen analysis test is often done before your first visit with your doctor.

For the most accurate results, you must:

- Not ejaculate for 2 to 5 days before the collecting your semen sample
- Not use any lubricants that may kill or damage your sperm
- Keep your semen sample at about body temperature (98.6°F or 37°C) and bring it to the lab **within 1 hour of collecting it**

Semen samples can vary greatly, so your doctor will want you to have at least 2 semen analyses before making a diagnosis. Your doctor may also ask you to do more tests to confirm the results.

Analysis Results

When you see your semen analysis results, you will see numbers for:

- *Ejaculate volume* (how much fluid is in the sample)
- Sperm *concentration* (how many sperm are in the sample)
- Sperm *motility* (how well the sperm can move)
- Sperm *morphology* (the shape of the sperm)

This table shows ideal results for a semen analysis, as set by the World Health Organization (WHO):

WHO Semen Analysis Reference Values	
Ejaculate volume	1.5 to 5.0 mL
Sperm concentration	More than 15 million/mL
Sperm motility	More than 45% motile
Total motile sperm count	More than 20 million
Sperm morphology	More than 5% normal (using the <i>Kruger Strict</i> system, which rates how likely it is that sperm can fertilize an egg)

If your ejaculate volume is small, your doctor may advise that you have a *urinalysis* (a study of your urine) after you ejaculate. Your urine will be checked for *retrograde ejaculation*. This is when semen is ejaculated into the bladder instead of through the penis.

Other Tests

Your doctor may also advise you to have other special tests done. These tests include assessment of:

- *Leukocytes* (white blood cells) to see if you have an infection or inflammation
- *Anti-sperm antibodies*, which the body's immune system may create in response to sperm
- *Reactive oxygen species* (free radicals that damage sperm)
- *Sperm DNA integrity* to see if there is damage to your sperm's genetic material

Endocrine Evaluation

The *endocrine* system is made up of hormones and the glands that produce them. Hormones play a major role in making sperm. You may or may not have endocrine tests as part of your infertility evaluation.

Sperm are produced in the testes when hormones are released from certain areas of the brain (the *hypothalamus* and the *anterior pituitary gland*). The testes produce sperm in a process called *spermatogenesis*. They also produce male hormones such as testosterone.

When hormones are out of balance, sperm production can be low. Sometimes this problem can be corrected.

Endocrine tests include measuring these hormones:

- Serum testosterone (T)
- Follicle stimulating hormone (FSH)
- Lutenizing hormone (LH)
- Prolactin (PRL)
- Estradiol (E2)

Your doctor may advise these tests if your ejaculate volume is low, your sperm concentration is less than 10 million/mL, or if you have symptoms of endocrine gland disease (*endocrinopathy*). An endocrine evaluation involves a simple blood test that is done in the lab. Blood samples that are taken before 10 a.m. give the most accurate results.

Ultrasound

Your doctor may recommend you have ultrasound of your scrotum if the results of your physical exam are not clear. Ultrasound is a *non-invasive* scan that uses sound waves to make images of structures inside the body. "Non-invasive" means it is done from outside the body.

Transrectal ultrasound (TRUS) may be done if the cause of low ejaculate volume is not known. TRUS will show if there are blockages in your prostate, seminal vesicles, or ejaculatory ducts. These blockages are called *ejaculatory duct obstructions* (EDO).

Genetic Testing

Abnormal genes may cause infertility by affecting sperm production (*spermatogenesis*) or the way sperm travel. Some genetic abnormalities that cause male infertility can be passed on to a man's children and affect their health. Genetic testing may show what treatment is needed. It can also show if there are abnormalities that may affect children.

The most common genetic factors that cause male infertility are:

- *Y-chromosomal microdeletions*. These result in no sperm or a small amount of sperm being present.
- *Klinefelter's Syndrome*, a condition in which there is an extra chromosome. The result is that testes do not work well.
- *Cystic fibrosis gene mutations*. These result in *congenital absence of the vas deferens* (CBAVD). This means the ducts that carry sperm are missing.

Treatments

After male infertility is diagnosed, there are 3 possible treatments. These treatments are explained on the next 3 pages:

- **Medical therapy** may be used to reverse or improve some types of inflammation or hormone deficiency.
- **Surgery** may be done to treat problems with the male anatomy, such as varicocele, ejaculatory duct obstructions, or reversal of a past vasectomy. Surgery may also be used to remove sperm from the testicles in some men.
- **Assisted reproductive technologies** (ART) may be advised for some men.

Medical Therapy

Hypogonadism

Hypogonadotropic hypogonadism (HH) results when the testes do not receive the right hormone signals from the *pituitary gland* in the brain. This means that the testes cannot work normally.

The pituitary gland may be affected by tumors, medicines, or a *congenital condition* (physical conditions that someone is born with). If one of these is the cause of HH, the pituitary hormones (FSH and LH) can be replaced. This will restore the function of the testes.

Infection or Inflammation

Inflammation of the prostate or other parts of the reproductive tract can cause low sperm production or poor motility. If there is evidence of an

infection, your doctor may prescribe antibiotics. Some men may have inflammation but not an infection. If this occurs, treatment with anti-inflammatory or antioxidant medicines may help.

Surgeries and Procedures

Anejaculation

Anejaculation (not being able to ejaculate) may be caused by damage to the pelvic nerve from diabetes, multiple sclerosis, abdominal-pelvic surgery, or spinal cord injury. Anejaculation is different from *erectile dysfunction* (not being able to achieve an erection), *premature ejaculation* (ejaculating before one desires), and *retrograde ejaculation* (ejaculating into the bladder and not into the penis).

Rectal probe electroejaculation can help men with anejaculation produce an ejaculate that can result in pregnancy. With this treatment, the pelvic nerves are stimulated in a controlled way. This makes a *reflex ejaculation* occur so that semen can be collected.

Varicoceles

Varicoceles are large veins that allow the blood to flow backward. They can occur inside the spermatic cord and the scrotum. Varicoceles are linked with low sperm count, poor motility, and abnormal *morphology* (physical structure).

Semen quality improves in about $\frac{2}{3}$ of men who have surgery to repair varicoceles. Research shows that natural pregnancy rates increase after this treatment.

Of all the causes of infertility, varicoceles are the most easily corrected. Since they are very common, the surgery should be considered only if there are no other infertility risk factors.

Varicoceles can be treated in 2 ways:

- With *venous embolization*, where a small catheter, guided by X-ray, is fed through the large veins of the neck or groin
- Through a small incision in the groin region

Vas Deferens or Epididymal Blockage

Infection or injury can cause scarring and blockage of the male reproductive tract. The most common cause of a blockage that surgery can correct is having had a vasectomy. About 6% of men (6 out of 100) who have a vasectomy also have a vasectomy reversal (*vasovasostomy* or *epididymovasostomy*).

The success of a vasectomy reversal depends on many things. The most important factors are the skill of the surgeon and what is found at the time

