



# Guide to Male Infertility

## MALE INFERTILITY: MANY CAUSES, MANY TREATMENTS

Approximately 15% of couples have difficulty achieving a pregnancy during their reproductive years. For nearly half of these couples, a male factor is involved — either as the sole cause, or as a contributing cause of infertility. Male infertility stems from a variety of sources, and today can be corrected with a number of treatments.

Significant progress has been made in the past decade in the diagnosis and treatment of male infertility. Many men who just a few years ago had little chance of fathering a child, can now have their problems corrected and have a biological child of their own.

### Should I Be Evaluated?

In the past, couples experiencing fertility problems were advised to postpone a diagnostic workup until they'd been trying to conceive for at least a year. Generally, when they did begin infertility testing, only the female was evaluated.

Today we know that this kind of delay can waste valuable time and lessen a couple's chances for conceiving. Couples are now encouraged to be evaluated as soon as they suspect a fertility problem, especially if the wife is over 35 years old, and men should begin their diagnostic workup at the same time as their female partner.

The man's workup should be performed by a male fertility specialist — usually a urologist who focuses on male fertility, and has some postgraduate training in this area.

## Evaluating the Male Patient: First Steps

### Taking a Medical History

A male fertility evaluation starts with a thorough medical history. A physician will ask about the man's general health, sexual habits, previous treatments, prior pregnancies, and how long he and his partner have been trying to conceive. He will be asked about any history of diabetes, prostate surgery, hernia repairs, mumps, and other relevant disorders. His doctor will also explore whether he has ever been exposed to toxic agents such as radiation, heavy metals, or organic solvents — all of which can affect fertility.

### Physical Examination

The next step in a fertility workup is a thorough physical examination. The doctor pays close attention to the penis and scrotum, noting the size and consistency of the testes, the presence or absence of the vas deferens, and any swelling or tenderness of the epididymis.

The patient may be asked to stand, take a deep breath, and "bear down" as he is examined for the presence of enlarged veins around the testicle (varicocele). A thorough evaluation will also include a prostate exam.





## Laboratory Testing

### Semen Analysis

Laboratory testing begins with a semen analysis. To perform this, a man is asked to produce a semen sample through masturbation, either at home or in a private area of the office, and return the sample to the laboratory within one hour (prompt return is essential). It is important to collect all the ejaculated fluid. The man should not ejaculate for 48 to 72 hours before the semen collection.

#### The sample will be analyzed to determine:

- Amount of ejaculate
- Number of sperm
- Percent motility and progression – how well sperm are able to swim and move forward
- Morphology – the percentage of sperm that have a normal shape
- Sperm agglutination – whether the sperm clump together abnormally
- Semen viscosity – whether the semen liquifies and flows properly
- Pyospermia – the presence of white blood cells, which may indicate infection

Table 1. Semen Analysis: Minimal Standards of Adequacy

<b>On at least two occasions:</b>	
Ejaculate volume:	1.5–5.0 cc
Sperm density:	>20 million/cc
Motility:	>60%
Forward progression:	>2 (scale 1–4)
Morphology:	>60% normal
<b>And:</b>	
No significant sperm agglutination	
No significant pyospermia	
No hyperviscosity	

Because these results can vary from one semen sample to another, every patient should have this test repeated at least once.





## Testing Semen Hormone Levels

A routine part of the initial male evaluation is measuring the level of hormones in the serum (blood), including FSH, LH, testosterone, prolactin, and estradiol. The way these 5 hormones interact is closely tied to normal sperm production. Abnormalities may signal a problem in the hypothalamus, pituitary gland, or testicle.

## Semen Leukocyte Testing

Increased numbers of leukocytes (white blood cells) in the semen have been associated with problems with sperm function and motility and may be due to infections or inflammation. Special staining techniques have been developed to detect white blood cells in the semen. If high levels are detected, the doctor should perform a semen culture — another type of lab test to spot infection.

White blood cells in the semen are also associated with the release of harmful substances called reactive oxygen species (ROS), which will be discussed in more detail below.

## Antisperm Antibody (ASA) Testing

Antisperm antibodies (ASAs) are immunoglobulins created by a man's own immune system that attack his normal, healthy sperm. These antibodies can cause the sperm to clump together and reduce their motility.

The presence of ASAs in the semen may signal genital or urinary infections, trauma to the testes, thermal injury, or an obstruction in the genital tract.

## Reactive Oxygen Species (ROS)

Reactive oxygen species, or oxidants, are highly reactive chemicals containing oxygen that can injure the sperm and the genital tract and impair sperm function. Specialized semen testing can determine whether ROS levels are too high.

## Morphology Testing

Analyzing the morphology (shape) of the sperm can offer clues about how they develop and function.

There are two methods for evaluating sperm morphology. Standard tests using a standard microscope provide a crude estimate of the percentage of sperm with normal shape. A more specialized test, known as "strict morphology," which provides more detail, can only be conducted by trained technicians in specialized male fertility labs.

## DNA Damage

DNA can be examined under a microscope to determine whether certain strands are broken or damaged. Damaged DNA can create abnormal embryos which fail to grow properly and are lost through miscarriage. Two main causes of DNA damage are cigarette smoking and the exposure to toxins in the environment.





## GENETIC TESTING

Genetic blood tests can provide other information about DNA, such as whether extra chromosomes are present, chromosomes are lost or rearranged, or large portions of DNA are missing. Abnormalities such as these can influence male fertility and the health of an embryo. Being aware of genetic problems can help your doctor guide your treatment

### Y Microdeletions

Approximately 10% to 20% of men with no sperm (and 5% of men with very reduced sperm counts) may be missing small parts of the Y chromosome, which carries genetic information required for the formation and function of the testes. Patients who have these deletions should ask their doctor about possible infertility in their male offspring.

### Karyotype

Karyotyping examines both the number and the structure of the chromosomes through microscopic examination and analysis. This test can provide information about whether extra chromosomes are present, whether a chromosome has been lost, whether the information on the chromosomes has been rearranged, or whether large deletions of DNA are present. Abnormalities in the number of chromosomes or the arrangements of genes on the chromosomes can influence male fertility.

### Cystic Fibrosis (CF) Testing

Cystic fibrosis (CF) is the most common life-threatening genetic disease in the Caucasian population, affecting approximately 1 in 2000 live births. Mutations of the CF gene are associated with abnormalities of the male reproductive tract, such as the absence of the vas deferens, or unexplained obstruction of the epididymis. Often, patients have no other symptoms and only learn about their CF mutations because of their infertility. Analyzing the CF gene can help these men make choices about treatment, and help them estimate the risk of transmitting CF to their offspring.

## TREATMENT OPTIONS

Based on the medical history, physical exam, and diagnostic testing, a physician will be able to recommend treatment options most likely to help an individual patient.





Keep in mind that, when being treated for male infertility, patience is important. Nearly all the treatments, whether medical or surgical, take at least 3 months to become effective — about the length of time it takes for sperm production to complete a full cycle. Sometimes, two or three complete cycles are needed before maximal results are achieved.

## MEDICAL TREATMENTS

**Hormone therapy** is the treatment of choice for men whose sperm production is impaired due to a lack of the hormones LH and FSH. Agents such as human chorionic gonadotropin (hCG), menotropins (hMG) or gonadotropin releasing hormone (GnRH) are administered to stimulate sperm production.

**Aromatase inhibitors** are medications that increase the levels of testosterone (a key male hormone) from the testicle and decrease the level of estrogen (a female hormone) in the blood. Elevated estrogen is a problem sometimes seen in obese men. Treatment with aromatase inhibitors can help men with low sperm counts achieve improvements in semen concentration and motility.

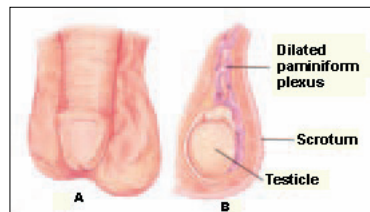
**Antioxidants** such as vitamins E and C are used to neutralize the molecules known as reactive oxygen species (ROS), also known as oxidants, which have been described above, and to minimize their harmful effects.





## SURGICAL TREATMENTS

### Varicocele Repair



About 40% of men with fertility problems have a swelling in their scrotum called a “varicocele.” Varicoceles form when blood cannot flow properly through a vein. The blood backs up, creating a swelling and widening of the vein. (This is a similar process to the development of a varicose vein in the leg.)

The exact way that varicoceles lower sperm production is not fully understood. In fact, many men have varicoceles that do not affect their fertility. But a varicocele can raise the temperature of the testicle, impairing sperm production. (One of the reasons the scrotum hangs outside the body is because the testes need to be kept a few degrees cooler than body temperature.)

Repairing a varicocele is a relatively simple surgical procedure, usually performed on an outpatient basis. Studies have shown that 40% to 70% of men who have a varicocele repaired will have an improvement in sperm quality, and about 40% will be able to initiate a pregnancy.

### Removing Obstructions of the Ejaculatory Duct

The ejaculatory ducts transport sperm and semen into the urethra, which is their final destination before ejaculation.

A number of factors can cause obstructions of the ejaculatory ducts, blocking the flow of sperm. These include congenital narrowing, scarring due to infection, and compression from a prostate cyst.

Obstructions in the ducts are usually diagnosed by ultrasound imaging or x-ray and can be removed by a simple procedure, leaving normal unobstructed tissue behind.

### Removing Obstructions of the Vas Deferens and Epididymis

An obstruction of the vas deferens is usually the result of a prior elective vasectomy. Over time, this obstruction may lead to significant “back pressure” within the fragile tubules of the epididymis, resulting in an epididymal obstruction often referred to as a “blowout.” Such problems can usually be corrected with microsurgery to bypass the obstruction. These delicate procedures are among the most technically demanding ones performed by urologists, and they are best accomplished by individuals who have special training in microsurgical techniques.

### Sperm Retrieval

Some men do not have enough sperm available in their ejaculate, due to a problem with sperm production, an ejaculation disorder, or a blockage in the reproductive tract. In these cases, doctors may be able to extract live sperm from within the patient’s reproductive system.





This procedure can be done by a variety of minor surgical techniques. For example, if the problem is caused by a blockage, sperm may be extracted from the epididymis. If the problem is one of abnormal sperm production, a small amount of sperm-containing tissue may be removed from the testicle.

The sperm obtained by these procedures may then be injected directly into an egg in a process known as intracytoplasmic sperm injection (ICSI), a form of in vitro fertilization. Only one healthy sperm is needed to fertilize each egg. Sperm that are not used immediately can also be frozen for use at a later date.

## FREQUENTLY ASKED QUESTIONS

### What should I expect at my first visit to the doctor?

You will be given a physical examination and be asked detailed questions about your medical history. It's a good idea to bring your partner with you to the first visit. This will help you gather data and also allow your partner to have her questions answered directly.

### What testing is usually ordered?

Testing often starts at the first visit, including measuring of blood hormone levels. Ask ahead of time whether you will be expected to collect a semen sample at the first visit (if so, you will need to abstain from ejaculating for two or three days before that visit). Most doctors will let you perform the semen collection at home, as long as you get the sample to the laboratory within 1 hour.

Based on your medical history and initial semen analysis, other specialized semen and genetic testing may then be ordered.

### I'm concerned about my job. How much time should I expect to miss if I have one of the surgical procedures described above?

Most procedures discussed can be performed on an outpatient basis. The timing of return to work varies, depending on the nature of your duties. Generally, even with the most invasive procedures described above, most patients are able to return to work within several days.

There may be some activity restrictions for a few weeks, and these should be discussed on an individual basis with your doctor.

### I feel healthy and take care of myself. Could I have done something differently to prevent this from happening?





Probably not. Most patients with male fertility problems are quite healthy overall. Although some men do develop problems after “preventable events” such as exposure to toxins, radiation, or trauma, most causes of infertility are probably present from birth, and unavoidable.

Remember, though, that **unavoidable does not mean untreatable**. Under the care of a properly trained physician, the chances of a successful pregnancy due to male factor infertility are quite good.

## WHERE TO TURN FOR HELP

There are many organizations dedicated to helping couples overcome infertility. Your first goal should be to find a urologist who has special training in male reproductive medicine and surgery. A number of organizations can help you find such a physician in your community, including:

### American Society for Reproductive Medicine (ASRM)

1209 Montgomery Highway

Birmingham, AL 35216-2809

Phone: 205-978-5000

Fax: 205-978-5005

[www.asrm.org](http://www.asrm.org)

The American Society for Reproductive Medicine provides a wide range of patient information on infertility and reproduction. ASRM encourages patients to explore all the information on their Web site – [www.asrm.org](http://www.asrm.org) – including:

- Help finding a doctor
- Patient information booklets and other publications
- Links to professional organizations
- Links to the Journal of Assisted Reproduction and Genetics
- Headlines in reproductive news

### American Urological Association (AUA)

1000 Corporate Boulevard







Linthicum, MD 21090

Toll Free (U.S. only): 1-866-RING AUA (1-866-746-4282)

Phone: 410-689-3700

[www.urologyhealth.org](http://www.urologyhealth.org)

Toll-free Urology Health Hotline: 1-800-828-7866

The American Urological Association (AUA) has a wealth of information for patients at [www.urologyhealth.org](http://www.urologyhealth.org). On this site, which is written and reviewed by expert urologists in partnership with the American Urological Association Foundation, you can:

- Find a urologist.
- Click on the Urology Health On-line Resource Center, a free service with valuable educational materials about urological conditions. Visitors can download brochures and news articles for personal use or for printing and distribution to members of their organizations or community groups free of charge.

### **FertilityJournal.com**

FertilityJourney.com provides a wealth of information and support for couples who are having trouble getting pregnant. The web site includes expert information on fertility tests and treatments, and covers both the physical and psychological aspects of trying to conceive. On the site, patients find encouragement to help them stay positive, tools for dealing with difficult emotions and stress, and even advice for making the most of their insurance coverage.

