Infertility

Reproductive endocrinologists, the doctors specializing in **infertility**, consider a couple to be infertile if:

* the couple has not conceived after 12 months of unprotected intercourse if the female is under the age of 35
* the couple has not conceived after 6 months of unprotected intercourse if the female is over the age of 35 (declining egg quality of females over the age of 35 account for the age-based discrepancy as when to seek medical intervention)
* the female is incapable of carrying a pregnancy to term.

Healthy couples in their mid-20s having regular sex have a one-in-four chance of getting pregnant in any given month. This is called "Fecundity". There are some health insurance companies that cover diagnosis of infertility but frequently once diagnosed will not cover any treatment costs.

Prevalence
Infertility affects approximately 10% of people of reproductive age , and 15% of couples. Roughly 40% of cases involve a male contribution or factor, 40% involve a female factor, and the remainder involve both sexes.

In the U.S.
According to the American Society for Reproductive Medicine, infertility affects about 6.1 million people in the U.S., equivalent to ten percent of the reproductive age population. Female infertility accounts for one third of infertility cases, male infertility for another third, combined male and female infertility for another 15%, and the remainder of cases are "unexplained".

Causes
This section deals with unintentional causes of sterility. For more information about surgical techniques for preventing procreation, see sterilization.

Primary vs. secondary
Couples with primary infertility have never been able to conceive , while, on the other hand, secondary infertility is difficulty conceiving after already having conceived and carried a normal pregnancy. Apart from various medical conditions (e.g. hormonal), this may come as a result of age and stress felt to provide a sibling for their first child. Technically, secondary infertility is not present if there has been a change of partners.

Some women are infertile because their ovaries do not mature and release eggs. In this case synthetic FSH can be given as injections to stimulate eggs to mature in the ovaries.

Causes in either sex

Factors that can cause male as well as female infertility are:

* Genetic
o A Robertsonian translocation in either partner may cause recurrent abortions or complete infertility.
* General factors
o Diabetes mellitus, thyroid disorders, adrenal disease
* Hypothalamic-pituitary factors:
o Kallmann syndrome
o Hyperprolactinemia
o Hypopituitarism

Female infertility

Factors relating only to female infertility are:

* General factors
o Significant liver, kidney disease
o Thrombophilia
* Hypothalamic-pituitary factors:
o Hypothalamic dysfunction
* Ovarian factors

o Polycystic ovarian syndrome
o Anovulation
o Diminished ovarian reserve (usually means high FSH), also see Poor Ovarian Reserve
o Luteal dysfunction
o Premature menopause
o Gonadal dysgenesis (Turner syndrome)
o Ovarian neoplasm
* Tubal/peritoneal factors
o Endometriosis
o Pelvic adhesions
o Pelvic inflammatory disease (PID, usually due to chlamydia)
o Tubal occlusion
o Tubal dysfunction
* Uterine factors
o Uterine malformations
o Uterine fibroids (leiomyoma)
o Asherman's Syndrome
* Cervical factors
o Cervical stenosis
o Antisperm antibodies
o Insufficient cervical mucus (for the travel and survival of sperm)
* Vaginal factors
o Vaginismus
o Vaginal obstruction
* Genetic factors
o Various intersexed conditions, such as androgen insensitivity syndrome

Male infertility
Factors relating only to male infertility include:

* Pretesticular causes
o Hypogonadism due to various causes
o Drugs, alcohol
* Testicular factors
o Bad semen quality
o Genetic defects on the Y chromosome
+ Y chromosome microdeletions
o Abnormal set of chromosomes
+ Klinefelter syndrome
o Neoplasm, e.g. seminoma
o Idiopathic failure
o Cryptorchidism
o Varicocele
o Trauma
o Hydrocele
o Mumps
o Testicular dysgenesis syndrome
* Posttesticular causes
o Vas deferens obstruction
o Infection, e.g. prostatitis
o Retrograde ejaculation
o Hypospadias
o Impotence
o Acrosomal defect/egg penetration defect

Combined infertility
In some cases, both the man and woman may be infertile or sub-fertile, and the couple's infertility arises from the combination of these conditions. In other cases, the cause is suspected to be immunological or genetic; it may be that each partner is independently fertile but the couple cannot conceive together without assistance.

Unexplained infertility

In about 15% of cases the infertility investigation will show no abnormalities. In these cases abnormalities are likely to be present but not detected by current methods. Possible problems could be that the egg is not released at the optimum time for fertilization, that it may not enter the fallopian tube, sperm may not be able to reach the egg, fertilization may fail to occur, transport of the zygote may be disturbed, or implantation fails. It is increasingly recognized that egg quality is of critical importance and women of advanced maternal age have eggs of reduced capacity for normal and successful fertilization.

Symptoms and Signs

Male infertility
The history should include prior testicular (penis) insults (torsion, cryptorchidism, trauma), infections (mumps orchitis, epididymitis), environmental factors (excessive heat, radiation, chemotherapy), medications (anabolic steroids, cimetidine, and spironolactone may affect spermatogenesis; phenytoin may lower FSH; sulfasalazine and nitrofurantoin affect sperm motility), and drugs (alcohol, marijuana). Sexual habits, frequency and timing of intercourse, use of lubricants, and each partner's previous fertility experiences are important. Loss of libido and headaches or visual disturbances may indicate a pituitary tumor. The past medical or surgical history may reveal thyroid or liver disease (abnormalities of spermatogenesis), diabetic neuropathy (retrograde ejaculation), radical pelvic or retroperitoneal surgery (absent seminal emission secondary to sympathetic nerve injury), or hernia repair (damage to the vas deferens or testicular blood supply).

Female infertility
Female infertility occurs when the woman does not conceive after one year of attempting to become pregnant. Other signs and symptoms depend on the underlying cause of the woman's infertility.

Diagnosis

Male infertility
The diagnosis of infertility begins with a medical history and physical exam. The provider may order blood tests to look for hormone imbalances or disease. A semen sample may be needed. Blood sample may indicate genetic causes.

Efficiency
In the majority of cases of male infertility and low sperm quality, no clear cause can be identified with current diagnostic methods.

Medical history
The cornerstone of the male partner evaluation is the history. It should note the duration of infertility, earlier pregnancies with present or past partners, and whether there was previous difficulty with conception.

Physical examination
A complete examination of the infertile male is important to identify general health issues associated with infertility. For example, the patient should be adequately virilized; signs of decreased body hair or gynecomastia may suggest androgen deficiency.

The scrotal contents should be carefully palpated with the patient standing. As it is often psychologically uncomfortable for young men to be examined, one helpful hint is to make the examination as efficient and as matter of fact as possible.

The peritesticular area should also be examined. Irregularities of the epididymis, located posterior-lateral to the testis, include induration, tenderness, or cysts.

Sperm sample
Main article: semen quality

The volume of the semen is measured, as well as the number of sperm in the sample. How well the sperm move is also assessed. This is the most common type of fertility testing.

Blood sample
A blood sample can reveal genetic causes of infertility, e.g. an Y chromosome microdeletion.

Female infertility

Diagnosis of infertility begins with a medical history and physical exam. The healthcare provider may order tests, including the following:

* an endometrial biopsy, which tests the lining of the uterus
* hormone testing, to measure levels of female hormones
* measurements of thyroid function (a thyroid stimulating hormone(TSH) level of between 1 and 2 is considered optimal for conception)
* laparoscopy, which allows the provider to see the pelvic organs
* measurement of progesterone in the second half of the cycle to confirm ovulation
* Pap smear, to check for signs of infection
* pelvic exam, to look for abnormalities or infection
* a postcoital test, which is done after sex to check for problems with secretions (not commonly used now because of test unreliability)
* special X-ray tests

Diagnosis of infertility should be made by physicians who are fellowship trained as reproductive endocrinologists. Reproductive Endocrinologists are usually Obstetrician-Gynecologists with advanced training in Reproductive Endocrinology & Infertility (in North America). These highly educated professionals and qualified physicians treat Reproductive Disorders affecting not only women but also children, men, the postmenopausal woman. These specialized professionals treat primarily, infertility for both sexes.

Prospective patients should note that reproductive endocrinology & infertility practices do not see women for general maternity care. The practice is primarily focused on getting their patients pregnant.

Treatment

Main article: Assisted reproductive technology

Treatment of infertility usualy starts with medication. In vitro fertilization (IVF) in addition to various forms and developments of it (ICSI, ZIFT, GIFT) is another solution. They all include that the fertilization takes place outside the body. On the other hand, an insemination can make a fertilization inside the body. Other techniques are e.g. tuboplasty, assisted hatching and PGD.

Prevention

Male infertility

Some cases of male infertility may be avoided by doing the following:

* Avoid smoking as it damages sperm DNA
* Avoid drugs and medications known to cause fertility problems, like steriods and some antifungal medications.
* Avoid excessive exercise.
* Avoid exposure to environmental hazards such as pesticides and heavy metals such as lead, mecury and cadmium.
* Avoid frequent hot baths or use of hot tubs.
* Avoid tight underwear or pants.
* Eat a diet with adequate folic acid, vitamin C, Zinc, calcium, magnesium, selenium, iron loaded food.
* Get early treatment for sexually transmitted diseases.
* Have regular physical examinations to detect early signs of infections or abnormalities.
* Keep diseases, such as diabetes and hypothyroidism, under control.
* Practice safer sex to avoid sexually transmitted diseases.
* Take a lycopene supplement.
* Wear protection over the scrotum during athletic activities.

Female infertility

Some cases of female infertility may be prevented by taking the following steps:

* Avoid excessive exercise.
* Avoid smoking.
* Control diseases such as diabetes and hypothyroidism

* Eat a well balanced nutritious diet with plenty of fresh fruits and vegetables (plenty of folates).
* Follow good weight management guidelines.
* Get early treatment for sexually transmitted diseases.
* Have regular physical examinations to detect early signs of infections or abnormalities.
* Limit caffeine and alcohol intake.
* Do not unecessarily delay having children if the options are available to you. Fertility starts declining after age 27

Costs
Not everyone in the U.S. has insurance coverage for fertility investigations and treatments, especially when a couple already has children. Many states are starting to mandate coverage, and the rate of utilization is 277% higher in states with complete coverage.

2005 approximate treatment/diagnosis costs (United States, costs in US$):

* Initial workup: hysteroscopy, hysterosalpingogram, blood tests ~$2,000
* Artificial insemination ~ $500- 900 per. trial
* Sonohysterogram (SHG) ~ $600 - 1,000
* Clomiphene citrate cycle ~ $ 200 - 500
* IVF cycle ~ $10,000 -14,000
* Use of a surrogate mother to carry the child - dependent on arrangements

Another way to look at costs is to determine the cost of establishing a pregnancy. Thus if a clomiphene treatment has a chance to establish a pregnancy in 8% of cycles and costs $500, it will cost ~ $6,000 to establish a pregnancy, compared to an IVF cycle (cycle fecundity 40%) with a corresponding cost of ($12,000/40%) $30,000.

In the UK all patients have the right to preliminary testing, provided free of charge by the National Health Service. However, treatment is not widely available on the NHS and there can be long waiting lists. Most patients therefore seek help from private clinics.

Most health insurance plans do not cover the cost of IVF (in vitro fertilization). Since IVF treatment is expensive and not often covered by health plans the InterNational Council on Infertility Information Dissemination, Inc. (INCIID -- pronounced "inside") created the first and only national (USA based) scholarship program for those without insurance and with financial need for the procedure. The first "Heart Baby" was born program on October 31, 2005. There have been numerous pregnancies and births since being launched in late 2004. The program is called "From INCIID the Heart" and details, application and criteria can be found on the INCIID website: http://www.inciid.org

Ethics
There are several ethical issues associated with infertility and its treatment.

* High-cost treatments are out of financial reach for some couples.
* Debate over whether health insurance companies should be forced to cover infertility treatment.
* The legal status of embryos fertilized in vitro and not transferred in vivo.
* Anti-abortion opposition to the destruction of embryos not transferred in vivo.
* IVF and other fertility treatments have resulted in an increase in multiple births, provoking ethical analysis because of the link between multiple pregnancies, premature birth, and a host of health problems.
* Religious leaders' opinions on fertility treatments.
* Infertility caused by DNA defects on the Y chromosome is passed on from father to son. If natural selection is the primary error correction mechanism that prevents random mutations on the Y chromosome, then fertility treatments for men with abnormal sperm (in particular ICSI) only defer the underlying problem to the next male generation.

Psychological impact
Infertility may have profound psychological effects. Partners may become more anxious to conceive, ironically increasing sexual dysfunction. Marital discord often develops in infertile couples, especially when they are under pressure to make medical decisions. Women trying to conceive often have clinical depression rates similar to women who have heart disease or cancer. Even couples undertaking IVF face considerable stress, especially the female partner