

the art of conception

INFERTILITY SERVICES



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## Welcome to Infertility Services at Kaiser Permanente

If you have been trying to conceive and have not been able to, you are not alone. One out of six couples experience infertility problems at some time in their lives.

At Kaiser Permanente, we realize that coping with infertility can be a trying and frustrating experience. In order to provide high-quality personalized care to our patients, we offer a team approach that includes physicians, nurse practitioners, nurses, medical assistants, and lab technicians. We give you the respect and quality of care that you deserve to help you reach your goal.

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### WHAT IS INFERTILITY?

Couples are considered to be infertile if they have not been able to conceive after 12 months of having sexual intercourse without using any form of birth control. For a woman 35 or older, 6 months is the appropriate time to begin to consider that she might have a fertility problem.

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### WHO IS ELIGIBLE FOR SERVICES?

Kaiser Permanente members who meet the previous definition of infertility.

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### WHAT INFERTILITY SERVICES ARE AVAILABLE TO MEMBERS?

- Basic education and literature about fertility issues.
- Blood tests and semen analysis.
- Pre-pregnancy screening tests.
- Diagnosis and treatment of recurring pregnancy loss.
- Initial consultation with an ob-gyn doctor. Through a review of the basic tests, semen analysis, and medical history, this

consultation will clarify if there might be a fertility problem.

When indicated, treatment options may also include:

- Medications
- Inseminations
- Advanced diagnostics
- Surgery
- Counseling
- In vitro fertilization (IVF)

It is important to check your infertility and drug coverage benefits. You can do this by:

- Calling a patient financial advisor at (925) 979-7768 or (925) 979-7782 (for Northern California members only).
- Calling the number on the back of your Kaiser Permanente Health Plan card.
- Checking with your employer's benefits office.
- Checking your plan and coverage on [kp.org](http://kp.org).

Kaiser Permanente's infertility programs offer in vitro fertilization (IVF) and many other related services. For most members, IVF is not a covered benefit. Different employers offer different benefits and benefits may also change from year to year, so it is important to verify your coverage as soon as possible.

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### WHAT QUESTIONS SHOULD A MEMBER ASK?

#### How do we get started?

Contact your women's health clinician or your primary care doctor if you are concerned about your ability to get pregnant or for a referral to infertility services. Your clinician

may ask you to complete some basic tests and fill out your medical history first. Please complete these steps as soon as possible and bring any previous infertility records to the consultation visit.

**Are there infertility support services?**

Counseling is available through Kaiser Permanente’s Psychiatry or Behavioral Medicine Departments. You can call to make an appointment in either of these departments, or you can speak to your doctor about a referral for counseling services. Infertility support groups may be available through these organizations:

- RESOLVE, Inc (The National Infertility Association, telephone 703-556-7172 or [resolve.org](http://resolve.org))
- American Society for Reproductive Medicine ([asrm.org](http://asrm.org))

Additional information about infertility is available at [kp.org/mydoctor](http://kp.org/mydoctor). We have programs that can help you manage stress and achieve other lifestyle changes that could affect fertility. Contact your local Health Education Center for help finding resources and support.

## Overview: The Biology of Reproduction

### FEMALE REPRODUCTIVE ANATOMY

Eggs develop and are stored and mature in the ovaries. The **fallopian tubes** carry the eggs that are released from the ovaries to the uterus during ovulation. Fertilization of an egg by a sperm occurs in the fallopian tube. If an egg is fertilized, it will develop into a fetus in the uterus. The uterus has a specialized lining called the endometrium that allows an embryo to implant into the wall and provides the developing baby with nutrients and support.

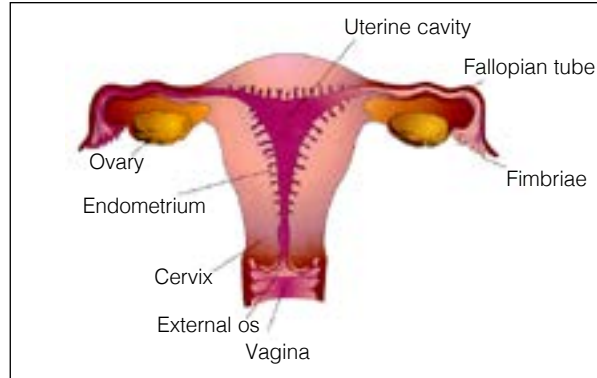


Figure from *Before We Are Born; Essentials of Embryology and Birth Defects, 5th Edition*, by Moore, Keith L. and Persaud, T.V.N. ©1998. Reprinted with permission of W.B. Saunders Company.

### Menstrual Cycle and Ovulation

The entire menstrual cycle is controlled by the brain together with the ovaries. There are five main hormones involved in reproduction. Follicle stimulating hormone (FSH), luteinizing hormone (LH), and prolactin are produced in the brain by the pituitary gland. FSH stimulates the growth of the egg within the ovary; LH stimulates ovulation or the release of the egg; and prolactin stimulates milk production. Estrogen and progesterone are produced in the ovaries and help prepare the lining of the uterus so it will accept a fertilized egg.

The menstrual cycle is measured in days, starting with day 1 as the first day of the menstrual period. Ovulation usually occurs

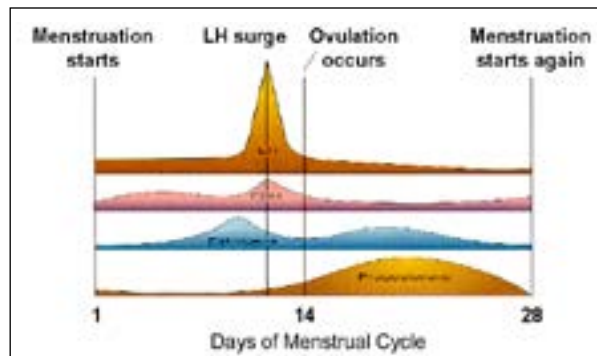


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at approximately day 14. If the released egg is not fertilized, the lining of the uterus (the endometrium) is sloughed off as the

menstrual period. A 28-day cycle is average, and most women's cycles vary in length.

### MALE REPRODUCTIVE ANATOMY

Millions of **sperm** are produced in the **testes** every day. Approximately 2 months are needed for sperm to develop and mature.

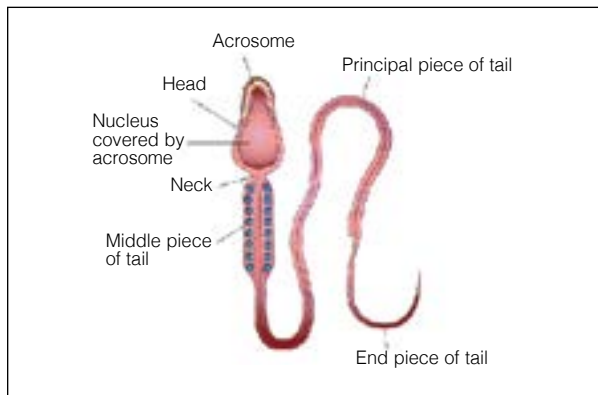


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The **vas deferens** carries the sperm from the testicles to the urethra, where the **seminal vesicles** and **prostate gland** add fluid to form semen. Semen moves out of the body through the **urethra** in the **penis**. Approximately 40 million sperm are released at ejaculation. Sperm are very small and most of the semen consists of fluid that provides nutrients and enzymes to nourish the sperm.

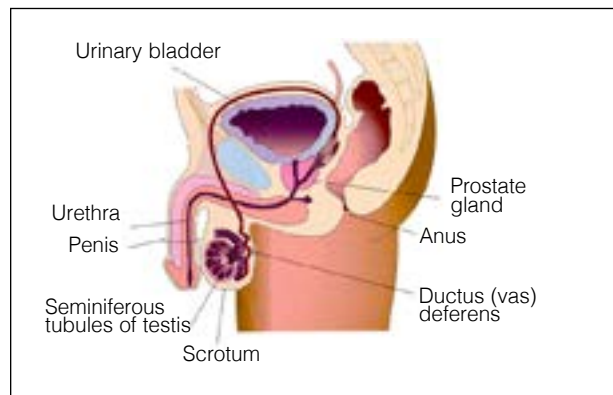
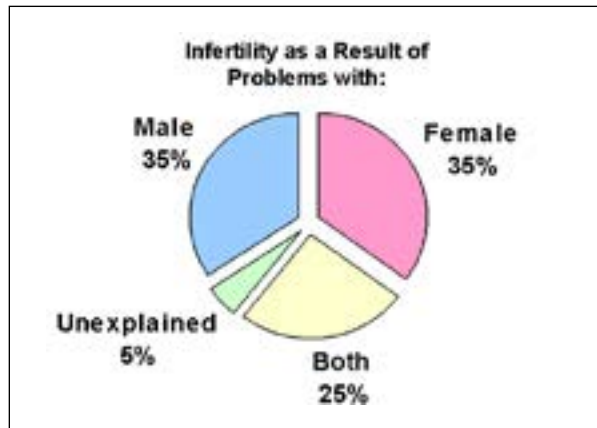


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## Overview: Some Causes of Infertility



### MEN OR WOMEN?

Infertility problems are associated about equally with men and women.

Men are most likely to have a problem with their sperm (volume, count, shape, movement). Sometimes infertility can be due to problems with testicles, prostate, or varicocele (large vein), or to illness, medications, or hormones.

Female infertility can be due to egg quality or to ovulation, cervical, tubal, or pelvic factors. Weight and excess stress have also been linked to infertility. Both hormone functioning and reproductive anatomy are important for fertilization and fetal growth to occur.

### EGG QUALITY

Egg quality refers to both the ability of an egg to become successfully fertilized and the ability of a fertilized egg to develop into a healthy baby. Egg quality is closely associated with age.

#### Why is it harder to get pregnant as we get older?

Females are born with a certain number of eggs. As women age, the number of eggs, as well as the quality of the eggs, declines. As a result, a woman over 35 years old has a lower chance of getting pregnant and a higher chance of having a miscarriage or a baby with congenital problems (such as Down syndrome).

Male fertility declines with age, as well. A man can have declining sperm quality or sperm count as he ages, and the risk for miscarriage increases as male age increases.

#### How can I tell if my eggs are a problem?

Age alone is a strong predictor of successful pregnancy. There are also blood tests that can help your doctor or nurse practitioner determine the level of your fertility. Two blood tests that are commonly done are called FSH and estradiol. If the results of these blood tests are high, your chances of becoming pregnant and having a baby are decreased.

Although your blood test results may change from month to month, the highest FSH and estradiol results are often used to predict your chances of success.

Unfortunately, if blood tests indicate a diminished chance of conceiving, there are limited drugs or treatments to help you conceive using your own eggs. Egg donation or adoption can be an option. If the test results are normal, your doctor may prescribe fertility drugs. If you respond well to these drugs or if you are over age 35, your doctor may suggest moving quickly to an advanced fertility treatment called in vitro fertilization (IVF).

#### WHEN TO CONTACT YOUR DOCTOR?

If you are younger than 35 and have not become pregnant after trying for 1 year, or if you are 35 or older and have not become pregnant after trying for 6 months, call your doctor or nurse practitioner. Then, an infertility care specialist can start testing for infertility.

If a chronic condition known to impact fertility affects either you or your partner, contact your doctor earlier than the times suggested above.




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## What Can Couples Do to Increase the Chances of Getting Pregnant?

Couples who are trying to conceive should practice good health habits including:

- Eating a well-balanced diet.
- Getting regular moderate exercise.
- Avoiding cigarette smoke, recreational drugs, and excessive alcohol consumption.

Additionally, it is important to attend to emotional health (by reaching out for support or counseling), since stress can impact the ability to conceive and maintain a healthy pregnancy. Tell your doctor if you have a history of mental health issues or eating disorders.

Getting certain nutrients is important. **We recommend that all women of child-bearing age take 400 mcg of folic acid daily.**

The easiest way to do this is by taking a standard multivitamin.

#### **How often should we have intercourse?**

You should try to have intercourse every day or every 2 days during the woman's fertile interval, near ovulation. Most, but not all, women ovulate on or near day 14 of their menstrual cycle. (Remember: Day 1 of the cycle is the first day of a period.) Both a

basal body temperature chart and a urine ovulation predictor kit can help a woman determine when she is most fertile.

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### **BASAL BODY TEMPERATURE CHART**

#### **What is basal body temperature?**

Basal body temperature (BBT) is your body temperature while at rest. Hormone changes during the menstrual cycle have an effect on body temperature.

#### **What is a BBT chart?**

The BBT chart is a record of your body temperature before you get active in the morning. Your body temperature is usually lowest in the morning when you have been at rest. It rises during the day. A woman's BBT increases right after ovulation. Therefore, a BBT chart is a simple method to tell whether or not you may be ovulating (releasing an egg). It will help you learn when your fertile times are.

#### **How do I use the BBT chart?**

Keep your thermometer at your bedside and shake it down the night before you use it. Put the thermometer under your tongue for 5 minutes every morning. Record the number on the chart. It is easiest to use a special thermometer called a basal thermometer because it covers a much smaller range of temperature than regular thermometers and is a lot easier to read. You can find a basal thermometer in most drugstores.

Other information should also be recorded on the chart. This information includes intercourse, factors that might affect the temperature (such as taking the temperature earlier or later than usual, or illness), and other signs such as increased vaginal mucus or sharp ovarian pain.

**Bring your basal body temperature chart for review if you have been keeping one.**

Sometimes, keeping a BBT chart can cause more stress than benefit. If it's not working for you, you can stop.

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### **OVULATION PREDICTION KIT**

#### **What is an ovulation prediction kit?**

Ovulation prediction kits are easy-to-use test kits that you can buy without a prescription to help determine when you are about to ovulate.

About 12 to 14 days before a menstrual period, the brain releases its supply of luteinizing hormone (LH). This is called the LH surge and can be detected in your urine. The LH surge happens about 1 to 1½ days before an egg is released and triggers the egg's release from the ovary. You are fertile around the time the egg is released. Generally, when the color of the predictor kit changes, you should have intercourse on that day and the following day. Kit brand names include Clear Blue Easy, Conceive, Q Test, Assure, and EZ-LH.

#### **How do I use the ovulation prediction kit?**

Be sure to carefully follow the directions from the kit you are using. It is best to test your urine in the morning after you have already urinated one time. You should begin testing on or around day 10 of your menstrual cycle unless your doctor or nurse practitioner tells you to start on a different day.





## What Are Some Infertility Tests?

Your physician or nurse practitioner will consider four main questions. These include:

- Are there enough moving, normally shaped sperm?
- Is ovulation occurring? If so, how often?
- Is anatomy normal? Can the egg and sperm meet?
- What is the quality of the eggs? What is the role of age?

## Female Tests

### BLOOD TESTS

#### FOLLICLE STIMULATING HORMONE (FSH) & ESTRADIOL

##### What is FSH?

FSH is a hormone that stimulates the development of the follicle (egg) in the ovaries.

##### How is FSH measured?

FSH level is measured by taking a blood test usually on day 2 or day 3 of your menstrual cycle (day 1 is the first day of your period).

##### What do the test results mean?

FSH levels measure ovarian reserve, or how well the ovaries are working. A normal FSH means the ovaries are working well. An elevated FSH (greater than 10) is an early chemical indication of decreased fertility.

Your doctor or nurse practitioner will receive the results of your FSH test and determine if you fall into the normal, borderline, or abnormal (decreased fertility) range.

- Normal: An FSH of 10 or less indicates that pregnancy is possible. However, it does not guarantee that you will become pregnant, nor does it accurately predict how well you may respond to fertility medication.
- Borderline: A borderline FSH of 11 to 14 suggests that you have declining egg quality or ovarian reserve. A borderline FSH indicates that your chances of pregnancy are low with or without treatment.
- Abnormal: An abnormal FSH (15 or higher) indicates poor egg quality. The chance for a successful pregnancy (using your own egg) and a live birth is very low.

If you have an abnormal FSH, your clinician can counsel you about alternative ways to become a parent. FSH levels can vary from



cycle to cycle. It is the highest FSH level that best predicts egg quality. Any one FSH level that is abnormal predicts a poor response to fertility medications and a diminished ovarian reserve.

#### **What is estradiol?**

Estradiol is made by the egg follicles as they grow in the ovaries. Estradiol, in addition to progesterone, prepares the uterine lining to receive the fertilized egg.

#### **When is the estradiol test done?**

The blood test to measure estradiol is taken at the same time as your FSH level (on day 2 or day 3 of your menstrual cycle).

A normal estradiol level indicates that pregnancy is possible.

A high estradiol level (greater than 80) shows that ovarian reserve is diminished and that a successful pregnancy is less likely. A high level may also be due to residual ovarian activity from a previous menstrual cycle.

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## **PROGESTERONE**

#### **What is progesterone?**

Progesterone is the hormone made in the ovaries after ovulation and is responsible for maintaining the lining of the uterus. This is important because the fertilized egg must attach to the lining in order to grow. Progesterone also causes the small rise in body temperature that happens after ovulation. This is the rise in temperature that you measure when you check your basal body temperature.

#### **How is progesterone measured?**

Progesterone is measured with a blood test during the second part of your menstrual cycle. This is usually a week after ovulation (around day 21, day 22, or day 23). If ovulation has occurred, your doctor or nurse practitioner will see a rise in your progesterone level.

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## PROLACTIN AND HYPERPROLACTINEMIA

### What is prolactin?

Prolactin is a hormone made in the pituitary gland, at the base of the brain. It is a hormone that stimulates milk production in women. Small amounts of prolactin normally circulate in the blood of nonpregnant, nonlactating (nursing) women.

### Why do we test for prolactin?

Too much prolactin (hyperprolactinemia) can cause irregular periods and trouble ovulating and/or getting pregnant. It can also cause nonpregnant women to have a milky secretion from their breasts.

### How do we test for prolactin?

A blood test measures your prolactin level. If your initial test is high, you may be asked to repeat the test. Sexual intercourse and breast stimulation should be avoided the day before prolactin testing.

### What causes high prolactin?

In some cases, high prolactin is caused by one of the following: medications, low levels of thyroid hormone (hypothyroidism), some types of surgery, or a small, benign (noncancerous) growth in the pituitary gland (prolactin-secreting adenoma).

### If prolactin is high, how is it treated?

First, the cause of the high prolactin level must be identified. You may be asked to take more blood tests and to get an MRI of the pituitary gland (brain scan) to try to determine the exact cause. In most cases, there is simple oral medicine that can be taken to reduce prolactin. Once prolactin levels are in the normal range, menstrual periods will usually become more regular and egg release (ovulation) will become more normal.

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## FASTING BLOOD SUGAR

Fasting blood sugar is a common laboratory test that measures the level of your blood sugar after you have not eaten for at least 8 hours. It is used to determine if you have diabetes or high blood sugar levels.

### How can high blood sugar be treated?

In some cases, it can be controlled by diet alone. However, oral medications or insulin injections are sometimes necessary to control blood sugar levels. It is important to have well-controlled blood sugar levels before starting infertility treatment.

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## RUBELLA

### What is rubella?

Rubella is a viral infection also known as German measles.

### Why do we test for rubella?

If you are exposed to rubella during pregnancy and do not have immunity to the disease, your baby can have serious birth defects.

### How do we test for rubella?

Before you attempt pregnancy, blood will be drawn to measure your immunity to rubella.

### What does rubella nonimmune mean?

Nonimmune means that you have no protection against rubella disease. If you are not immune, you should speak to your doctor or nurse practitioner to receive a vaccination prior to trying to get pregnant. You should not be pregnant when you receive the vaccine. You will be instructed to use birth control to avoid pregnancy for 28 days after you receive the rubella vaccination.



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## IMAGING STUDIES

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### HYSTEOSALPINGOGRAM (HSG)

#### What is an HSG?

HSG is an X-ray dye procedure used to view the inside shape of the uterus and fallopian tubes. This shows whether the tubes are open or damaged, and whether the uterine cavity is normal. Problems in these areas may make it difficult to become pregnant.

#### How is an HSG done?

A liquid, dye-like solution is injected through the cervix, and its progress as it flows up through the uterus and tubes is viewed on an X-ray. Spillage of the dye from a tube indicates that the tube is open. The inner shape of the uterus is also checked for abnormalities.

#### When is an HSG performed?

A hysterosalpingogram is performed after all menstrual bleeding is over, but before ovulation. In women with a 28-day cycle, this is usually between day 6 and day 12.

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### PELVIC ULTRASOUND

#### What is a pelvic ultrasound?

An ultrasound is an instrument that uses high frequency sound waves. The sound waves reflect off your internal organs and are “read” by scanners that create pictures of your internal organs. A pelvic ultrasound scans your uterus and ovaries.

#### How does it work?

There are various types of ultrasound that all work on the same principle. Sound waves are directed into a specific area of your body through a microphone-like device called a transducer. This can be done in two ways. In an abdominal pelvic ultrasound a special gel, which helps to conduct the sound waves, is applied to your abdomen. The transducer glides across your skin to scan your pelvis. In early pregnancy or infertility, it is easier to view the embryo, or developing egg, and pelvic organs through the vagina. This procedure is called a transvaginal ultrasound. A transvaginal transducer is inserted into your vagina to produce sharp, clear images of the pelvic organs.

### When is it used?

Ultrasound is often used in gynecology, as well as in pregnancy. It can help detect uterine fibroids and polyps, ovarian cysts, and early pregnancy. It can also examine the thickness of the endometrial (uterine) lining. In infertility, it can help monitor egg (follicle) growth and ovulation. Transvaginal ultrasound is also used for egg retrieval during in vitro fertilization (IVF).

### What are the risks?

Ultrasound has been used for over 30 years and no harmful effects have been noted from its use. No radiation, dyes, drugs, or chemicals are used in ultrasound. An ultrasound may be uncomfortable for some women but is not painful.

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## HYSTEROSCOPY

### What is a hysteroscopy?

A hysteroscopy is a way of looking at the inside of a uterus. A small lighted scope is placed through the vagina, up into the uterus. This view is helpful in diagnosing problems within the uterus such as polyps, scar tissue, abnormal shapes or membranes, and fibroids.

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## SURGERY

### What is a laparoscopy?

A laparoscopy is a surgical procedure that allows the doctor to look inside the pelvis. To do this type of surgery, a doctor puts a lighted scope and other surgical tools through small incisions in the belly. The doctor may be able to see if scar tissue, ovarian cysts, tubal blockage, or endometriosis is present. These conditions may be treated during the same surgery.

### What is a laparotomy?

Laparotomy is a surgical procedure that is done to remove fibroids or severe scarring in the pelvis. It is done through one incision in the belly. The incision may be small (2 to 3 inches) or larger, up to 4 to 5 inches.

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## Male Tests

### SEMEN ANALYSIS

#### What is semen analysis?

Semen analysis is one of the most basic laboratory tests for a couple undergoing an infertility work-up. The male partner is asked to produce a semen specimen to determine if the quality or quantity of sperm is a contributing factor to the couple's infertility.

#### What is a normal semen analysis?

Kaiser Permanente follows the World Health Organization (WHO) guidelines for normal values when analyzing:

- Volume
- Sperm count
- Motility (percentage of moving sperm)
- Morphology (shape of the sperm)
- White blood cells

Your doctor will be able to interpret your results. The combination of volume, sperm count, and percentage of motile sperm determines the amount of active sperm and may provide an informative way to interpret the data:

$$\text{volume} \times \text{count} \times \% \text{ motility} = \text{total motile sperm}$$

### How do you collect semen for the analysis?

- Obtain a container for collection from your clinician.
- Abstain from any ejaculation for 2 or 3 days before your collection date.
- Collect specimen by masturbation directly into the container.
- Do not use a condom for collection because it contains agents that kill sperm.
- Keep the specimen warm by placing the container directly next to the body. Deliver the specimen to the laboratory within 1 hour.

Please check the laboratory address and collection times prior to obtaining the specimen. Collection times vary from lab to lab.

### How are low or abnormal semen analysis counts treated?

Your clinician will discuss the results with you. He or she may ask you to repeat the semen analysis to confirm an abnormal count. If needed, you may be referred to a specialist called a urologist, or have other blood tests done.

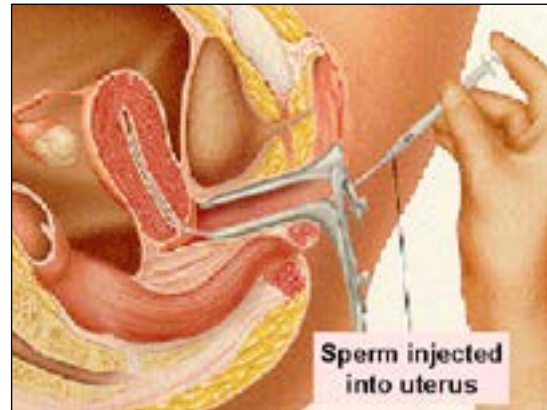
Usually the treatment for a mildly abnormal semen analysis is to do intrauterine insemination. The process of preparing the sperm to be placed directly into the woman's uterus is called sperm washing.

If the sperm count is extremely low, your doctor may suggest using donor sperm or assisted reproductive technology (ART), such as IVF with intracytoplasmic sperm injection (ICSI). Your doctor will discuss options if male factors are identified as contributing to your ability to conceive as a couple.



## What Treatments Are Available?

Depending on the results from your initial work-up, including lab tests, physical examination, and history, your physician or nurse practitioner will discuss what treatment will be most effective for you and where you should start. Every patient is different and may have to try a number of treatments or combinations of treatments to achieve a successful result. Below is a brief introduction to some of the treatments you may hear about or need to undergo.



### FERTILITY MEDICATIONS

The use of fertility medication ranges from noninvasive oral medications with little or no side effects to injections with more significant side effects.

- **Clomiphene citrate (Clomid).** An oral medication that has been used for many years. It has been very effective, especially for women with irregular or no ovulation. Clomiphene citrate can help women ovulate better by increasing the production of hormones that stimulate egg development. Your doctor may suggest other medications that might work better for you.
- **Gonadotropins.** These provide an extra supply of FSH and LH, helping to stimulate the development of eggs. Taking these medications is a more intense process that involves daily injections at home and frequent blood estrogen level and ultrasound evaluations.
- **Endocrine medications.** Medications that may improve fertility, such as the following: cabergoline or bromocriptine (for elevated prolactin), thyroid medication (for an under- or overactive thyroid), insulin (for diabetes), metformin (for selected polycystic ovarian syndrome patients).

### INTRAUTERINE INSEMINATION

Insemination is a procedure that uses a small flexible tube attached to a syringe to place washed sperm into the uterus.

Intrauterine insemination (IUI) is done after a sperm wash has removed prostaglandin, bacteria, and unwanted debris from the collected sperm. The washed sperm are placed through the cervix directly into the uterus, closer to the ovulated egg. Insemination can be done with sperm from a male partner, or sperm from a known or anonymous donor. Insemination is helpful when there is a problem with the male partner's sperm, when the female has problems with her cervix, or when pregnancy is desired without a male partner. Kaiser Permanente performs donor inseminations, but check your plan and coverage.

### IN VITRO FERTILIZATION

Through in vitro fertilization (IVF), a woman's own eggs can be fertilized outside the body and placed back in the uterus to develop. This process can also be done by using donor eggs (often from a younger woman). Kaiser Permanente has two IVF programs, in Fremont and Sacramento.



Your reproductive health can be seriously affected by violence or abuse. If you are hit, hurt, or threatened by a partner or spouse, there is help. Call the National Domestic Violence Hotline at 1-800-799-7233 or connect to [ndvh.org](http://ndvh.org).

This information is not intended to diagnose health problems or to take the place of medical advice or care you receive from your physician or other health care professional. If you have persistent health problems, or if you have additional questions, please consult with your doctor.

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