Polycystic Ovary Syndrome (PCOS)

What is it?
- An endocrine (hormonal) disorder.
- Because there is such variability in how PCOS presents itself, there is not universal agreement among health professionals on how to best define it. What is clear, however, is that women with PCOS:
  - do not ovulate (release an egg from the ovary) in a predictable manner, and
  - produce excessive quantities of hormones called androgens (especially testosterone).

Who gets it?
- Symptoms often first appear in adolescence, though some women don't develop symptoms until their early to mid-20's.
- PCOS is estimated to affect between 5% and 10% of women of reproductive age, thus making it the most common hormonal disorder among women in this age group.
- It affects women of all races and nationalities.

What are the symptoms?
No two women have exactly the same symptoms. The following characteristics are very often associated with PCOS, but not all are seen in every woman:
- Hirsutism (excessive hair growth on the face, chest, abdomen, etc.)
- Hair loss (often in a classic "male baldness" pattern)
- Acne
- Obesity
- Infertility or reduced fertility

If I have PCOS, do I have cystic ovaries?
Each month, during a woman's normal menstrual cycle, an egg (ovum) matures within a fluid-filled sac or cyst (follicle) inside the ovary. The rupture of the follicle and release of the mature ovum is called ovulation.

Some, but not all, women with PCOS have a characteristic appearance to their ovaries known as polycystic ovaries. These consist of multiple small follicles or cysts less than 1/2 inch in diameter that form in the ovary. These small cysts are the result of eggs that only partially develop within the ovary.
It is thought that even a slight elevation of androgens may inhibit the egg’s development. The egg’s failure to mature leads to a lack of ovulation (anovulation) in women with PCOS. Polycystic ovaries are often, but not always, seen in women with PCOS. Approximately 20% of women without menstrual or hormonal abnormalities have polycystic ovaries seen on ultrasound. The syndrome of PCOS is thus defined by menstrual and hormonal abnormalities with or without polycystic ovaries.

The tiny cysts found in polycystic ovaries are quite different from large ovarian cysts that sometimes require surgery. Surgery is not a recommended treatment for PCOS.

**What other terms are sometimes used for PCOS?**

- Hyperandrogenic chronic anovulation syndrome
- Functional ovarian hyperandrogenism
- Ovarian androgen excess
- Stein-Leventhal syndrome. This was the original name for the most severe manifestations of PCOS.

**What causes PCOS?**

The underlying cause of PCOS is unknown. However, we do understand that it develops in several contexts.

- PCOS can develop when the ovaries overproduce androgens (e.g., testosterone), often in response to overproduction of LH (luteinizing hormone), produced by the pituitary gland.
- Research also suggests that women with PCOS may have abnormally high blood levels of insulin, or have ovaries which are hyper-sensitive or responsive to the body’s insulin. In either case, the ovary appears to be stimulated to produce more testosterone.
- Obesity, which itself can cause insulin levels to rise, may intensify PCOS. Yet not all women who are overweight develop PCOS. Thus, there appears to be something unique about PCOS both in the excessively high insulin production and the increased sensitivity of the ovaries to the insulin that is produced.

**How is PCOS diagnosed?**

There is no single, quick test to identify PCOS. Accurate diagnosis depends on the experience and skills of the clinician when conducting a detailed medical history, a brief physical exam, and laboratory studies.

Clinicians usually recommend several blood tests, to detect changes in levels of certain hormones

- Ultrasound is usually not helpful and is not recommended for most women.
Does PCOS run in families?
Studies are currently underway to investigate a possible hereditary basis for PCOS and associated metabolic abnormalities such as diabetes. One question such studies may answer is whether women with PCOS who have a family history of diabetes are at increased risk for abnormalities in glucose tolerance.

How is PCOS treated?
Treatments for PCOS can be divided into:
- Exercise and Diet
- Hair Removal by Electrolysis or Laser
- Medical Therapies
- Investigational Treatments

EXERCISE AND DIET
These approaches are the most important, effective, and safest treatments for PCOS. Exercise makes the body more sensitive to insulin and keeps glucose and insulin levels down. This, in turn, reduces the ovaries' production of testosterone. With lower testosterone, ovulation and menstruation are more regular and unwanted hair growth decreases. For women with PCOS who are overweight, weight loss achieved through exercise and dietary changes can help in other ways. As it does for men and women without PCOS, losing weight reduces a person's risk of cardiovascular disease and non-insulin dependent (type 2) diabetes. Because of excess testosterone and insulin resistance, losing weight can be quite challenging for women with PCOS. These women truly have a metabolic cause for their extra weight. In addition to exercising regularly, many women with PCOS follow a lower carbohydrate diet designed to help with insulin resistance and weight management. The registered dietitian in the Office of Health Promotion can help with this: stop by or call 924-1509 for more information on scheduling a nutrition appointment.

HAIR REMOVAL BY ELECTROLYSIS OR LASER
Either electrolysis or laser can eliminate or decrease unwanted hair. During these treatments, individual hair follicles are destroyed by using an electric current or a focused beam of light. Unfortunately, most medical insurance policies do not cover these treatments.

MEDICAL THERAPIES
Many therapies target specific symptoms of PCOS, though they do not address the underlying cause. Oral contraceptives. Traditionally, oral contraceptives (birth control pills), which contain a combination of hormones (estrogen and progesterone) have been used to regulate menstrual periods in women with PCOS. Menstruating regularly (and, thus, shedding the endometrial or uterine lining), can help to reduce a woman's risk of endometrial cancer. Oral contraceptives also suppress the production of androgens by the ovaries. Anti-androgens. Anti-androgenic agents, such as spironolactone, block the effect of androgens (male hormones, including testosterone), thus reducing unwanted hair growth and acne. Treating infertility. Many women with PCOS do not require medical assistance in getting pregnant. For those who do, several kinds of assisted-reproduction techniques are available. Therapies range
from medications that stimulate ovulation, to advanced methods of in vitro fertilization including use of donor eggs.

INVESTIGATIONAL TREATMENTS
Rather than focusing on relieving specific symptoms, the newer treatments aim at what may be the root cause of PCOS, i.e., insulin resistance. Many of these new therapies are designed to lower insulin levels and, thus, reduce production of testosterone. These treatments are currently under investigation. Metformin (Glucophage®). Metformin is an insulin lowering drug Troglitazone (Rezulin®). Troglitazone is an insulin-sensitizing agent that improves glucose tolerance and insulin resistance.

Are there any long-term problems associated with PCOS?

Studies about PCOS and its long-term effects are still underway but it appears that women with PCOS are at increased risk of developing the health problems listed below. **Not all women with PCOS will develop all of these conditions, but having PCOS does increase your risk.** It is important to have your health monitored regularly by a clinician who has experience treating women with PCOS. Regularly scheduled health care visits should continue after menopause, even though you will no longer have erratic periods and other PCOS symptoms may lessen.

1. **Insulin resistance**
   - Insulin helps the body to metabolize or process glucose (blood sugar). Insulin resistance or impaired glucose tolerance have been linked to PCOS. Furthermore, high levels of insulin stimulate the production of testosterone, which aggravates the PCOS.
   - By age 40, up to 40% of women with PCOS have some level of abnormal glucose tolerance, in the form of either diabetes or impaired glucose tolerance.

2. **Lipid abnormalities**
   - Hyperandrogenism (increased testosterone) can lead to an unfavorable lipid profile in women with PCOS. In some women, the blood lipid profile may show a lower level of high-density lipoproteins (HDL, the "good" cholesterol) and a higher level of low-density lipoproteins (LDL, the "bad" cholesterol). This imbalance can increase the risk for cardiovascular disease.

3. **Cardiovascular disease**
   - Preliminary evidence suggests that women with PCOS may be at increased risk for heart disease and other cardiovascular diseases.
   - The tendency for women with PCOS to be overweight increases the risk of cardiovascular disease, just as obesity increases cardiovascular risk among women and men who do not have PCOS.

4. **Endometrial carcinoma (cancer)**
   - From the teens through menopause, all women experience a monthly buildup of the endometrial lining in the uterus, as the body prepares itself for the potential of a fertilized egg. If a woman does not become pregnant, the lining normally is shed through menstruation.
Women with PCOS also experience this buildup of the endometrial lining. However, because they have infrequent or nonexistent menstrual periods, the lining is not regularly shed. Thus, the lining continues to build up and, if this occurs over a long period of time, it can increase the risk of endometrial cancer.

5. Infertility or subfertility
- Many women do not realize they have PCOS until they see a doctor to determine why they cannot get pregnant. Infertility or subfertility (reduced fertility) is a common problem for women with PCOS.
- This may be due to the imbalance of hormones (including the ovaries' overproduction of the "male" hormone, testosterone). The ovaries may release ova (eggs) only infrequently.
- Thanks to the availability of ovulation-inducing drugs and advances in assisted reproductive technologies, many women with PCOS can be helped to conceive.