

About PCOS



Polycystic Ovarian Syndrome (PCOS) is the most common hormonal reproductive problem in women of childbearing age. It can affect not just a woman's menstrual cycle, fertility, hormones and appearance but also her overall health, increasing risk for diabetes and heart disease. Although its exact cause is unknown, up to 10% of reproductive-aged women suffer from PCOS.

Symptoms of PCOS may include:

- High levels of male hormones (androgens)
- Irregular or no menstrual cycle
- High incidence of small fluid-filled ovarian cysts
- Infertility or inability to get pregnant
- Increased growth of hair on the face, chest, stomach and back
- Acne, oily skin or dandruff
- Deepening voice
- Weight gain or obesity
- Type 2 diabetes
- High cholesterol
- High blood pressure
- Male-pattern baldness or thinning hair
- Patches of thickened and dark brown or black skin on the neck, arms, breasts or thighs
- Skin tags or tiny excess flaps of skin in the armpits or neck area
- Sleep apnea or excessive snoring

What are the risks of PCOS?

PCOS, left untreated, increases a woman's risk for diabetes, cardiovascular disease, stroke and cancer of the endometrium (lining of the uterus) and breast. Women with PCOS are also at risk for infertility, miscarriage and complications of pregnancy including gestational diabetes and pregnancy-induced hypertension.

What causes PCOS?

Although no one knows the exact cause of PCOS, it has been noted that many women with the disorder have a mother or sister with PCOS. Because many women with PCOS are overweight, researchers are studying the relationship between PCOS and the body's production of excess insulin, which can also lead to acne, excessive hair growth, weight gain and ovulation problems.

How is PCOS diagnosed?

There is no single test to diagnose PCOS. Your doctor will use a number of diagnostic tools, including medical history, physical exam, Body Mass Index (BMI) measurement, ultrasound and pertinent lab tests (PCOS Lab Panel) to determine whether you have PCOS.

Yale PCOS Program

A PROGRAM OF THE YALE FERTILITY CENTER



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Cosmetic Concerns of PCOS



Cosmetic concerns are common in women with PCOS. While not hazardous to health, they may be a source of significant psychological distress.

The Yale PCOS Program helps women manage bothersome cosmetic concerns with medical interventions, lifestyle modifications, and psychological support and counseling.

Hirsutism is the excess growth of coarse, visible body hair, which can be evident on the upper lip, around the jaw, on the cheeks, and sometimes on the chest, stomach and upper thighs. Increased male hormone levels and insulin contribute to hirsutism in women with PCOS. Treatments include:

- Anti-androgens* (Flutamide, Finasteride and Spironolactone) – to decrease the male hormone’s effect on hair growth
- Vaniqa (Eflornithine) cream – to reduce facial hair
- Birth control pills* – to decrease production of male hormones
- Non-pharmacological options – such as shaving, bleaching, waxing, electrolysis and laser hair removal

Acne is common in women with PCOS and is caused by elevated male hormone and insulin levels. Treatments include:

- Anti-androgens* – to counter the effects of the male hormone on skin
- Benzoyl peroxide – a common over-the-counter ingredient used in creams and lotions to treat mild to moderate acne

- Topical retinoids* – prescription creams formed from Vitamin A that help unclog pores and increase cell turnover
- Topical antibiotics – creams, lotions or gel pads that reduce inflammation by killing bacteria

Hyperpigmentation (*Acanthosis nigricans*) causes thickened, darkened skin patches that commonly affect the nape of the neck, armpits, skin under the breasts, and the groin. Insulin resistance causes this condition, which improves with adequate treatment of the underlying endocrine disorder. Treatment may include:

- Weight loss
- Dietary/pharmaceutical control of insulin resistance (such as Metformin)
- Topical exfoliants (e.g., lactic acid, tretinoin, urea-based medications)

Hair loss (*Androgenic alopecia*) in women with PCOS is commonly due to a male hormone imbalance.

Treatments include:

- Minoxidil (Rogaine) – the only FDA-approved treatment for female pattern baldness, used topically on the scalp
- Anti-androgens* (Finasteride) – to counter the effects of the male hormone on hair loss

Excessive body weight – approximately 50% of women with PCOS are overweight, due to an imbalance in caloric intake and caloric expenditure. Management options include:

- Nutritional counseling – Individualized nutritional plans are created based on the patient's preferences to ensure long-term compliance
- Physical activity counseling – Detailed assessment of patient's lifestyle and individualized counseling to achieve optimal caloric expenditure
- Therapy – For certain patients, medical and/or surgical weight loss (bariatric surgery) and psychological counseling may be considered; treatment plans are individualized

* For women who are not pregnant and are not trying to get pregnant

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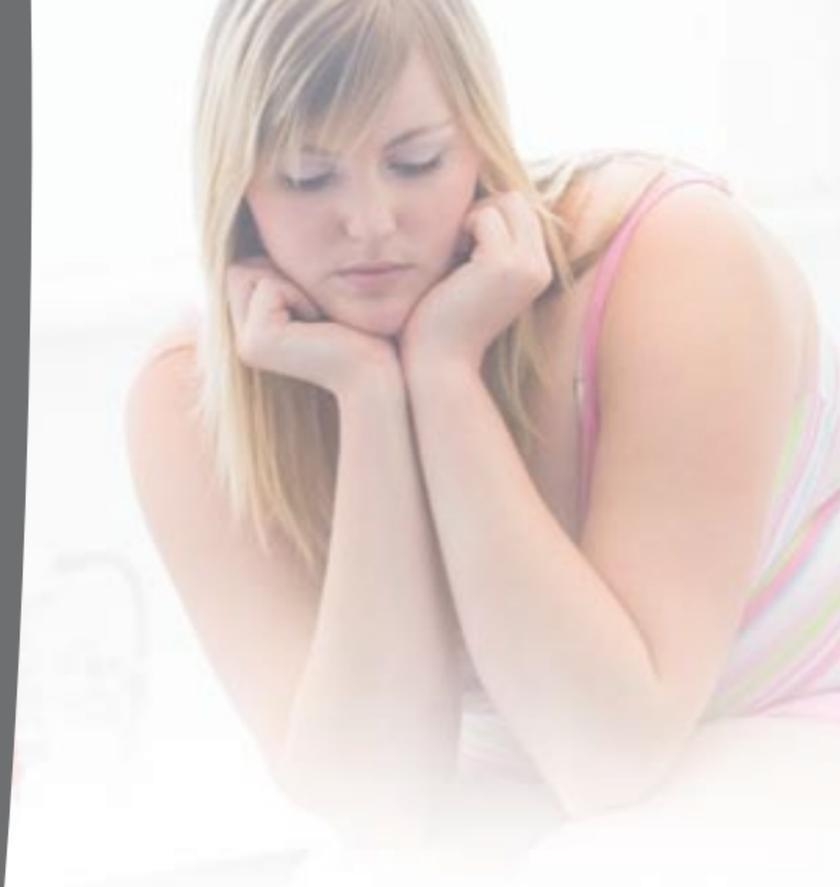


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Psychological Support & Counseling



Weight problems, cosmetic concerns, and distress regarding body image and infertility can be a source of tremendous stress for women with PCOS. Studies have identified that women with PCOS may be more likely to suffer from anxiety and depression. Chronic stress itself may contribute to some of the symptoms of PCOS (such as irregular menses) and be detrimental to fertility success.

In recognition of the importance of the emotional component of PCOS, the Yale PCOS Program offers psychological support and counseling to complement medical, nutritional and lifestyle management strategies, and to help improve overall well-being in women of all ages diagnosed with PCOS. Psychological counseling options are available on site with our experienced counselor to help patients cope with:

- Menstrual irregularities
- Concerns related to self-image resulting from weight-related problems, acne, excessive body hair or hair loss
- PCOS-related infertility

Adolescents with PCOS may be especially prone to psychological and emotional distress from symptoms of PCOS. We offer a comprehensive program of psychological counseling and support for adolescents and their families to help cope with a PCOS diagnosis.



Dorothy A. Greenfeld, LCSW, received her MSW at the Columbia University School of Social Work in 1982 and joined the Yale Fertility Center staff in 1984. She is a Clinical Professor of Ob/Gyn at the Yale School of Medicine. Her clinical interests include individual and couples counseling in all phases of reproduction and pregnancy, particularly the emotional impact of infertility, pregnancy loss, and multi-fetal pregnancies; egg and sperm donation; and gestational surrogacy. Dorothy's expertise has enhanced the lives of many of our patients at YFC and she is available to help women cope with the stresses relating to a diagnosis of PCOS.

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Health Risks of PCOS



Women with PCOS are at increased risk for developing a number of long-term health problems. At the Yale PCOS Program, we seek to address these risks before they become serious medical issues, with a combination of lifestyle modifications and medical interventions.

- Endometrial Hyperplasia – A thickening of the endometrium (uterine lining) can cause heavy or irregular bleeding, and may lead to pre-cancerous changes in the endometrium that could develop into endometrial cancer.
- Cardiovascular Disease Risk – Women with PCOS have a greater chance of developing Metabolic Syndrome – a cluster of risk factors that raise the likelihood of a heart attack or stroke later in life.

These factors include:

- Obesity – approximately 50% of women with PCOS in the US are obese
- Dyslipidemia – increased total cholesterol, triglycerides or both and decreased HDL (good cholesterol)
- Elevated blood pressure (hypertension)
- Insulin resistance – 40% of women with PCOS are insulin resistant
- Type II diabetes – affects 10% of women with PCOS
- Sleep apnea – can present as disturbed sleep, frequent sleep interruptions, restlessness, snoring, and daytime fatigue and sleepiness

Given these risk factors, women with PCOS have a seven-fold increased risk for heart attack and are four times more likely to have a stroke compared to women without PCOS.

- Breast Cancer – Some studies indicate that there is a correlation between PCOS and breast cancer, but the evidence so far is inconclusive.

Women with PCOS are encouraged to visit the Yale PCOS Program for a complete metabolic assessment and risk profile. Your initial examination will include a complete medical history, physical exam with BMI measurement, pelvic ultrasound and all appropriate lab tests. Once we have assessed your risk, we will tailor an individualized plan to meet your specific needs.

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PCOS in Adolescents



Signs and symptoms of polycystic ovarian syndrome (PCOS) can often be seen as a girl progresses through puberty. Although irregular menstrual cycles are part of the normal course of puberty, girls with PCOS are more likely to exhibit exaggerated symptoms such as:

- Irregular menstrual cycles for longer than a year
- Increased androgen production resulting in unwanted hair growth or scalp hair loss
- Increased body mass and insulin resistance
- Delay of more than two years between onset of puberty and occurrence of menses
- Early appearance of pubic hair prior to puberty
- Heavy uterine bleeding
- Acne
- Depression
- Weight gain

At the Yale PCOS Program, our medical practitioners include Ob/Gyns specializing in adolescent medicine. During a young woman's first appointment, we strive to establish a physician/patient relationship that ensures the patient's and family's comfort and confidence in discussing any health issues and concerns. Discussions are individualized to the adolescent's needs and include a review of:

- Normal pubertal development and menstruation
- Healthy eating habits and body image
- Preventive healthcare including the HPV vaccine and reproductive hygiene (including pregnancy and sexually transmitted infection prevention, if appropriate)
- PCOS-related concerns

Assessment of PCOS-related symptoms consists of a thorough medical evaluation, including a detailed medical history, nutritional assessment, physical examination, laboratory testing and an abdominal ultrasound (if appropriate). Treatment is individualized to the needs of each adolescent and tailored to her life stage.

Similar to adult women, therapies for adolescents with PCOS include:

- Lifestyle modifications including diet and exercise to lessen the symptoms of PCOS by improving insulin insensitivity and lipid levels, managing weight, and increasing self-esteem
- Birth control pills to regulate menstrual cycles and reduce androgen levels, which improves acne and excessive body hair, and may have a beneficial effect on overall body image
- Insulin sensitizing agents such as Metformin to lower insulin levels and improve metabolic problems associated with PCOS
- Anti-androgen treatments to decrease unwanted hair growth when non-medical treatments are ineffective
- Psychological support for adolescents and families to help cope with the diagnosis of PCOS

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PCOS & Fertility



Ovulation disturbance is the most likely cause of infertility in women with PCOS who do not ovulate regularly, although other factors may contribute to fertility problems in some couples.

The Yale PCOS Program provides state-of-the-art management of PCOS-related infertility. With one of the highest success rates in the region, our experts offer individualized management strategies to maximize success while minimizing the risks of ovarian hyperstimulation and multiple pregnancy in patients with PCOS.

Treatment begins with a basic infertility workup:

- Pelvic ultrasound
- Prenatal lab tests
- HSG (hysterosalpingogram) – X-ray of the uterus and fallopian tubes
- SHG (sonohysterogram) – saline ultrasound to determine uterine abnormalities
- Semen analysis
- Complete health assessment, including a risk profile for diabetes, heart disease and other diseases associated with PCOS

After reviewing these test results, we meet with you to determine the best course of action.

Options include:

- Ovulation induction – A number of medications are available to induce ovulation in women with PCOS; dose and treatment duration are individualized:
 - Clomid – orally administered fertility medication

- Gonadotropins – injectable fertility medications for those who do not respond to simpler treatments; more expensive with greater chance of multiple pregnancy
- Aromatase inhibitors – trigger ovulation in women; safer and less expensive than some alternatives
- Insulin sensitizing agents – Metformin has been shown to restore normal ovulation in some women with PCOS, may improve response to other fertility drugs, and has little or no risk of multiple pregnancies.
- *In vitro* fertilization (IVF) – removing eggs from your body, fertilizing them with your partner’s sperm, and implanting a fertilized egg into your womb. We utilize minimal stimulation and blastocyst culture and transfer strategies to reduce risks for such problems as ovarian hyperstimulation syndrome and multiple pregnancy.
- Lifestyle modifications – Because being overweight or obese may reduce a woman’s fertility, weight loss is highly recommended to improve fertility and pregnancy outcome. We provide a comprehensive lifestyle management program that includes weight management counseling.
- Optimizing Vitamin D status – Our ongoing research indicates lower pregnancy rates following IVF in women with low blood levels of Vitamin D. Vitamin D levels are assessed for all women attending the Yale PCOS Program and treatment provided to achieve normal levels.

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Pregnancy & PCOS



Pregnant women with PCOS face a number of challenges before, during and after their pregnancies. To address these concerns, Yale's infertility specialists and Maternal-Fetal Medicine specialists at the Yale PCOS Program provide on-site consultations prior to conception and throughout pregnancy for women likely at high risk for pregnancy-related complications.

Pregnancy Risks

- Infertility – Due to ovulation disturbances, women with PCOS may find it difficult to get pregnant. YFC boasts one of the highest success rates in the region for managing PCOS-related infertility, offering individualized management strategies to minimize the risks of ovarian hyperstimulation and multiple pregnancy while maximizing success of fertility treatments. Fertility therapies include ovulation induction strategies, injectable hormones, aromatase inhibitors and *in vitro* fertilization. We also recommend lifestyle interventions that may help with spontaneous ovulation.
- Miscarriage – Women with PCOS may be at increased risk for spontaneous miscarriage. Contributing factors include elevated insulin levels (insulin resistance) and high levels of luteinizing hormone (LH) or androgens (male hormones). Miscarriage risk can be reduced by lowering insulin levels through weight loss or with insulin-lowering medicines such as Metformin. Women with elevated homocysteine levels may also require increased folic acid.
- Pregnancy Complications – Women with PCOS are particularly at risk for gestational diabetes, which may increase the risk of birth defects, miscarriage, pre-eclampsia, preterm delivery, macrosomia (excessive

birth weight) and birth injury. Weight reduction and lowering insulin levels before pregnancy are beneficial to ensuring a healthy pregnancy.

- Multiple Pregnancy – Pregnancy with more than one fetus increases the overall risk for pregnancy-related complications in women with PCOS. Because they are at high risk for multiple pregnancy following fertility treatment compared to women with other causes for infertility, our goal is to minimize this risk by utilizing gentler treatment protocols that reduce the likelihood of multiple gestation.

In addition to working with high-risk pregnant women with PCOS, YFC monitors all PCOS pregnancy outcomes to help the medical community understand the fetal and perinatal implications of PCOS.

Risks to Children of Women with PCOS

Studies suggest that PCOS diagnosis may have implications for the children of women with PCOS.

- Daughters of women with PCOS may grow up to exhibit the characteristic features of PCOS.
- Weight problems, insulin resistance and high cholesterol are consistently seen in children of women with PCOS.

Healthy lifestyle and healthy weight goals are therefore important not just for women with PCOS, but also for their children.

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Directions via:

I-95 Traveling North

Exit 46 and turn left at the end of the ramp. At the next light, turn left under the overpass. Take another left onto Sargent Drive; stay to the right and look for a two-story white building labeled Yale-New Haven Health, immediately after the Mobil gas station. Just past the building, turn right towards the parking lot behind the building. Parking is free.

I-95 Traveling South

Exit 46 and at the end of the ramp turn left onto Sargent Drive. Stay over to the right side of the road. A short distance ahead on your right is a two-story white building labeled Yale-New Haven Health, 150 Sargent Drive. Just past the building, turn right towards the parking lot behind the building. Parking is free.

I-91 South:

Travel south to the interchange of I-91 and I-95 in New Haven. At this merge, take I-95 South to Exit 46. At the end of the ramp, turn left onto Sargent Drive. Stay over to the right side of the road. A short distance ahead on your right is a two-story white building labeled Yale-New Haven Health, 150 Sargent Drive. Just past the building, turn right towards the parking lot behind the building. Parking is free.



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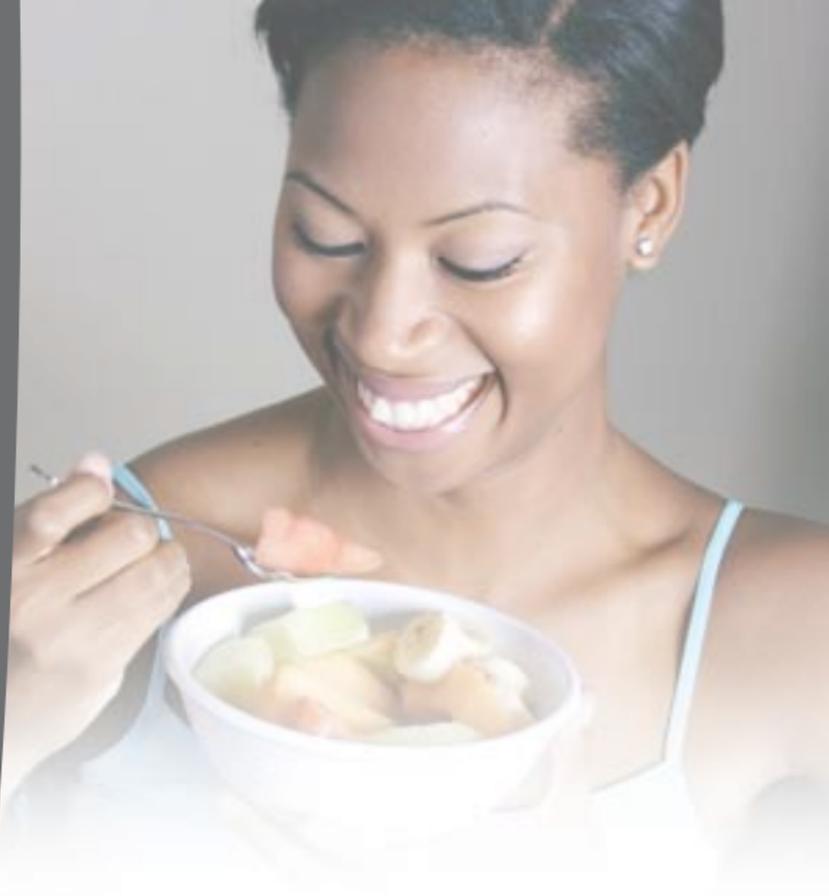
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While the causes of PCOS remain unclear, most experts believe insulin plays a major role in its development. The majority of PCOS patients have decreased insulin sensitivity, causing high levels of insulin or what is commonly known as insulin resistance. Approximately 50% of women affected by PCOS are overweight.

Risk Factors

Insulin resistance places an individual at increased risk for:

- Abnormal carbohydrate metabolism – raising the likelihood of developing type II diabetes
- Heart disease due to:
 - Increased levels of LDL or “bad” cholesterol
 - Decreased levels of HDL or “good” cholesterol
 - Increased levels of triglycerides
 - Increased blood pressure
- Significant weight gain and difficulty losing weight
- Low self-esteem

Lifestyle Modifications

Diet and exercise have been established as the first line of defense against PCOS.

Diet

Studies show that a 5%-10% weight loss may substantially improve the metabolic and reproductive abnormalities associated with PCOS while lowering the risk of heart disease and type II diabetes.

A registered dietitian (RD) can help customize a balanced diet, low in fat and moderate in carbohydrates, to help you achieve and maintain your weight loss goals. The RD will evaluate your current diet, lifestyle and risk factors and establish a nutrition plan specific to your individual needs. The following factors will be considered:

- Current height and weight
- Ideal body weight (IBW)
- Age, overall health and medical history
- Current medications or supplements taken
- Current eating patterns, food preferences and dietary customs

Exercise

Evidence clearly supports the importance of physical activity for women affected by PCOS; exercise may be just as important as diet in treating the disorder.

Both aerobic exercise and strength conditioning can be effective in:

- Improving lipid levels
- Improving insulin insensitivity
- Lowering blood pressure
- Improving self-esteem
- Managing weight
- Aiding in prevention and treatment of chronic disease

An RD can help develop a customized exercise plan based on your preferences and lifestyle pattern.

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PCOS Study Opportunities at YFC



As part of our commitment to ensuring the health of women with PCOS, the Yale PCOS Program has centralized research into this disorder in an effort to understand its underlying mechanisms as well as to advance treatment intervention to improve the overall health and pregnancy outcomes of women with this condition.

Currently, we are conducting research into the health benefits of Vitamin D and calcium in women with PCOS.

Vitamin D & PCOS: A Clinical Study

Recent studies have shown that many women with PCOS also have decreased insulin function (also called insulin resistance) and are at increased risk for developing diabetes and heart disease. We have identified a high proportion of women with PCOS as deficient in Vitamin D. Low Vitamin D levels are associated with increasing body weight, insulin resistance, increased risk for heart disease and diabetes ... all features commonly seen in women with PCOS.

Supplementing with Vitamin D, along with calcium, has been found to improve insulin sensitivity by lowering insulin levels. It also has been shown to have a positive impact on blood vessels, heart, mood and risk of developing diabetes. With this study, we plan to observe the effects and assess

the benefits of Vitamin D and calcium supplements on insulin resistance in overweight women with PCOS who have a low Vitamin D level. We believe that Vitamin D will offer many health benefits to women with PCOS, including reduced insulin levels.

Eligibility

You may be eligible to participate in this clinical study if you meet the following criteria:

- You are a premenopausal woman between the ages of 18 and 40.
- You have been diagnosed with PCOS or exhibit the typical symptoms of PCOS (irregular or no menstrual cycles, acne, hirsutism and/or elevated testosterone levels).
- You are overweight.
- You have evidence of Vitamin D deficiency (as determined by a blood test).
- You are not taking any hormonal treatment or insulin-lowering medications.

Study participants will be compensated for time and travel.

If you are interested in participating in this study or would like more information on this or future research taking place at YFC, please contact our research team at 203-785-7403.

Research Team:

Lubna Pal, MBBS, MRCOG, MSc., Principal Investigator

Amber Berry, Research Associate

Luisa Corraluzzi, RN, Research Nurse

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The Practitioners of the Yale PCOS Program



Dr. Pinar Kodaman is Co-director of the Yale Recurrent Pregnancy Loss Program, having joined the Section of Reproductive Endocrinology and Infertility in the Department of Obstetrics, Gynecology & Reproductive Sciences in July 2008. She is a graduate of Yale Medical School's combined MD/PhD program; her research focused on the role of oxidative stress in ovarian function. Following residency in Ob/Gyn at Yale-New Haven Hospital, Dr. Kodaman completed our fellowship in Reproductive Endocrinology & Infertility and is Board Certified in Obstetrics & Gynecology. She is currently a Women's Reproductive Health Research Scholar. Dr. Kodaman's research interests include endometrial angiogenesis and endothelial dysfunction; clinical interests include PCOS, recurrent pregnancy loss, reproductive surgery and infertility.



Dr. Lubna Pal is Director of the Yale PCOS Program and the Yale Reproductive Aging and Bone Health Program. She completed her residency in Ob/Gyn at Yale and received fellowship training in Reproductive Endocrinology and Infertility at Albert Einstein College of Medicine, New York, and at Massachusetts General Hospital, Boston. She is Board Certified in both Obstetrics & Gynecology and Reproductive Endocrinology & Infertility. Dr. Pal's clinical interests include reproductive endocrinopathies such as PCOS, reproductive aging, menopause and skeletal health. She is currently studying the health benefits of Vitamin D in women with PCOS.



Dr. Beth W. Rackow is Director of Yale Pediatric and Adolescent Gynecology. She is Board Certified in Obstetrics & Gynecology and Board Eligible in Reproductive Endocrinology & Infertility. After completing her residency at the Hospital of the University of Pennsylvania, she came to Yale for fellowship training in Reproductive Endocrinology & Infertility. Dr. Rackow's clinical interests include pediatric and adolescent gynecology, PCOS, abnormal uterine bleeding, reproductive surgery, advanced endoscopic surgery, infertility and endometriosis.



Dr. Stephen F. Thung has been a member of the Section of Maternal-Fetal Medicine in the Department of Obstetrics, Gynecology & Reproductive Sciences since 2005. He completed his Ob/Gyn residency at New York University and his Maternal-Fetal Medicine fellowship at Northwestern University, and is Board Certified in both. He is Director of the Yale Diabetes During Pregnancy Program. Dr. Thung's clinical interests include the management of endocrine disorders complicating pregnancy, including diabetes and thyroid disease. His research interests revolve around novel management strategies of diabetes during pregnancy and economic analyses of population-based diabetes screening strategies during pregnancy.



Amy Krystock, RD, is a registered dietitian at Yale-New Haven Hospital specializing in weight loss, diabetes counseling, eating disorders and employee wellness. She completed her dietetic training at Yale-New Haven Hospital and recently completed her master's in clinical nutrition from the University of Connecticut. Her research focuses on disordered eating pathology in athletes and protein metabolism. Amy employs a total lifestyle modification approach to nutrition counseling and customizes diet and exercise programs to fit the needs of each patient.



Dorothy A. Greenfeld, LCSW, received her MSW at the Columbia University School of Social Work in 1982 and joined the YFC staff in 1984. Her clinical interests include individual and couples counseling in all phases of reproduction and pregnancy, particularly the emotional impact of infertility, pregnancy loss, and multi-fetal pregnancies; egg and sperm donation; and gestational surrogacy. Dorothy's expertise has enhanced the lives of many of our patients at YFC and she is available to help women cope with the stresses relating to a diagnosis of PCOS.

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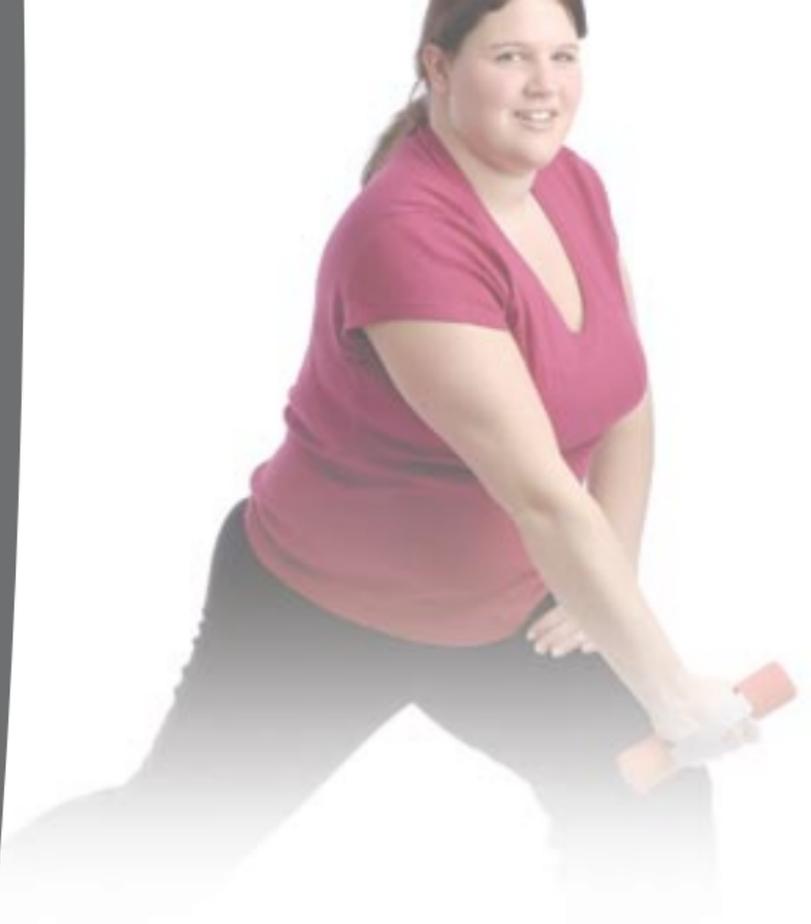
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Management of PCOS

Lifestyle Modifications



Lifestyle Modifications

The multidisciplinary team at the Yale PCOS Program focuses on managing PCOS through a combination of lifestyle modifications and medical interventions based on your individual needs.

Lifestyle modifications include:

Diet & Exercise – Achieving and maintaining a healthy weight helps correct hormonal imbalances that contribute to symptoms of PCOS, helps to lower blood levels of insulin, and improves the efficiency of insulin. This, in turn, results in improvements in symptoms such as menstrual irregularity, excessive body and facial hair, and acne, and the reduction of health risks such as diabetes and heart disease.

Nutrition Counseling – Our trained and dedicated nutritionists offer individualized assessment and nutritional plans tailored to each patient's physical and metabolic profile. A registered dietitian (RD) can help customize a balanced diet, low in fat and moderate in carbohydrates, to help you achieve and maintain your weight loss goals. The RD will evaluate your current diet, lifestyle and risk factors and establish a nutrition plan specific to your individual needs.

Treatment of Cardiovascular Disease (CVD) and Diabetes Risk – We provide a detailed metabolic assessment and risk profile for each patient and create an individualized management plan that includes a combination of weight management, exercise and smoking cessation to lower the risk of CVD and diabetes.

Vitamins – Low Vitamin D levels are associated with increased body weight, insulin resistance, increased risk of heart disease and diabetes, all features commonly seen in women with PCOS. Ongoing studies at YFC focus on a role for Vitamin D and calcium in improving the action of insulin and managing PCOS symptoms.

Psychological Counseling – Weight problems, cosmetic concerns, and distress regarding body image and infertility can be a source of tremendous stress. Chronic stress itself may contribute to some of the symptoms of PCOS (such as irregular menses) and be detrimental to fertility success. Psychological counseling options are available on site with our experienced counselor to help patients cope.

Symptom Management – We offer on-site medical expertise in the management of bothersome symptoms of PCOS including excessive hair, acne, concerns with body image and psychological distress.

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Medical Interventions



Medical Interventions

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We offer medical interventions for:

Excessive Hair Growth (Hirsutism) – A number of medications, including hormone treatments, Spironolactone, Flutamide and Finasteride, can decrease unwanted hair growth when non-medical treatments are ineffective. Along with a birth control pill, anti-androgen treatments can also reduce hair growth.

Acne – Treatment options are individualized to the patient's fertility-related plans and include skin treatments such as benzoyl peroxide, retinoids and antibiotics as well as use of anti-androgens and hormonal contraceptives.

Menstrual Cycle Regulation – Birth control pills can regulate menstrual cycles, reduce male hormone levels and help to clear acne. For women who cannot or do not want to take a birth control pill, a monthly 10-to-14-day course of progestin can regulate bleeding and protect the uterus from precancerous changes.

Insulin Resistance – Decreased efficiency and increased blood levels of insulin are thought to con-

tribute to PCOS symptoms. Lowering insulin levels with exercise, weight reduction and certain medications (*i.e.*, Metformin) improves these symptoms.

Diabetes and Cardiovascular Disease – If lifestyle modifications are insufficient, we treat underlying conditions such as hyperinsulinemia, hypertension and dyslipidemia with appropriate medications to lessen PCOS symptoms and reduce the risk of diabetes and cardiovascular disease. Medications include the insulin sensitizer Metformin, anti-hypertensives and, in certain cases, lipid-lowering statins.

Management of PCOS-Related Infertility – Following a basic infertility workup, YFC experts individualize ovulation induction strategies to minimize the risks of ovarian hyperstimulation and multiple pregnancy in patients with PCOS. Medications used include Clomid, gonadotropins and aromatase inhibitors. The option of *in vitro* fertilization with single embryo transfer is available for those at increased risk for multiple pregnancy.

Pregnancy in PCOS – Our specialists offer on-site pre-conception and peri-conception consultations for patients with PCOS to identify those at increased risk for pregnancy-related complications such as gestational diabetes, hypertension and miscarriage. Our goal is to help achieve a healthy pregnancy in a healthy mother.

Surgery – Although not a first-line intervention, ovarian drilling may be considered as a tool to facilitate spontaneous resumption of ovulation for a patient who remains non-responsive to oral ovulation induction agents and for whom proceeding with gonadotropins may not be a realistic possibility.

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