## PCOS General Info:

[Johns Hopkins Medicine](https://www.hopkinsmedicine.org/health/conditions-and-diseases/polycystic-ovary-syndrome-pcos)

Description:

* Condition where ovaries produce an excessive amount of male hormones (androgens)
* May or may not develop cysts due to problems in menstrual cycle (anovulation)
* [Womenshealthgov](https://www.womenshealth.gov/a-z-topics/polycystic-ovary-syndrome#:~:text=Who%20gets%20PCOS%3F,at%20any%20age%20after%20puberty.) most women get diagnosed in 20s — 30s

Current treatment:

* Current treatment includes medication to mitigate symptoms

Causes:

* Unknown
* [Healthline](https://www.healthline.com/health/womens-health/endometriosis-vs-pcos#causes) chronic inflammation can lead to hormonal imbalance

Risk factors:

* Insulin resistance (Diabetes Type II)
* Obesity in the family
* Sister, mother, aunt with PCOS
* [NIH other conditions that coincide with PCOS](https://www.nichd.nih.gov/health/topics/pcos/more_information/FAQs/conditions-associated) mainly high blood pressure

Symptoms: (at least 2)

* Excess body hair growth (hirsutism)
* Sudden weight gain, excess skin, & greater circumference
* Male-patterened baldness
* Missed, light, irregular periods

Diagnosis:

* Ultrasound → looking for cysts in the endometrium
* Bloodtests → checking for hormones, blood glucose, cholesterol, triglyceride levels

## What we can do to our dataset:

##### **Age + Weight + height → calculate the BMI**

* Here is the formula ([CDC](https://www.cdc.gov/healthyweight/assessing/bmi/index.html#:~:text=Body%20Mass%20Index%20(BMI)%20is,can%20indicate%20high%20body%20fatness.)) for kids and adults
* **BMI = weight (kg) / [ height (m) ]2 = weight (lbs) / [ height (in) ]2 x 703**
  + U.S. Adults: 20+ y.o.
    - 18.5 — 24.9 healthy weight
    - 25.0 — 29.9 overweight
    - 30.0+ obesity
  + Child: N/A

##### **Blood type + Hb (g/dl)**

– Not sure what “blood type” (see xlsx instructions) has to do with PCOS, but there might be some interesting correlations if one group is more prone to develop it

– Might be interesting to see which blood type is more susceptible to develop high blood pressure

##### **Pulse rate (bpm) + RR (breaths/min) + BP\_systolic (mmHg) + BP\_diastolic (mmHg)**

Your max. Heart rate is about 220 - (your age)

**HR → heart rate** (average resting HR for adults is [60-100](https://www.mayoclinic.org/healthy-lifestyle/fitness/expert-answers/heart-rate/faq-20057979#:~:text=A%20normal%20resting%20heart%20rate%20for%20adults%20ranges%20from%2060,to%2040%20beats%20per%20minute.) bpm)

**RR → respiratory rate** (normal [12-16](https://www.hopkinsmedicine.org/health/conditions-and-diseases/vital-signs-body-temperature-pulse-rate-respiration-rate-blood-pressure#:~:text=Respiration%20rates%20may%20increase%20with,to%2016%20breaths%20per%20minute.) breaths per minute)

(Historically difficult to measure tho, idk about data reliability here)

**BP\_systolic → systolic blood pressure** (max blood concentration in ventricles contraction)

**BP\_diastolic → diastolic blood pressure** (min blood concentration before next contraction)

Generally, a lower heart rate implies more efficient heart function and better cardiovascular fitness. Expected that people who exercise regularly have a heart rate around 40-50 bpm.

Normal systolic / diastolic is: 120 over 80. Elevated BP = systolic 120-129 and diastolic < 80

At risk (prehypertension) → systolic 120-139 mmHg and diastolic 80-89 mmHg

High BP (hypertension) → systolic > 140 mmHg and diastolic > 90 mmHg

Cycle (R/I) + Cycle length (days)

**Cycle R/I**

There’s no documentation on what the 2, 4, 5 mean >:(((

My guess is that 2 is regular, 4 is irregular, 5 is none but this is unusable

**Cycle Length**

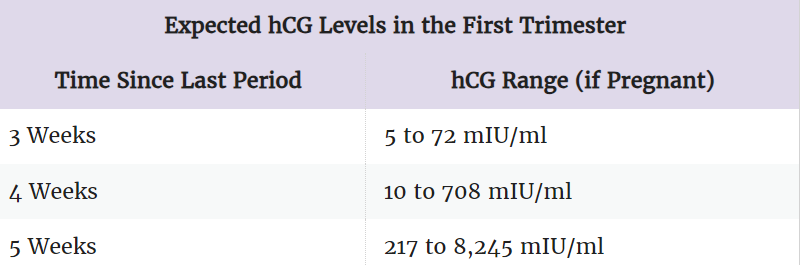
Varies, but the average is 28 days

Follicle No. (L, R) + Avg. F size (L, R) (mm) + endometrium (mm)

Just relative health, probably taken from ultrasound

beta-HCG (mlU/ML)

Used in [pregnancy testing](https://www.verywellfamily.com/the-pregnancy-hormone-hcg-1960127). Can also determine the age of the fetus based on gestation period.



Case I

[Case II](https://www.urmc.rochester.edu/encyclopedia/content.aspx?contenttypeid=167&contentid=hcg_urine#:~:text=Results%20of%20less%20than%205,test%20in%20about%20a%20week.)

(a beta hCG level of less than 5 mIU/mL is considered negative for pregnancy, and anything above 25 mIU/mL is considered positive for pregnancy)

Pregnant (Y/N) + # abortions

Doesn’t really say much, just an extra insight

FSH (mlU/mL) + LH (mlU/mL) → FSH/LH ratio

**FSH → Follicle-stimulating hormone**

During puberty: it ranges from 0.3 to 10.0 mIU/mL (0.3 to 10.0 IU/L)

Women who are still menstruating: 4.7 to 21.5 mIU/mL (4.5 to 21.5 IU/L)

After menopause: 25.8 to 134.8 mIU/mL (25.8 to 134.8 IU/L)

**LH → Luteinizing hormone**

Test detects a rise in LH which signals the beginning of an ovulation cycle

[**FSH/LH ratio:**](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7520057/#:~:text=Usually%2C%20in%20healthy%20women%2C%20the,ovary%20disease%20patients%20(9).)

Normal: between 1-2

PCOS: higher, could be 2-3

TSH(mlU/L)

**Thyroid stimulating hormone** → normal levels are between 0.4 and 4.0 mIU/L

Well according to [UCLA Health](https://www.uclahealth.org/medical-services/surgery/endocrine-surgery/patient-resources/patient-education/endocrine-surgery-encyclopedia/tsh-test#:~:text=Normal%20Values%3A,very%20closely%20by%20a%20doctor.) it’s 0.5 – 5.0 mIU/L but those above 0.2 should see a doctor

AMH(ng/mL)

**Anti-Mullerian Hormone** → [egg count](https://my.clevelandclinic.org/health/diagnostics/22681-anti-mullerian-hormone-test#:~:text=Experts%20debate%20how%20to%20define,low%3A%200.4%20ng%2FmL.)

Experts debate how to define typical AMH levels, but these are general ranges: Average: Between 1.0 ng/mL to 3.0 ng/mL. Low: Under 1.0 ng/mL. Severely low: 0.4 ng/mL

PRL(ng/mL)

**Prolactin levels.**

Here’s an [article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8689332/#:~:text=The%20modest%20rise%20in%20serum,well%20as%20ovulation(3).) about PRL and follicle levels and PCOS, I’m tired.

Vit D3(ng/mL)

Normal vitamin D levels in the blood are 20 ng/ml or above for adults.

* There might be an [association](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8351864/#:~:text=The%20study%20findings%20show%20that,in%20the%20development%20of%20PCOS.) between low VitD levels and high androgen levels

PRG(ng/dl)

**Progesterone levels.** Regulates menstruation cycles.

RBS (mg/dl)

**Random Blood Sugar Test**. A blood sugar level of 200 mg/dL or higher indicates diabetes.

Hip(in) + Waist(in) → Waist/Hip ratio

[WebMD](https://www.webmd.com/fitness-exercise/what-is-waist-to-hip-ratio) / [Medicalnewstoday](https://www.medicalnewstoday.com/articles/319439#what-is-a-healthy-waist-to-hip-ratio) formula might give a better idea of health than BMI

**Health risk: obesity, type II diabetes, heart disease**

* Low = 0.80 or below
* Moderate = 0.81 - 0.85
* High = 0.86 or higher

Fast food + reg. Exercise + other physical symptoms

Meh

Just see which factors coincide the most among those with PCOS, can also ID higher-risk groups among those who haven’t been diagnosed also

* Exercise is also inversely related to blood glucose, triglyceride levels

## Stats & Probability Formulas

Tbd

Find the groups of high and moderate risk