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Polycystic Ovary Syndrome in Adolescents - Updates on Diagnosis and Management

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Based on presentation given by Sarah Golub, MD, MPH (UW Division of Adolescent Medicine)

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BMC Medicine

GUIDELINE Open Access

International evidence-based recommendations for polycystic ovary syndrome in adolescents

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Objectives

Using updated guidelines:

- Recognize signs and symptoms of polycystic ovary syndrome (PCOS)
- Diagnose PCOS using clinical and laboratory evidence
- Prescribe/Recommend appropriate treatment regimens
- Screen for associated comorbidities including mental health conditions
- Aspirational Objective
  - create and use a blurb for discussing PCOS with patients

What is Polycystic Ovary Syndrome?

- Chronic disease
- Otherwise unexplained persistent evidence of the following:

Ovulatory Dysfunction

+

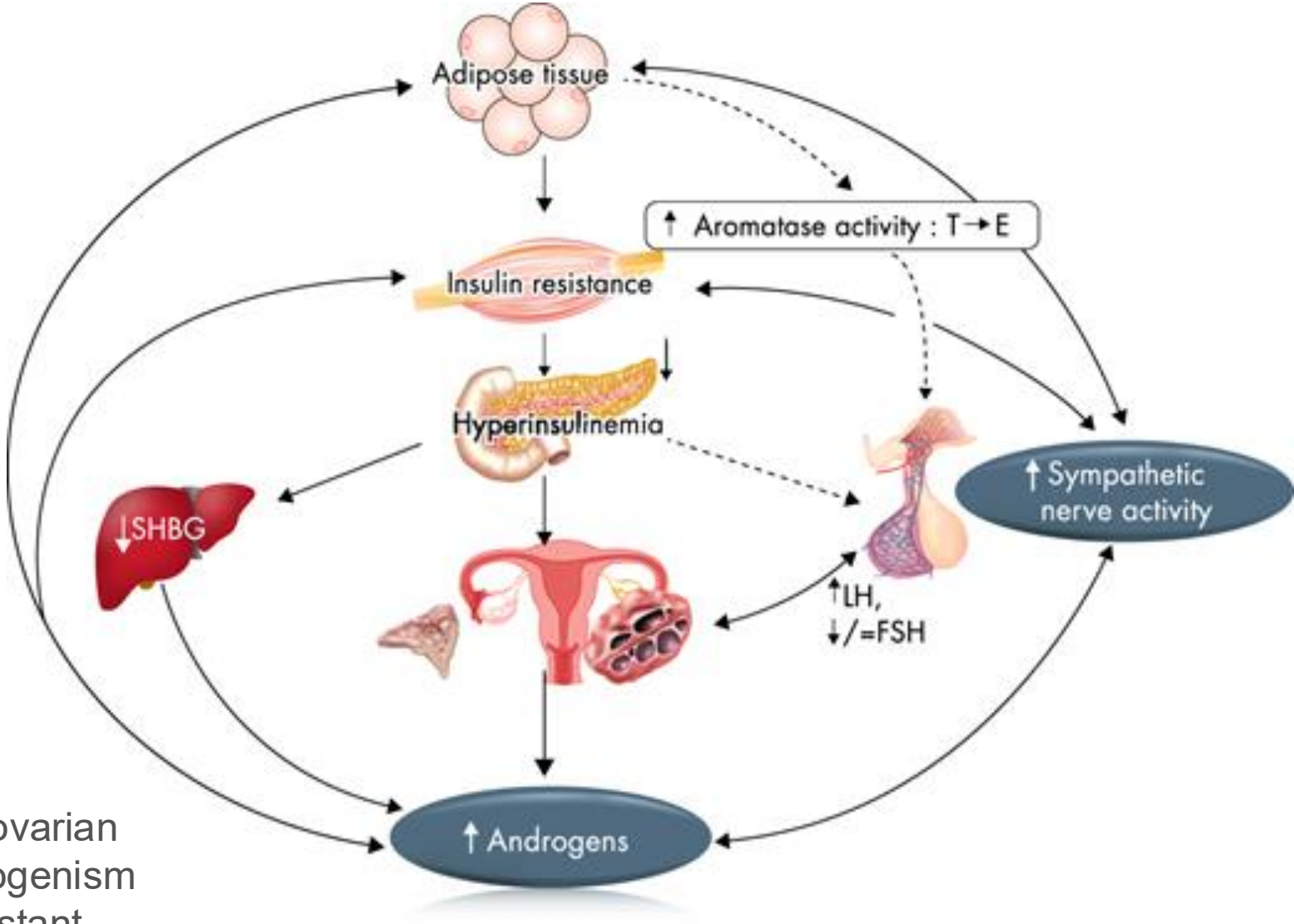
Clinical and/or biochemical evidence of androgen excess

How Common is it? Epidemiology

- Most common endocrine disorder in reproductive aged individuals assigned female at birth
- **Prevalence between 5-18%** depending on diagnostic criteria applied
  - 8% in adolescents

Etiology

- Genetic
  - Maternal PCOS
  - Heritable traits (e.g. hyperandrogenemia, genetic variation)
- Fetal exposures
  - Androgens
  - Over/under nutrition
- Postnatal Environment
  - Insulin resistance, increased adiposity
  - Premature adrenarche



1. functional ovarian hyperandrogenism
2. insulin-resistant hyperinsulinism

How to diagnose PCOS?

Diagnostic Criteria in Adults

Table 1

Diagnostic criteria for polyc ian syndrome (PCOS).

National Institutes of Health (NIH) 1990 [17]	Rotterda	AE-PC y 2006	NIH 2012/International PCOS Guidelines 2018 [14,15]
• Hyperandrogenism • Chronic Anovulation ---Both criteria needed	• Hyperandrog • Oligo-and/or anovulation • Polycy ---2 of 3 c ed	Hyperandrogenism arian ction ---Bo eded	• Hyperandrogenism • Oligo-and/or anovulation • Polycystic ovaries ---2 of 3 criteria needed
First developed and most commonly used criteria today	Form pand on N c definition	Formulated evidence-based	Encouraged a name change (2012 only) and identifying ub-phenotypes

Diagnostic Criteria in Adolescents

Otherwise unexplained combination of:

1. Menstrual irregularities and ovulatory dysfunction that is abnormal for gynecologic age
2. Clinical and/or biochemical evidence of hyperandrogenism
   a. Acne and/or hirsutism, severe
   b. total (LC/MS) testosterone and free (indirect (calculation or equilibrium dialysis) testosterone

Pena, et al. BMC Medicine 2025 23:151

Case 1

- 15yo cis-gender female presents with irregular menses.
- Menarche occurred at age 12 years; having 5-day periods, coming once every 4-6 months.
- Moderate inflammatory acne requiring topical and oral tx.
- Reports coarse, thick, dark hair on upper lip, chin, abdomen.

When are periods considered to be "abnormal" in adolescents?

a) Bleeding lasting < 6 days per cycle
b) Periods coming at intervals > 90-days
c) Only if pattern persists 3 years post menarche

Menstrual dysfunction in adolescence

- 1st year post-menarche
  - Any menstrual pattern, including stretches of amenorrhea could be normal
  - If periods are **>90 days apart**, evaluate
- 2nd year post-menarche
  - Irregular cycles and skipping of cycles are still considered normal.
  - Generally, expect **21-45 days** between periods.
- 3rd year post-menarche
  - Cycles should now be more regular with **21-35 days** between menstrual periods.

Primary amenorrhea by age 15 or > 3 years post thelarche needs further evaluation

Menstrual dysfunction in adolescence

- Prolonged bleeding
  - Bleeding >7 consecutive days is abnormal
- Heavy menstrual bleeding
  - If “interferes with quality of life”
  - Concerning if > 6 saturated menstrual products/day

Rosenfield RL, J PAG 2020

“Ovulatory dysfunction” in PCOS

- May present as:
  - Primary/secondary amenorrhea
  - Irregular menses (abnormal uterine bleeding)
  - Heavy menstrual bleeding

Evaluation

- Detailed history
- Confidential social history
- Growth charts
- Vital signs
- Physical exam
- Labs

History taking

- Hair/skin changes
- Galactorrhea
- Headaches/visual changes
- Changes in growth trajectory
- Changes in voice (deepening)
- Signs/sx of thyroid dysfunction
- Medication review
- Family history

Confidential HEADSS assessment

- Anxiety, Depression (screening: GAD-7, PHQ-9)
  - Shame, stigma
  - Refer to mental health counseling as needed
- Disordered eating behaviors
  - Restrictive eating
  - Binge eating disorder
- Sexual activity
  - Unmet need for contraception?
- Gender dysphoria

Mental health comorbidities

- Turkish cross-sectional study of adolescents (13-18 yrs) with PCOS vs controls had:
  - Increased rate of MDD (21% vs 3%)
  - Prevalence of psychiatric disorders of 50%
- Australian Longitudinal Study on Women's Health (n 8,467) found that women with PCOS vs controls had:
  - Higher prevalence of eating disorders (11% vs 7.6%)
  - Lower self esteem (31.7% vs 24.2%)
  - Severe psychological distress (21% vs 13.5%)

Çoban ÖG et al, J Pediatr Adolesc Gynecol 2019
Tay et al. Fertility and Sterility 2019

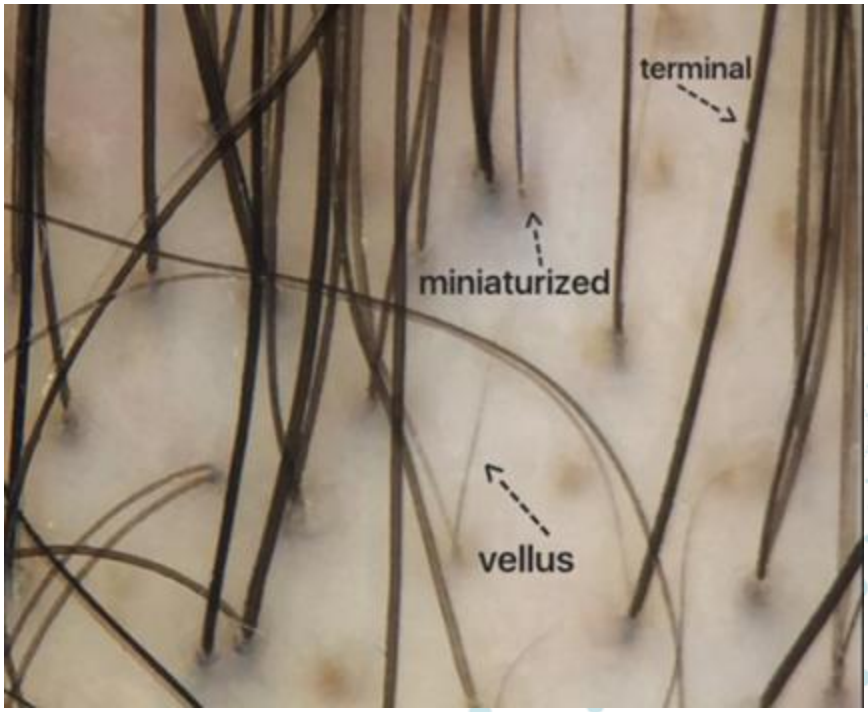
Physical exam

- Hirsutism
- Acne
- Scalp hair loss

- Potential associated findings
  - Acanthosis nigricans
  - Hidradenitis suppurativa
  - Striae
- External genital exam
  - Rule out clitoromegaly

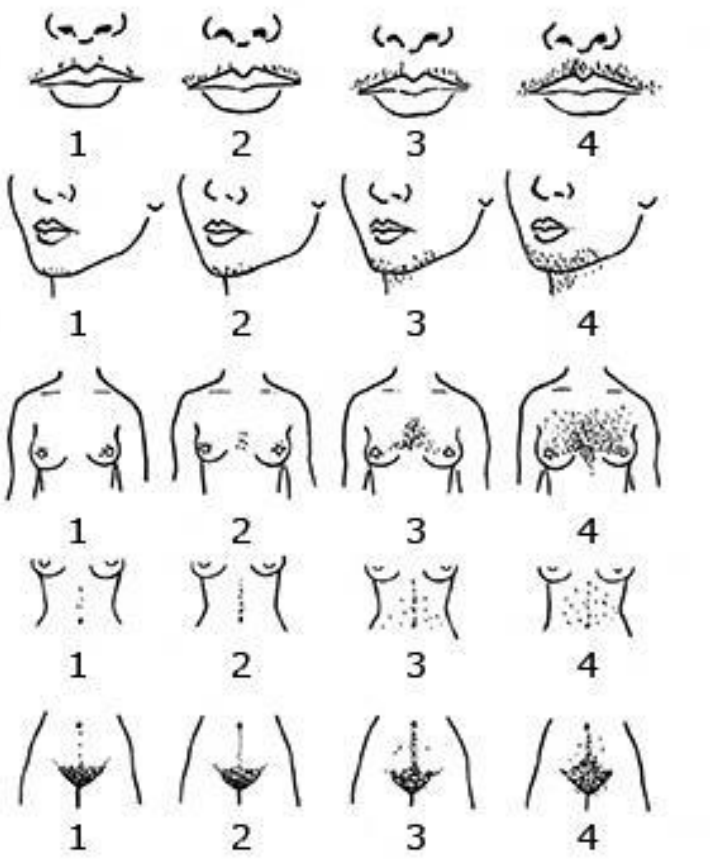
Hirsutism

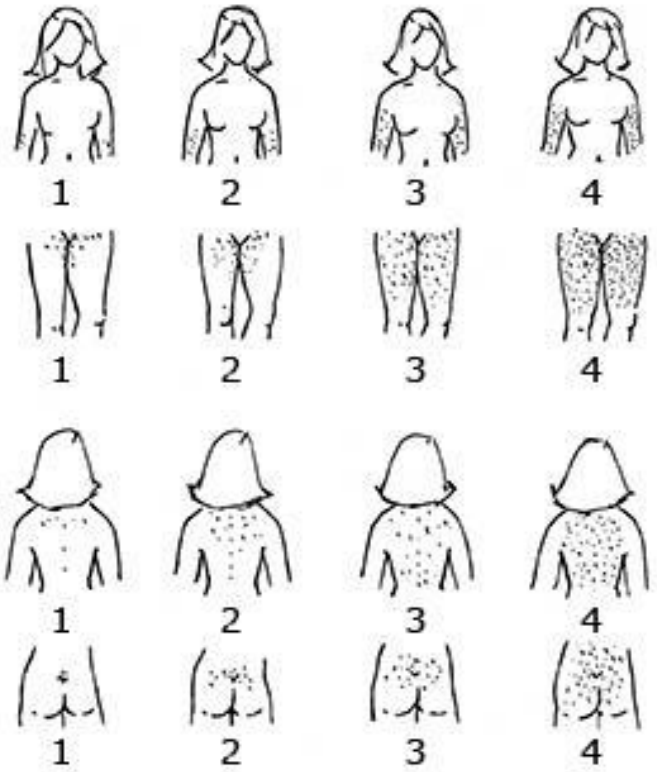
Only terminal hairs need to be considered to define hirsutism



https://donovanmedical.com/hair-blog/2017/6/12/different-hairs-in-aga

Ferriman-Gallwey: Hirsutism Scoring System



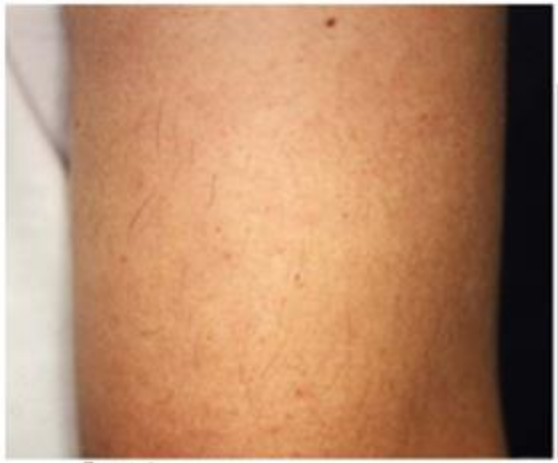


Hirsutism is defined as a score of **8 or more** in general US adult female population

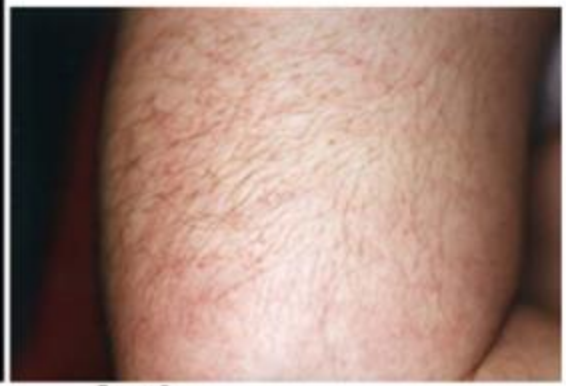
Definition varies with ethnicity

Hatch et al, Am J Obstet Gynecol 1981

Upper Arm



Score 1



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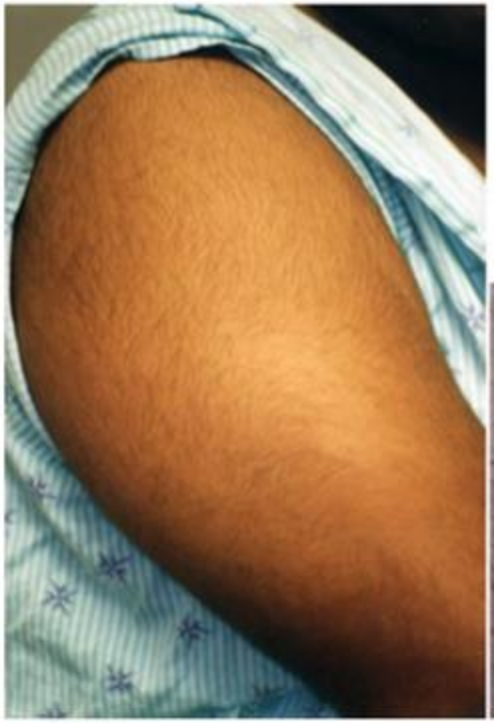
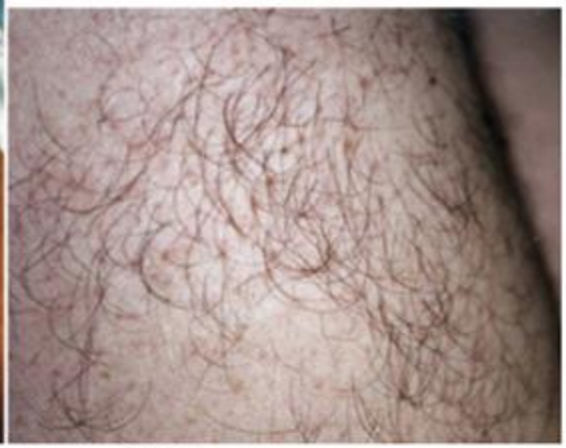


Score 3



Score 4

Yildiz BO, Bolour S, Woods K, Moore A, Azziz R. Visually scoring hirsutism. Hum Reprod Update. 2010 Jan-Feb;16(1):51-64. doi: 10.1093/humupd/dmp024. PMID: 19567450; PMCID: PMC2792145.

Hirsutism

- Limitations to Ferriman-Gallwey scoring
  - Race/ethnicity
  - Familial pattern
  - Unreliable if s/p hair removal
- Ask about hair removal techniques
  - Techniques/tools used?
  - How recently utilized?
  - Frequency required?

- Ask your patient: **is hair bothersome – or not**?
  - Consider preferences of gender diverse youth

Acne

- Mild acne is common during adolescence
- Comedonal acne related to androgen
- Moderate to severe acne (treatment resistant) suggestive of hyperandrogenemia

	Comedonal	Inflammatory
Severity	**# of Lesions**	**# of Lesions**
Mild	1 – 10	1 – 10
Moderate	11 – 25	11 – 25
Severe	> 25	> 25

- Assess face, chest, shoulders, back
- Comedones: open ("blackheads") or closed ("whiteheads") >1 mm diameter.
- Inflammatory lesions: pustules, papules (≤5 mm), and nodules (>5 mm).

Differential diagnoses

- Amenorrhea
  - Pregnancy!
  - Primary ovarian insufficiency (POI)
  - Thyroid disorder
  - Hyperprolactinemia
  - Hypothalamic amenorrhea
    - Eating disorder
    - Systemic illness
    - Stress
- Hyperandrogenism
  - Congenital adrenal hyperplasia (CAH) (non classic!)
  - Androgen-secreting tumor (ovarian, adrenal)
  - Acromegaly
  - Exogenous androgenic steroids, valproic acid
  - Idiopathic hirsutism
  - Disorders of sex development
- Both
  - Cushing's syndrome
  - Diabetes

Lab Workup

- hCG
- Total and free (indirect) testosterone
- DHEA-Sulfate
- TSH
- Prolactin
  - early morning
- LH, FSH, estradiol
- 17-OH progesterone
  - early morning, ideally when amenorrheic or 10 days after menses

- +/- Cortisol
- +/- HgA1c
- +/- Lipids
- +/- Androstenedione

What about…

LH: FSH Ratio?

>2.5 suggestive but not diagnostic for PCOS

AMH?

It could have some diagnostic value, but lacking good studies

What role does imaging play in the diagnosis of PCOS in adolescents?

A pelvic ultrasound is…

a) Necessary to confirm presence of polycystic ovaries

b) Useful in ruling out other causes of elevated androgens

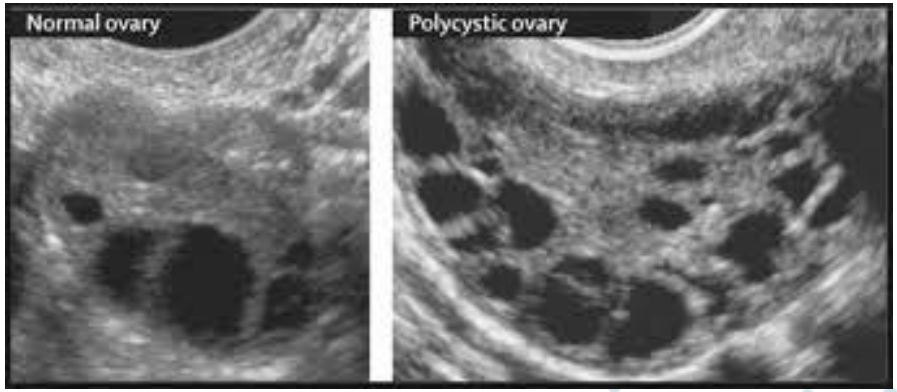
c) Only useful in evaluating adults

Pelvic Ultrasound

- **Neither recommended nor required for the diagnosis of PCOS in adolescents**
  - 25 – 50% of normal adolescents meet Rotterdam adult criteria for PCO morphology

Imaging

- Useful to:
  - **Exclude other causes of hyperandrogenemia** (ovarian, adrenal tumors)
  - Support a probable diagnosis in patients with **large ovaries >12 cc** (on 1 or both sides) or high number of antral follicles (>25) who meet partial criteria



Witchel SF, Horm Res Paediatr. 2015

At risk of PCOS

- Per the new guidelines:
  - If meets one of the criteria, consider "at risk of PCOS"
- Per SCH Ado med:
  - Above OR
  - If has one of the criteria and other features of PCOS, and is within two years postmenarche
- Need reassessment at or before 8 years post menarche ("reproductive maturity")
- Need management according to symptoms

Other Risks Associated with PCOS

- Increased risk of impaired fasting glucose, impaired glucose tolerance, and Type 2 DM
  - Glycemic status assessment (SCH: A1c annually)
- As adults, increased risk of CVD, impaired glucose tolerance, OSA, endometrial hyperplasia/cancer
  - Lipids annually
- Increased risk of depression, anxiety, and eating disorders
  - Mental health screenings, eating disorders

What about fertility potential?

- Counsel that fertility may be impacted in some individuals if abnormal uterine bleeding persists
  - May take longer to conceive
  - Many effective ovulation induction therapies available
  - Cycles may normalize over time

- Remind patients that **diagnosis of PCOS does not mean they are infertile!**
  - Assess need for contraception

Case continued..

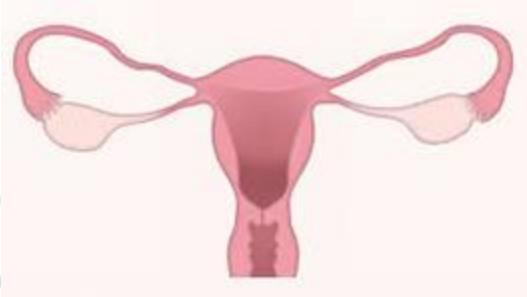
- You have diagnosed your patient with PCOS based on history, exam and lab findings. She asks you if it's ok that she isn't getting her period regularly. She shares that she would **strongly prefer *not* to have periods at all**, even though she knows her mom wants her to have "regular" cycles.

Your response is…

a) “There are no medical risks associated with infrequent periods.”
b) “If you are consistently having 3+ months between menses, this might increase your risk of uterine cancer years from now.”
c) “We can talk about hormonal methods that can keep your uterus healthy, but also prevent you from having monthly periods.”
d) Both b and c

Goals of Management

- Endometrial protection
  - Prevent endometrial hyperplasia to diminish future risk of uterine carcinoma
- Diminish signs of hyperandrogenism if desired
- Minimize long term metabolic risks
- Improve quality of life
  - Provide support for any co-occurring anxiety, depression, disordered eating



Goals of Management

- **Ask your patient what <u>their</u> goals are, and prioritize in developing treatment plan**
  - Menstrual regulation?
  - Acne/hirsutism reduction?
  - Decrease acanthosis/insulin resistance?
  - Decrease risk of related long term comorbidities?
- Parent goals may differ; offer teen autonomy in their care

Everyone should:

- Have balanced, consistent nutrition
  - No evidence to support any type of diet
- Daily physical activity - Joyful Movement!
  - Aim for ≧ 60 minutes of moderate to vigorous intensity daily
  - Includes strengthening exercise at least 3 times a week
  - Focus on healthy individual preferences that are sustainable, recognizing role of broader family engagement

- *Substantial/sustained decrease in adiposity or glycemic control may not be feasible to achieve for all*
- *Consider HAES (health at every size) approach if appropriate*

Menstrual management

- Combined hormonal contraceptives (CHCs)
  - OCPs, ring, patch
  - Dual benefit of acne, hirsutism tx
  - Assess for contraindications to estrogen

- Progestin-only pills
  - Can exacerbate acne for some
  - Slynd/drospirenone 4mg is an option
- Cyclic progesterone
  - PO Medroxyprogesterone (Provera) 10 mg x 10 days taken every 3 months to induce withdrawal bleed
- LARCs
  - Levonorgestrel IUD
  - Etonorgestrel Subdermal implant

Hirsutism

- Combined hormonal contraceptives
- Spironolactone - better combo with CHC

- Hair removal
  - Laser
  - Electrolysis
  - Referral to dermatology

Acne

- CHCs
- Spironolactone
- Topical agents
  - Benzoyl peroxide
  - Topical antibiotics
  - Retinoids
- Consider dermatology referral if severe (Accutane)

Metabolic comorbidities

- Metformin for insulin resistance
  - Off label use
  - Can help regulate periods

- GLP-1 agonists and orlistat
  - Some evidence in adults
  - No studies in adolescents with PCOS

- Inositol “Vitamin B8”
  - Not recommended due to lack of evidence

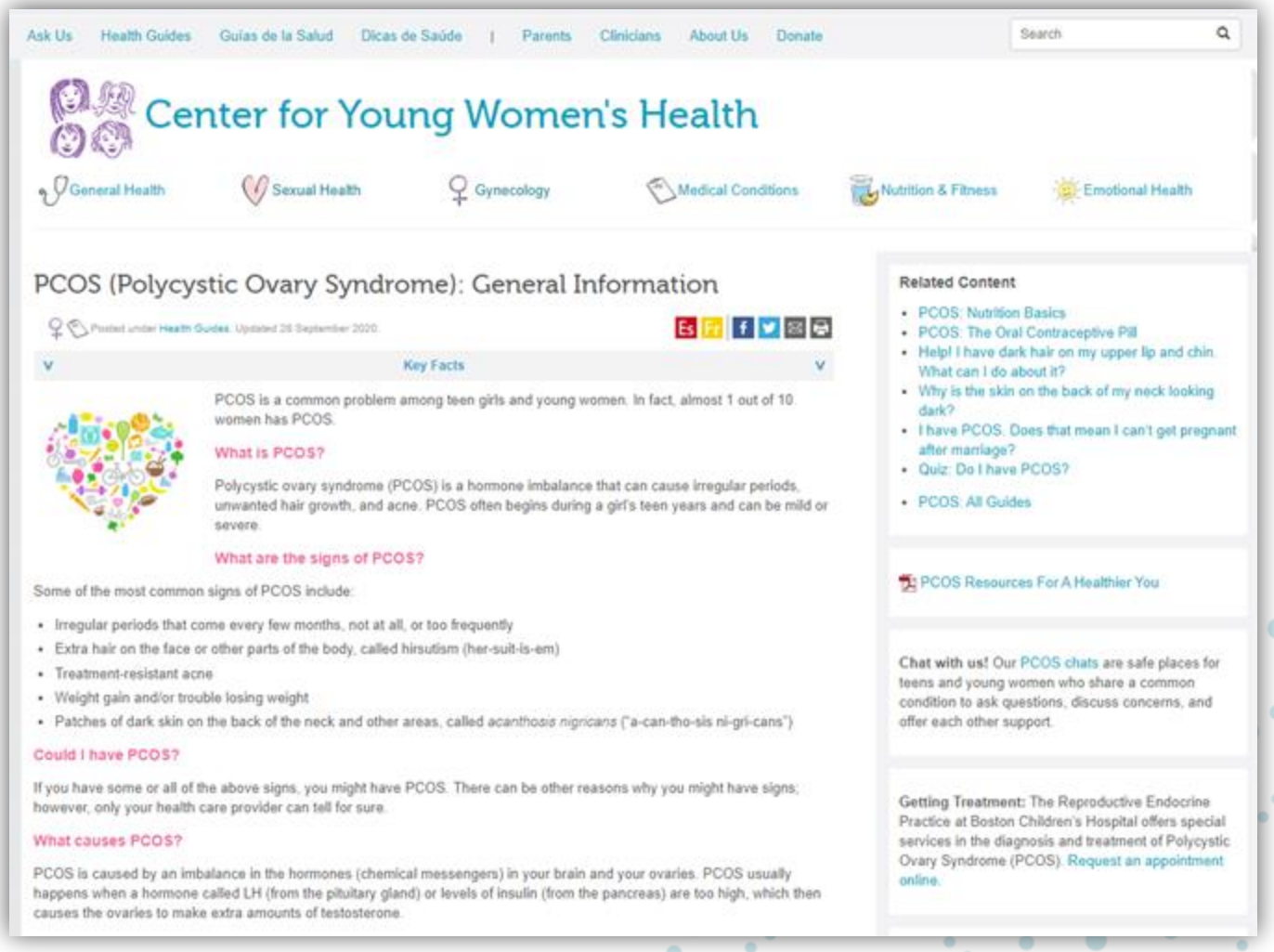
Summary

- PCOS is a very common yet complex syndrome; poor understanding of etiology
- Diagnosis of exclusion
- Challenging to diagnose in teens given irregular menses and acne normal part of development
- Lifelong implications with increased risk for infertility, metabolic syndrome, type 2 diabetes mellitus and endometrial carcinoma

Adolescent-specific PCOS pearls

- Treatment should be individualized, patient driven
- Be aware of shame, stigma associated with diagnosis
- Screen for mental health comorbidities, disordered eating behaviors
- Identify unmet needs for contraception

PCOS Resources for Teens



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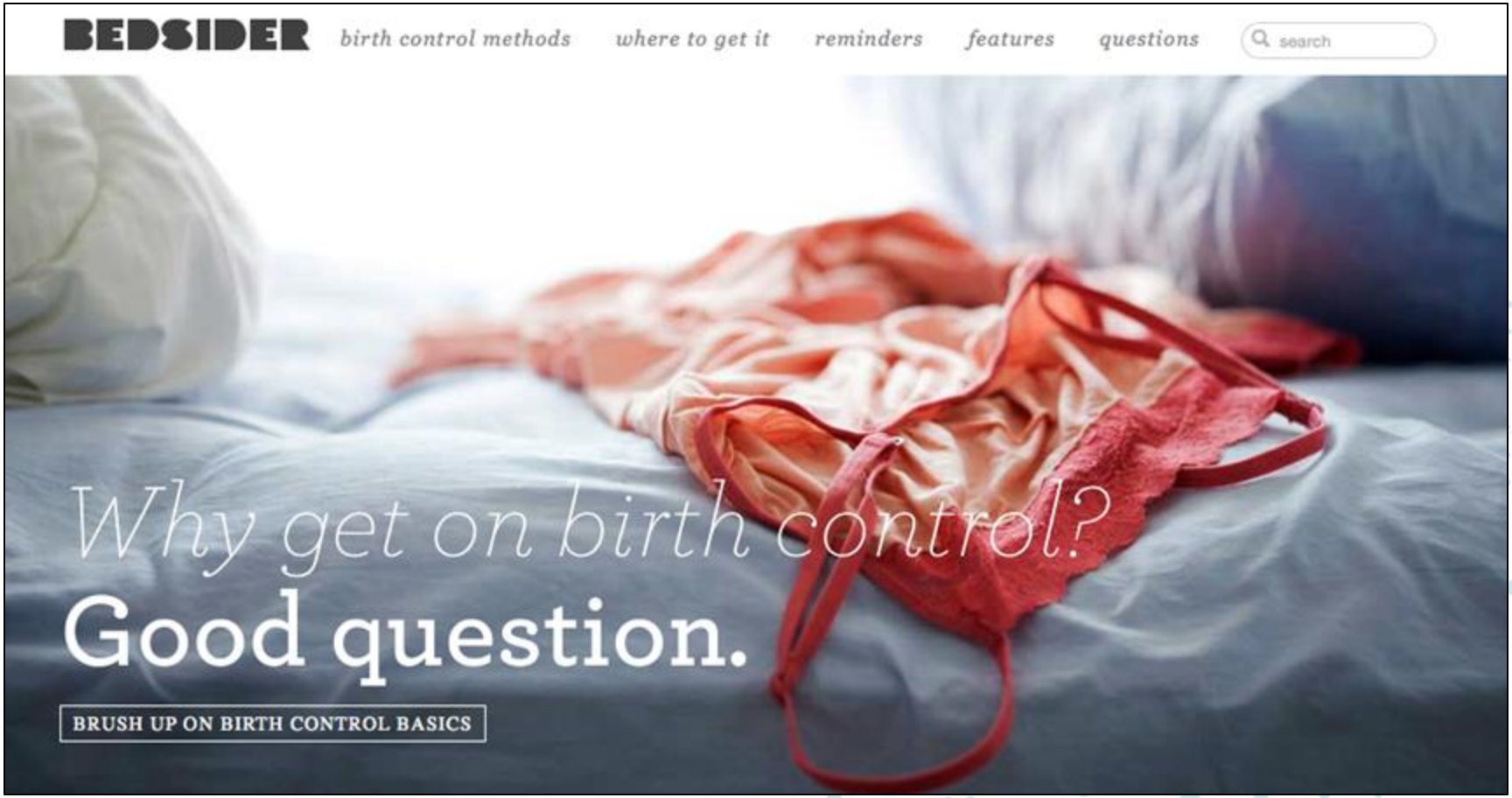
https://youngwomenshealth.org/

Contraception Resources



Referral to SCH Adolescent Clinic

- Adolescent Medicine
  - Evaluation of irregular menses/PCOS
  - Contraceptive consultation/management
  - LARC clinic
  - Nutritional counseling
  - Eating disorder clinic
  - Gender clinic

Thank you!

EVAL QR WILL BE ADDED HERE

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How I explain PCOS to patients

1. what is it
2. how do you diagnose it (aka why do you have it)
3. what are the symptoms (short + long term considerations)
    a. menstrual
    b. androgenic
    c. metabolic
    d. mood and eating disorders
4. what to do about it
    a. balanced, consistent nutrition
    b. joyful movement
    c. meds depending on their goals and needs (e.g. endometrial protection, acne/hirsutism, preDM)