



JEOPARDY!

Endocrine!



Male Hypogonadism	Female Hypogonadism	PCOS	Transgender
<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>
<u>300</u>	<u>300</u>	<u>300</u>	<u>300</u>
<u>400</u>	<u>400</u>	<u>400</u>	 <u>400</u>
<u>500</u>	<u>500</u>	<u>500</u>	 <u>500</u>

Male Hypogonadism - 100

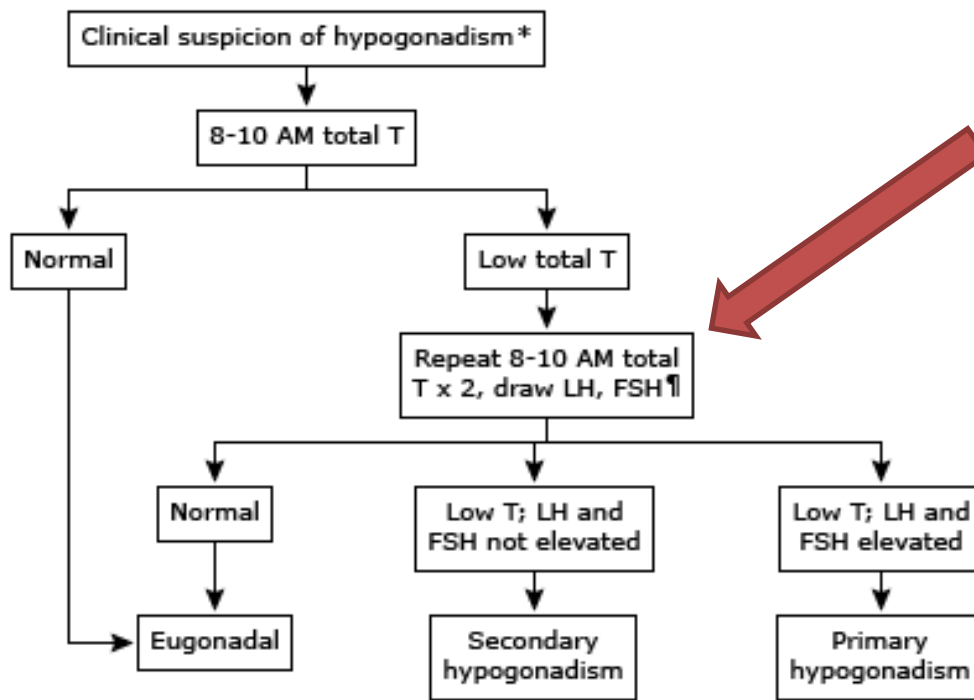
- 58 yo M presents with fatigue and low libido so his PCP obtained an 8AM total testosterone level which came back 280 (300-800).
- What is the next diagnostic step?



Male Hypogonadism - 100

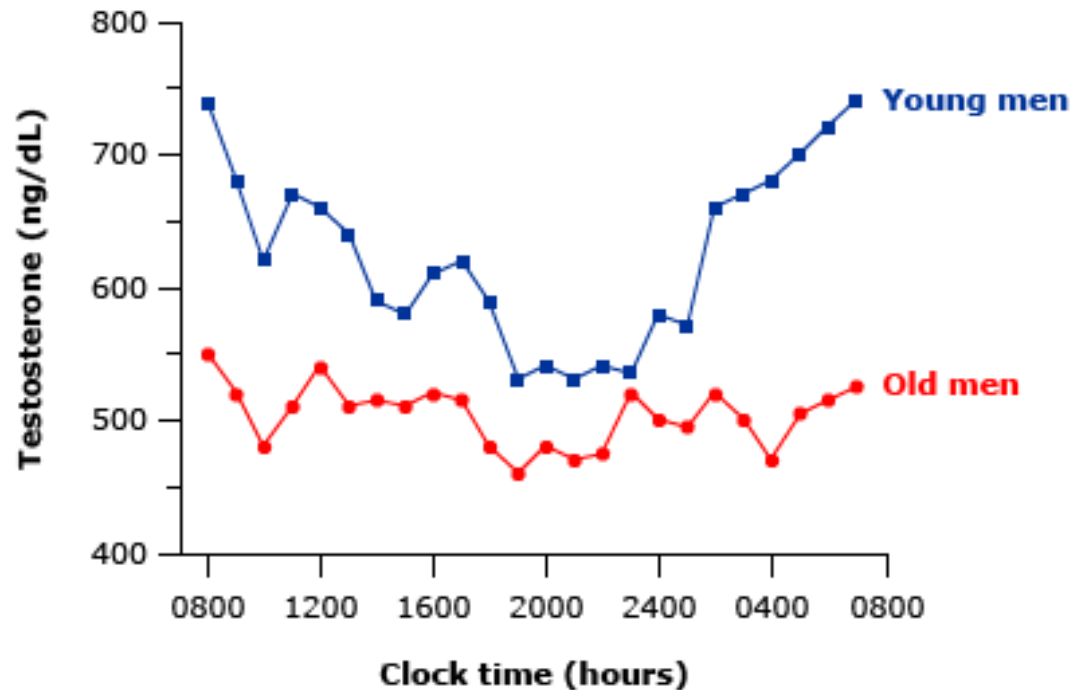
- Repeat AM testosterone level

Evaluation of the male with possible hypogonadism



Male Hypogonadism - 100

Diurnal pattern of testosterone secretion



Male Hypogonadism - 200

- You decide to treat your hypogonadal patient with testosterone.
- What 2 essential lab tests do you monitor while a patient is on testosterone replacement therapy (TRT)?



Male Hypogonadism - 200

- CBC and PSA



Male Hypogonadism - 200

- Total testosterone level – generally target between 300-800 (depending on the age)
- CBC – TRT stimulates production of RBCs so Hb & Hct should be checked to ensure HCT is not > 54
- PSA – TRT increases PSA which leads to theoretical risk of prostate cancer



Summary of Recommendations

+1.0 Diagnosis of Hypogonadism in Men

+2.0 Treatment of Hypogonadism with Testosterone

-3.0 Monitoring of Testosterone Replacement Therapy

3.1 In hypogonadal men who have started testosterone therapy, we recommend evaluating the patient after treatment initiation to assess whether the patient has responded to treatment, is suffering any adverse effects, and is complying with the treatment regimen. (Ungraded Good Practice Statement)

3.2 We recommend a urological consultation for hypogonadal men receiving testosterone treatment if during the first 12 months of testosterone treatment there is a confirmed increase in prostate specific antigen concentration **>1.4 ng/mL above baseline**, a confirmed prostate-specific antigen **>4.0 ng/mL**, or a prostatic abnormality detected on digital rectal examination. After 1 year, prostate monitoring should conform to standard guidelines for prostate cancer screening based on the race and age of the patient. (2 |⊕⊕○○)



Male Hypogonadism - 300

- List 3 potential side effects of testosterone replacement therapy (TRT).



Male Hypogonadism - 300

- Infertility!!!
- Erythrocytosis → cardiovascular risk
- Acne
- Agitation
- Hypertension → cardiovascular risk
- Worsens sleep apnea
- (Theoretical) BPH, prostate cancer



Male Hypogonadism - 400

- List 4 signs and/or symptoms of male hypogonadism.



Male Hypogonadism - 400

- Low energy
- Low libido
- Decreased muscle mass
- Decreased body/facial hair
- Small testes
- Gynecomastia



Male Hypogonadism - 500

- You diagnose your male patient with secondary hypogonadism.
- List 5 diagnostic tests you would perform to evaluate for secondary causes.



Male Hypogonadism - 500

- MRI Brain
- TSH + FT4
- PRL
- Sleep study
- Hba1c
- Iron studies
- 8AM cortisol level
- IGF-1

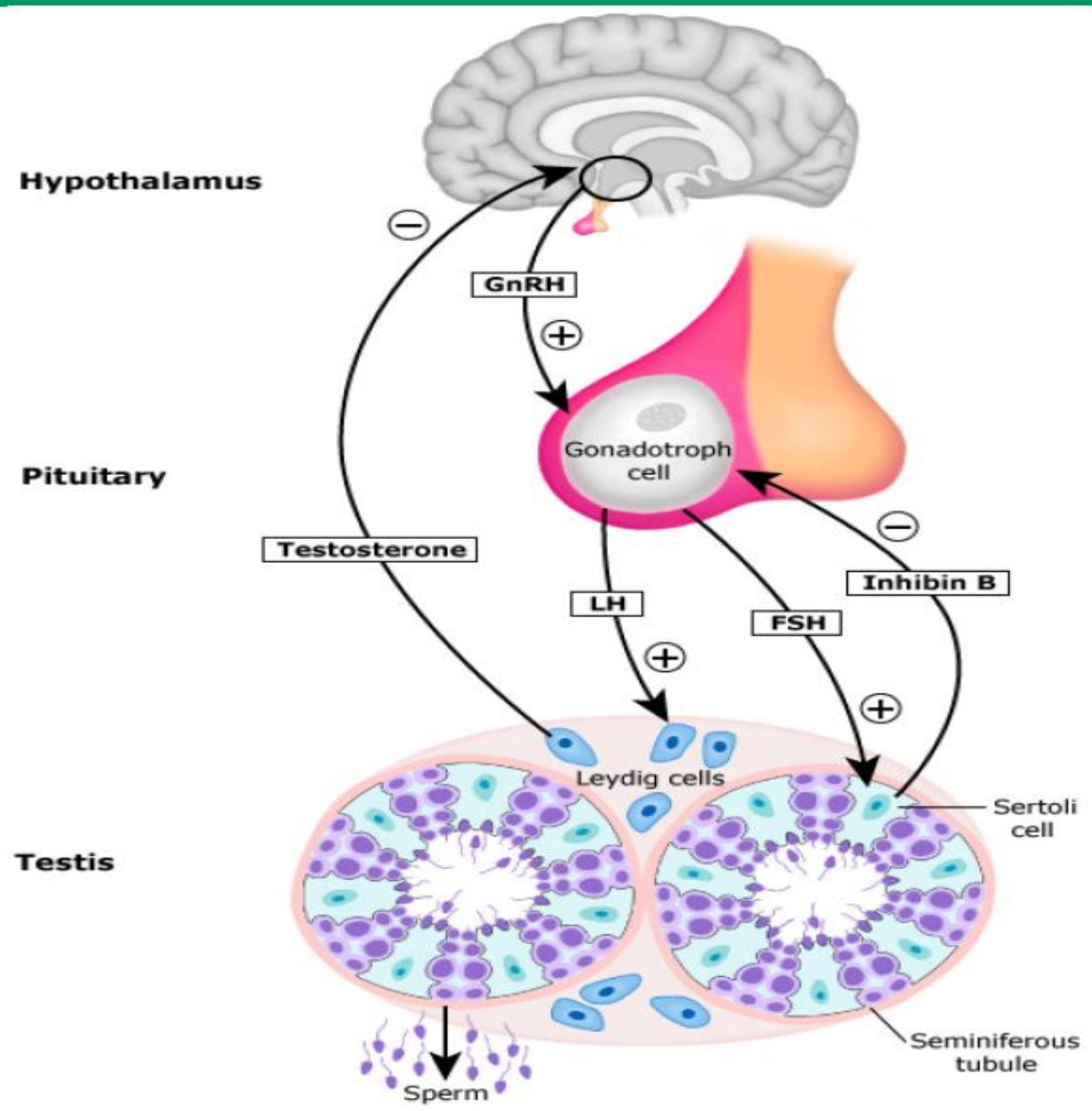


Male Hypogonadism - 500

- Other things:
 - Obesity
 - Opioid use
 - Difficulty having children
 - Testicular trauma or infection
 - History of traumatic brain injury
 - History of head radiation
 - Age



Hypothalamic-pituitary-testicular axis



Causes of hypogonadotropic (secondary) hypogonadism

Acquired

Tumors

Benign tumors and cysts

Craniopharyngiomas

Germinomas, meningiomas, gliomas, astrocytomas

Metastatic tumors (breast, lung, prostate)

"Functional" gonadotropin deficiency

Chronic systemic disease

Acute illness

Malnutrition

Hypothyroidism, hyperprolactinemia, diabetes mellitus, Cushing's disease

Anorexia nervosa, bulimia

Post-androgen abuse

Infiltrative diseases

Hemochromatosis

Granulomatous diseases

Histiocytosis

Head trauma

Pituitary apoplexy

Drugs - marijuana, opioids, anabolic steroids



Female Hypogonadism - 100

- Diagnosis of a woman younger than 40 years with irregular menses and elevated FSH in menopausal range.



Female Hypogonadism - 100

- Primary ovarian insufficiency, “premature ovarian failure”



Female Hypogonadism - 200

- List 2 treatment options for menopausal symptoms (vasomotor).



Female Hypogonadism - 200

- Hormone replacement therapy
- SSRI's – venlafaxine, fluoxetine, paroxetine
- Gabapentin



Female Hypogonadism - 300

- List 3 causes of functional hypothalamic amenorrhea.



Female Hypogonadism - 300

- Over exercise
- Weight loss, anorexia nervosa or bulimia
- Severe Depression
- End Stage of Chronic disease



Female Hypogonadism - 400

- What is the most important test that you will order during initial evaluation for amenorrhea in a young woman.



Female Hypogonadism - 400

- HCG first to rule out pregnancy



Female Hypogonadism - 400

- Others
- If hyperandrogenism, can order total testosterone, DHEAS, and 17-OH progesterone
- Prolactin
- LH + FSH
- Estradiol
- TSH
- Pelvic ultrasound



Female Hypogonadism - 500

- List 5 physiologic changes that accompany menopause.



Female Hypogonadism - 500

- Loss of bone calcium---osteoporosis
- Increased rates of CAD
- Skin and vaginal atrophy
- Hot flashes
- Dyslipidemia – increased Tg's and LDL, decreased HDL
 - Thought to contribute to increased cardiovascular risk
- Sleep disturbance
- Depression



PCOS - 100

- A 26 yo F presents for assistance with weight loss. She mentions that she has been having periods every 3-4 months and on exam she has increased facial hair as well as acanthosis nigricans.
- What additional test (if needed) is required to diagnose PCOS?



PCOS - 100

- None – she has oligomenorrhea and clinical signs of hyperandrogenism



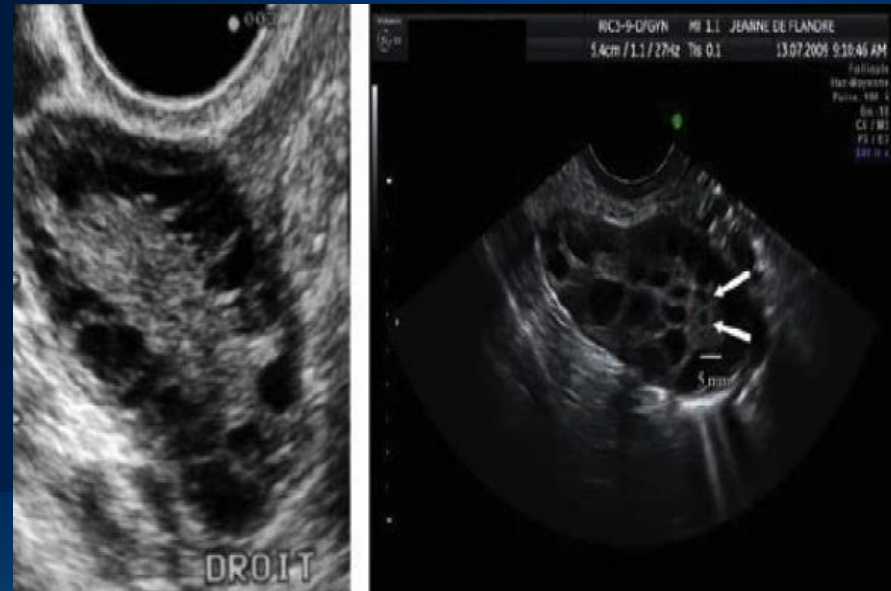
PCOS - 100

- PCOS is primarily a clinical diagnosis but per Rotterdam criteria (2003), you need 2 of 3:
 - Oligo- or anovulation
 - Clinical and/or biochemical signs of hyperandrogenism
 - Polycystic ovaries (ultrasound)



PCOS - 100

- Serum total testosterone can be measured – a level > 45 ng/dL suggests biochemical evidence of hyperandrogenism
 - Type of lab matters, LC-MS/MS (liquid chromatography), +/- measuring free testosterone
- Transvaginal ultrasound
 - 12+ follicles in each ovary



Clinical Signs of Androgen Excess: Alopecia, Hirsutism, Acne



In androgen excess, androgen-sensitive hair follicles shorten during anagen phase



PCOS - 200

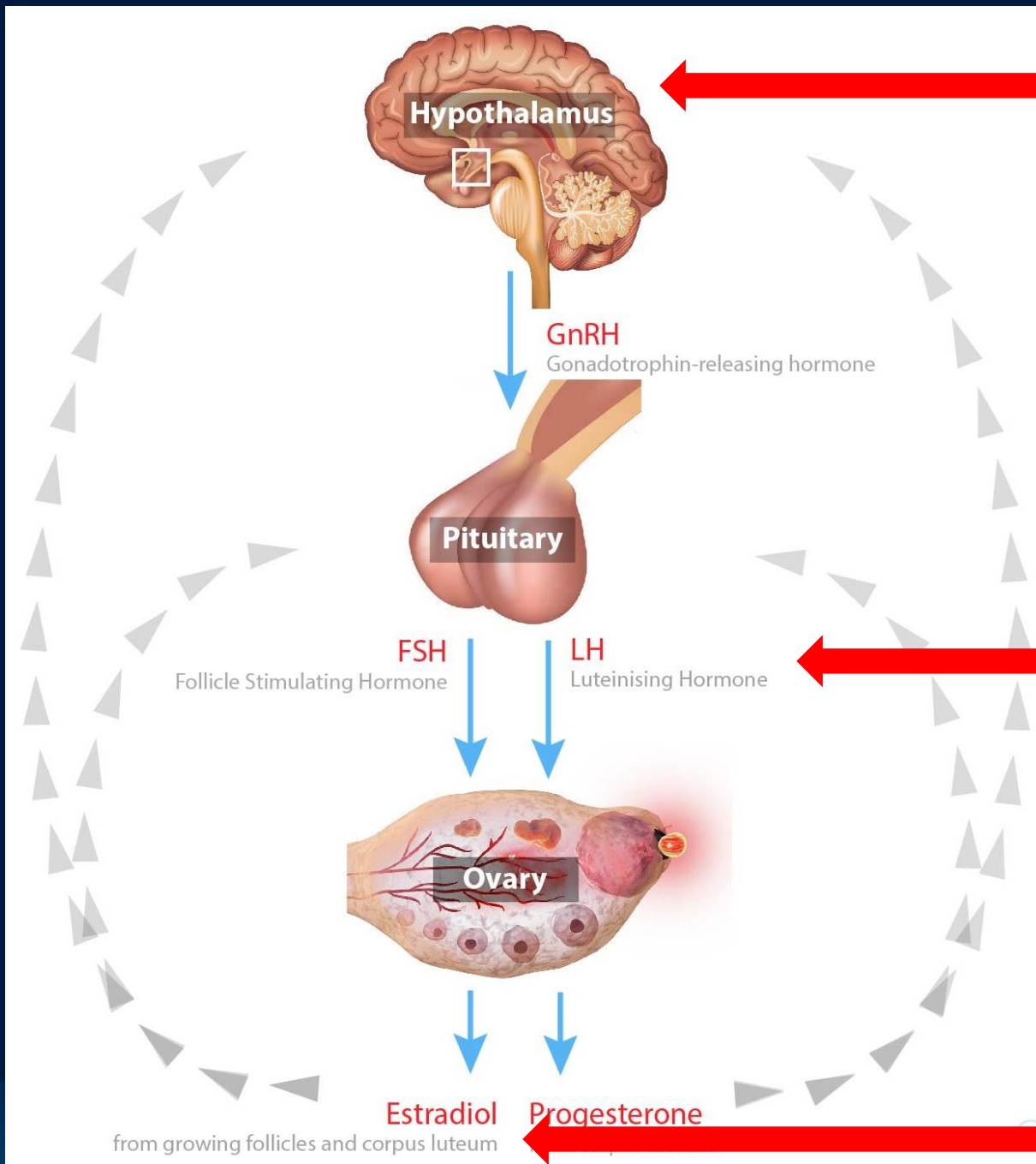
- A 34-yo F is evaluated after inability to conceive for 13 months without success. She was recently diagnosed with PCOS.
- Name 1 treatment option that can help her become pregnant.



PCOS - 200

- Treatment options:
 - Clomiphene (selective estrogen receptor modulator)
 - Letrozole (aromatase inhibitor) – per ACOG 2018 is first line
 - Gonadotropins is second line for PCOS





Clomiphene

Gonadotropins

Letrozole



PCOS - 300

- A 30 yo woman diagnosed with PCOS desires treatment for her hirsutism.
- What hormonal treatments can you offer?



PCOS - 300

- OCP's
- Spironolactone



PCOS - 400

- List at least 3 metabolic consequences of PCOS



PCOS - 400

- Obesity
- Insulin resistance/diabetes
- Hyperlipidemia
- Hypertension
- NASH
- Metabolic Syndrome



PCOS - 400

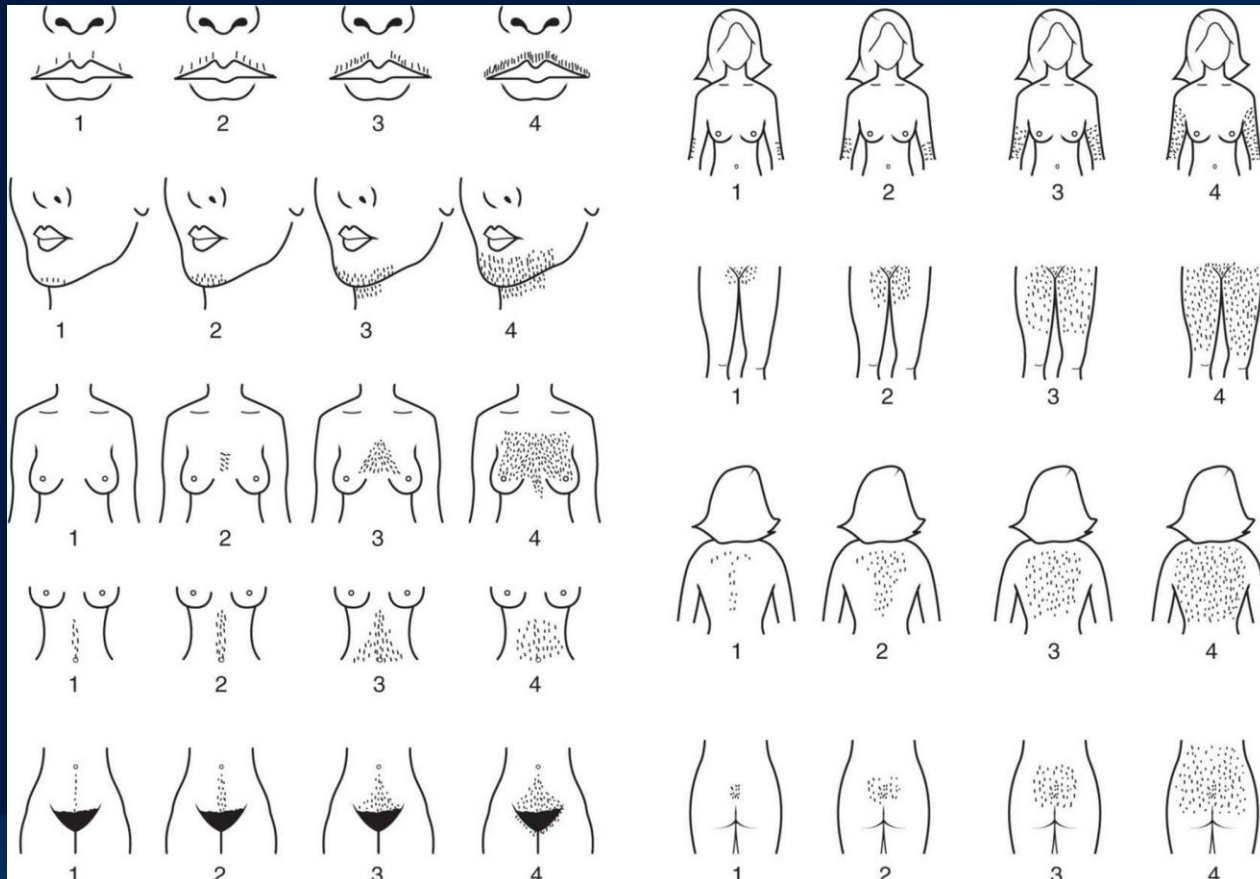
Diagnoses	Non-PCOS	PCOS	P Value	HR	95% CI
n	25 660	2566			
Endocrine					
Obesity	943 (3.7)	411 (16.0)	<.001	4.71	4.19–5.28
Late-onset diabetes	980 (3.8)	321 (12.5)	<.001	2.84 ^a	2.49–3.23
Other endocrine, nutritional, or metabolic	1873 (7.3)	521 (20.3)	<.001	2.96 ^a	2.69–3.27
Circulatory					
Hypertensive disorder	192 (0.7)	98 (3.8)	<.001	3.20 ^a	2.47–4.13
Ischemic heart disease	50 (0.2)	21 (0.8)	<.001	2.89 ^a	1.68–4.97
Cerebrovascular disease	51 (0.2)	15 (0.6)	.002	2.58 ^a	1.43–4.67
Other forms of heart disease	266 (1.0)	44 (1.7)	.013	1.49 ^a	1.09–2.05
Arterial/venous disease	1497 (5.8)	275 (10.7)	<.001	1.81 ^a	1.59–2.05
Respiratory					
Asthma	1160 (4.5)	271 (10.6)	<.001	2.51	2.18–2.88
Other diseases	3635 (14.2)	585 (22.8)	<.001	1.67	1.53–1.82
Musculoskeletal diseases/disorders	4167 (16.2)	661 (25.8)	<.001	1.55 ^a	1.43–1.68
Mental disorders					
Stress/anxiety	1525 (5.9)	358 (14.0)	<.001	2.50	2.19–2.76
Depression	1116 (4.3)	252 (9.8)	<.001	2.32	2.03–2.67

Hart R et al. *JCEM* 2015; 100(3):911-9
 Dube R. *Avicenna J Med*. 2016; 6(4): 91-102



PCOS - 500

- Identify this scale



PCOS - 500

Ferriman-Gallwey Score



Transgender - 100

- A 28 yo birth female mentioned that she feels like male since 5 years old and wishes to undergo replacement hormone therapy. What medication would you start for this transmale?



Transgender - 100

Table 2. Hormonal Regimens Regularly Used in Transmen

Testosterone	Recommended dose
Intramuscular enanthate or cypionate*	100–200 mg/2 weeks
Intramuscular mixed esters (Sustanon®)	250 mg/2-3 weeks
Intramuscular undecanoate	1000 mg/12 weeks OR 750 mg / 8 weeks**
Testosterone gel	25-100 mg/day
Testosterone patch	2 or 4 mg/day

- Generally target T levels in a normal male level for the same age



Transgender - 200

- What are 2 hormonal treatment options for transwomen?



Transgender - 200

Estrogens	Recommended Dose
Oral estradiol	2-6 mg daily
Intramuscular estradiol valerate/cypionate	10-20 mg/1-2 weeks
Estradiol patch*	50-100 mcg/24 hours
Estradiol gel*	0.75 mg-2.25 mcg daily
Antiandrogens**	
Cyproterone acetate	10-50 mg daily
Spironolactone	50-200 mg daily
GnRH analogue	Varies per preparation



Transgender - 200

- Generally target premenopausal E2 levels (100-200)
- If postmenopausal, no specific guidelines but I generally target between 60-100
- Older patients are at greater risk of experiencing adverse effects of E2



Transgender - 300

- A 55 yo MTF transgender wishes to undergo hormone replacement therapy with estradiol but expresses concern about increased risk of VTE.
- What hormone replacement therapy would be preferable in this case?



Transgender - 300

- Estradiol patch or injection



Transgender - 400

- List 4 physical changes in a transwoman undergoing hormone replacement therapy.



Transgender - 400

- Softening of the skin (variable)
- Decreased muscle mass and strength (years)
- Fat redistribution (years)
- Decreased hair growth (years)
- Decreased sexual desire (6 months)
- Breast growth (6 mo – 2 years)
- Decreased erections (6 months)
- Decreased sperm production (months to years)



Transgender - 500

- List 5 physical changes in a transman undergoing hormone replacement therapy.



Transgender - 500

- Skin oiliness/acne (6 months)
- Increased muscle mass and strength (years)
- Deepened voice (1-2 years)
- Fat distribution (years)
- Body and facial hair growth (years)
- Cessation of menses (variable)
- Clitoral enlargement (1-2 years)
- Vaginal atrophy (1-2 years)

