An Approach to the Transgender Patient

Aren Skolnick D.O.
Medicine and Surgery Grand Rounds
October 25, 2018
CME ACCREDITED UPDATES IN MEDICINE ELEARNING SERIES

- **COURSE NAME:**
  - Medicine RSS eLearning Modules

- **CME eLEARNING ACTIVITY NAME:**
  - An Approach to the Transgender Patient

**PROGRAM DESCRIPTION, EDUCATIONAL GOAL AND RATIONALE:**
Evidence based guidelines are constantly changing and being updated for several core areas of Internal Medicine throughout the year. It is important for physicians to practice the most up-to-date standard of care in all specialties to promote patient health and well-being. Our series of lectures at the medicine regularly scheduled series promotes continuing education for the practicing internist and highlights important updates in medical practice in these core areas. Physicians in general practice often and do not have the time to keep themselves up-to-date with medical advances as they are busy seeing patients in the clinical setting. The Medicine Regularly Scheduled Series gives these physicians the opportunity to learn these advances in an academic setting.
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• TARGET AUDIENCE:
  • Physician Partners and Premium Network community-based providers

LEARNING OBJECTIVES:
Upon successful completion of this activity, participants should:
• Define gender dysphoria
• Identify treatment methods for gender dysphoria
• Identify risks & outcomes of treatment methods
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  Division of Hospital Medicine
  Site Director, Internal Medicine, Residency Program

- Sean LaVine, MD
  Site Director, Division of Hospital Medicine, Long Island Jewish Medical Center
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  • Read/view the entire educational activity.
  • Input name and credentials to gain CME credit.
  • Answer at least 80% of the Post-Test questions correctly.
  • Complete and return Post-Test.
  • Complete and return Program Evaluation.

• CREDIT DESIGNATION:
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- COURSE HOST:
  - Department of Medicine
  - Northwell Health

- ESTIMATED TIME TO COMPLETE ACTIVITY:
  - 90 minutes

- ACKNOWLEDGEMENT OF COMMERCIAL SUPPORT:
  - An announcement of program support will be made to all attendees at the beginning of each educational activity.
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• **FACULTY DISCLOSURES:**
  Drs. Thomas McGinn, Dr. Aren Skolnick, George Boutis, John Raimo and Sean LaVine have nothing to disclose.

• **RELEASE DATE:** 1/18/19
• **REVIEW DATE:** 1/18/19
• **PROGRAM EXPIRATION:** 7/30/19
Disclosures

• None
Review of Terms

GENDER
GENDER ROLE
GENDER IDENTITY
SEXUAL ORIENTATION
Gender Dysphoria = Gender Identity Disorder

- The desire to live and be accepted as a member of the opposite sex usually accompanied by the wish to make the body as congruent as possible with the preferred sex through surgery and hormone treatment. (WHO)

- Discomfort or stress from the discrepancy in gender identity an assigned sex at birth (DSM)
  (Fisk, 1974; Knudson, DeCuypere, & Bockting, 2010b).
Transgender History
The World of Transgender Today
Epidemiology

- Difficult assessing due to cultural differences
- Most studies performed in Europe
- De Cuypere and colleagues (2007)
  - range from 1:11,900 to 1:45,000 for male-to-female individuals (MtF)
  - 1:30,400 to 1:200,000 for female-to-male (FtM) individuals.
- Likely underestimated
- Direct comparisons across studies are difficult
Treatment

• Improve quality of life
  ▫ Psychological
    • Explore gender identity role
    • Impact of gender dysphoria
    • Enhance social and peer support
    • Improve body image
  ▫ Medical
    • Hormone Therapy
  ▫ Surgical
    • Change primary and/or secondary sex characteristics
Mental Health Professionals

- Competency
- Assess Gender Dysphoria
- Information for various options
- Assess and treat co-existing diagnoses
  - “Minority Stress” (Meyer, 2003)
- Prepare and refer for hormone treatment and/or surgery
- Referral for peer support
- Access to care issues
Hormonal Therapy

• Individualized
  ▫ Goals
  ▫ Risk vs. Benefits
  ▫ Other medical conditions
  ▫ Social factors
  ▫ Economic issues
Hormonal Regimens

- No randomized clinical trials comparing safety and efficacy
- Observational and Anecdotal
Feminizing Hormone Therapy

- **Estrogens**
  - Oral
  - Transdermal
  - Parenteral

- **Antiandrogens**
  - Spironolactone
  - Cyproterone acetate
  - 5-alpha reductase inhibitors

- **GnRH Analogs**
# Physical Effects of Hormonal Therapy

<table>
<thead>
<tr>
<th>Effect</th>
<th>Expected onset&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Expected maximum effect&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body fat redistribution</td>
<td>3–6 months</td>
<td>2–5 years</td>
</tr>
<tr>
<td>Decreased muscle mass/strength</td>
<td>3–6 months</td>
<td>1–2 years&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Softening of skin/decreased oiliness</td>
<td>3–6 months</td>
<td>Unknown</td>
</tr>
<tr>
<td>Decreased libido</td>
<td>1–3 months</td>
<td>1–2 years</td>
</tr>
<tr>
<td>Decreased spontaneous erections</td>
<td>1–3 months</td>
<td>3–6 months</td>
</tr>
<tr>
<td>Male sexual dysfunction</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Breast growth</td>
<td>3–6 months</td>
<td>2–3 years</td>
</tr>
<tr>
<td>Decreased testicular volume</td>
<td>3–6 months</td>
<td>2–3 years</td>
</tr>
<tr>
<td>Decreased sperm production</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Thinning and slowed growth of body and facial hair</td>
<td>6–12 months</td>
<td>&gt; 3 years&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Male pattern baldness</td>
<td>No regrowth, loss stops 1–3 months</td>
<td>1–2 years</td>
</tr>
</tbody>
</table>
Masculinizing Hormone Therapy

- Testosterone
  - Oral*
  - Transdermal
  - Parenteral
  - Buccal
  - Implantable
# Table 1. Testosterone Replacement Therapies Approved for Use in the U.S.¹

<table>
<thead>
<tr>
<th>Delivery System (Drug)</th>
<th>Route of Delivery</th>
<th>Standard Dosage for Androgen Deficiency</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Estimated Monthly Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testosterone esters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testosterone enanthate</td>
<td>IM</td>
<td>100 mg every week or 200 mg every 2 weeks</td>
<td>Inexpensive; administered every 2 weeks</td>
<td>Roller-coaster pharmacokinetics; requires injection</td>
<td>$100</td>
</tr>
<tr>
<td>Testosterone cypionate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testosterone pellets</td>
<td>SC</td>
<td>Two to six 75-mg pellets every 3 to 6 months</td>
<td>Convenient 6-month biological duration</td>
<td>Expensive; requires small incision; high rate of extrusion; available only through manufacturer</td>
<td>$150</td>
</tr>
<tr>
<td>Buccal testosterone</td>
<td>Buccal</td>
<td>30 mg BID</td>
<td>Testosterone levels within physiologic range</td>
<td>Expensive; twice-daily dosing; possible oral irritation</td>
<td>$250</td>
</tr>
<tr>
<td>Testosterone patch</td>
<td>Nonscrotal topical</td>
<td>5 mg/day</td>
<td>Mimics circadian rhythm</td>
<td>Expensive, daily administration; skin irritation</td>
<td>$250</td>
</tr>
<tr>
<td>Testosterone gel</td>
<td>Topical</td>
<td>5 g/day</td>
<td>Testosterone levels within physiologic range</td>
<td>Expensive; daily administration; possible transference to intimate contacts</td>
<td>$300</td>
</tr>
</tbody>
</table>

Adapted with permission from Edelstein D, Dobs A, Basaria S. Emerging drugs for hypogonadism. Expert Opin Emerg Drugs. 2008;11(4):685-707.¹
Subcutaneous Testosterone

Subcutaneous Injection of Testosterone Is an Effective and Preferred Alternative to Intramuscular Injection: Demonstration in Female-to-Male Transgender Patients

Daniel I. Spratt,1 India I. Stewart,1 Clara Savage,1 Wendy Craig,2 Norman P. Spack,3 Donald Walt Chandler,4 Lindsey V. Spratt,1 Toni Eimicke,5 and Jerrold S. Olshan5

1Department of Obstetrics and Gynecology, Division of Reproductive Endocrinology and Infertility, Maine Medical Center, Portland, Maine 04102; 2Maine Medical Center Research Institute, Scarborough, Maine 04704; 3Division of Endocrinology, Boston Children’s Hospital, Boston, Massachusetts 02115; 4LabCorp, Calabasas, California 91301; and 5Department of Pediatrics, Division of Pediatric Endocrinology, Maine Medical Center, Portland, Maine 04102
# Physical Effects of Hormone Therapy

## TABLE 1a. Effects and Expected Time Course of Masculinizing Hormones

<table>
<thead>
<tr>
<th>Effect</th>
<th>Expected onset(^b)</th>
<th>Expected maximum effect(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin oiliness/acne</td>
<td>1–6 months</td>
<td>1–2 years</td>
</tr>
<tr>
<td>Facial/body hair growth</td>
<td>3–6 months</td>
<td>3–5 years</td>
</tr>
<tr>
<td>Scalp hair loss</td>
<td>&gt;12 months(^c)</td>
<td>Variable</td>
</tr>
<tr>
<td>Increased muscle mass/strength</td>
<td>6–12 months</td>
<td>2–5 years(^d)</td>
</tr>
<tr>
<td>Body fat redistribution</td>
<td>3–6 months</td>
<td>2–5 years</td>
</tr>
<tr>
<td>Cessation of menses</td>
<td>2–6 months</td>
<td>n/a</td>
</tr>
<tr>
<td>Clitoral enlargement</td>
<td>3–6 months</td>
<td>1–2 years</td>
</tr>
<tr>
<td>Vaginal atrophy</td>
<td>3–6 months</td>
<td>1–2 years</td>
</tr>
<tr>
<td>Deepened voice</td>
<td>3–12 months</td>
<td>1–2 years</td>
</tr>
</tbody>
</table>

\(^a\) Adapted with permission from Hembree et al. (2009). Copyright 2009, The Endocrine Society.

\(^b\) Estimates represent published and unpublished clinical observations.

\(^c\) Highly dependent on age and inheritance; may be minimal.

\(^d\) Significantly dependent on amount of exercise.
Figure 1. Testosterone levels after replacement with gel, patch, or injection.
Testosterone Pellets (Testopel)
Contraindications

Table 1. Absolute and relative contraindications to cross sex hormone therapy in transsexual people (Futterweit, 1998).

1. Severe hypertension
2. Ischaemic heart disease and other cardiac diseases
3. Thrombophlebitis or thromboembolic disease
4. Cerebrovascular disease
5. Hepatic dysfunction
6. Renal impairment
7. Refractory migraine, seizures, or retinal lesions
8. Brittle or poorly controlled diabetes
9. Hyperprolactinaemia
10. Strong family history of breast cancer
11. Heavy cigarette consumption
12. Marked obesity
13. Hypertriglyceridaemia or hypercholesterolemia in genetic females
### Risks of Hormonal Treatment

#### TABLE 2. Risks Associated with Hormone Therapy

<table>
<thead>
<tr>
<th>Risk level</th>
<th>Feminizing hormones</th>
<th>Masculinizing hormones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likely increased risk</td>
<td>- Venous thromboembolic disease&lt;sup&gt;a&lt;/sup&gt;</td>
<td>- Polycythemia</td>
</tr>
<tr>
<td></td>
<td>- Gallstones</td>
<td>- Weight gain</td>
</tr>
<tr>
<td></td>
<td>- Elevated liver enzymes</td>
<td>- Acne</td>
</tr>
<tr>
<td></td>
<td>- Weight gain</td>
<td>- Androgenic alopecia (balding)</td>
</tr>
<tr>
<td></td>
<td>- Hypertriglyceridemia</td>
<td>- Sleep apnea</td>
</tr>
<tr>
<td>Likely increased risk with presence of</td>
<td>- Cardiovascular disease</td>
<td></td>
</tr>
<tr>
<td>additional risk factors&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible increased risk</td>
<td>- Hypertension</td>
<td>- Elevated liver enzymes</td>
</tr>
<tr>
<td></td>
<td>- Hyperprolactinemia or prolactinoma</td>
<td>- Hyperlipidemia</td>
</tr>
<tr>
<td>Possible increased risk with presence of</td>
<td>- Type 2 diabetes&lt;sup&gt;a&lt;/sup&gt;</td>
<td>- Destabilization of certain psychiatric disorders&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>additional risk factors&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>- Cardiovascular disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Hypertension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 2 diabetes</td>
</tr>
<tr>
<td>No increased risk or inconclusive</td>
<td>- Breast cancer</td>
<td>- Loss of bone density</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Breast cancer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Cervical cancer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ovarian cancer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Uterine cancer</td>
</tr>
</tbody>
</table>
Cross-sex Hormones and Acute Cardiovascular Events in Transgender Persons

A Cohort Study

Darios Getahun, MD, PhD, MPH; Rebecca Nash, MPH; W. Dana Flanders, MD, MPH, DSc; Tisha C. Baird, MD; Tracy A. Becerra-Culqui, PhD; Lee Cromwell, MS; Enid Hunkeler, MA; Timothy L. Lash, PhD; Andrea Millman, MA; Virginia P. Quinn, PhD; Brandi Robinson, MPH; Douglas Robin, PhD; Michael J. Silverberg, PhD; Joshua Safer, MD; Jennifer Slawis, MD; Vin Tangpricha, MD, PhD; and Michael Goodman, MD, MPH

Background: Venous thromboembolism (VTE), ischemic stroke, and myocardial infarction in transgender persons may be related to hormone use.

Objective: To examine the incidence of these events in a cohort of transgender persons.

Design: Electronic medical record-based cohort study of transgender members of integrated health care systems who had an index date (first evidence of transgender status) from 2006 through 2014. Ten male and 10 female cisgender enrollees were matched to each transgender participant by year of birth, race/ethnicity, study site, and index date enrollment.

Setting: Kaiser Permanente in Georgia and northern and southern California.

Patients: 2842 transfeminine and 2118 transmasculine members with a mean follow-up of 4.0 and 3.6 years, respectively, matched to 48 686 cisgender men and 48 775 cisgender women.

Measurements: VTE, ischemic stroke, and myocardial infarction events ascertained from diagnostic codes through the end of 2016 in transgender and reference cohorts.

Results: Transmasculine participants had a higher incidence of VTE, with 2- and 8-year risk differences of 4.1 (95% CI, 1.6 to 6.7) and 16.7 (CI, 6.4 to 27.5) per 1000 persons relative to cisgender men and 3.4 (CI, 1.1 to 5.6) and 13.7 (CI, 4.1 to 22.7) relative to cisgender women. The overall analyses for ischemic stroke and myocardial infarction demonstrated similar incidence across groups. More pronounced differences for VTE and ischemic stroke were observed among transfeminine participants who initiated hormone therapy during follow-up. The evidence was insufficient to allow conclusions regarding risk among transmasculine participants.

Limitation: Inability to determine which transgender members received hormones elsewhere.

Conclusion: The patterns of increases in VTE and ischemic stroke rates among transfeminine persons are not consistent with those observed in cisgender women. These results may indicate the need for long-term vigilance in identifying vascular side effects of cross-sex estrogen.

Primary Funding Source: Patient-Centered Outcomes Research Institute and Eunice Kennedy Shriver National Institute of Child Health and Human Development.

For author affiliations, see end of text.
This article was published at Annals.org on 10 July 2018.
VTE Incidence

Graphs showing the adjusted cumulative incidence of VTE (per 1000) over time from the first filled estrogen prescription. The graphs compare Transfeminine cohort to Reference men and Transfeminine cohort to Reference women. The tables below the graphs provide event counts and risk differences (RD) with 95% confidence intervals (CI).

**Transfeminine cohort**
- Events/patients at risk: 0/7619
- Time from first filled estrogen prescription (y): 6/4951, 11/2342, 6/1252, 6/633
- RD (95% CI)*: 8.8 (2.9 to 15.4), 14.0 (3.7 to 24.5), 19.8 (2.5 to 34.7), 32.1 (3.5 to 56.4)

**Reference men**
- Events/patients at risk: 0/853

**Reference women**
- Events/patients at risk: 0/7678
- Time from first filled estrogen prescription (y): 29/5093, 17/2429, 4/1330, 10/695
- RD (95% CI)*: 6.9 (1.2 to 11.9), 13.5 (3.7 to 23.4), 19.1 (5.8 to 33.3), 37.0 (7.9 to 63.4)
Ischemic Stroke Incidence

![Graph showing the incidence of ischemic stroke over time for different cohorts. The graphs compare the cumulative incidence of ischemic stroke among patients with a transfeminine cohort and reference men and women. The tables below each graph provide the number of events, patients at risk, and the time from the first filled estrogen prescription in years. The tables also include the adjusted cumulative incidence of ischemic stroke per 10000 and the 95% confidence interval (CI).]
Myocardial Infarction Incidence
Side effects of cross sex hormone administration in transsexuals
Clin Endocrinol, 47 (1997), p. 337
P. Van Kestern, J.A. Megens, H. Asscheman, et al.

- Increase in activated protein C resistance
- Increase in plasma protein C
- Decrease in total and free plasma protein S
Women Fear Drug They Used To Halt Puberty Led To Health Problems

By Christina Jewett February 2, 2017
Treatment with a Luteinizing Hormone–Releasing Hormone Agonist in Adolescents with Short Stature

Jack A. Yanovski, M.D., Ph.D., Susan R. Rose, M.D., Giovanna Municchi, M.D., Ora H. Pescovitz, M.D., Suvimol C. Hill, M.D., Fernando G. Cassorla, M.D., and Gordon B. Cutler, Jr., M.D.

Gonadotropin-Releasing Hormone Agonists and Fracture Risk: A Claims-Based Cohort Study of Men With Nonmetastatic Prostate Cancer

Matthew R. Smith, Won Chan Lee, Jane Brandman, Qin Wang, Marc Botteman, Chris L. Pashos
Show Affiliations
From the Massachusetts General Hospital, Boston, MA; Abt Associates Clinical Trials, Bethesda, MD; and Novartis Pharmaceutical Corp, East Hanover, NJ
DOI: http://dx.doi.org/10.1200/JCO.2004.00.6908
Transgender and BMD

- Very little data
- Ruetsche, Kneubuehl, Birkhaeuser, Lippuner, et al. (2005)
  - Cross sectional
  - 39 Transsexuals
    - Trans women BMD preserved over 12.5 years with antiandrogen and estrogen therapy
    - Trans men BMD preserved or increased after 7.5 years with androgen treatment.
Reproductive Considerations

- Limitations on fertility
- Make decisions early
- Sperm banking prior to HRT
- Oocyte banking
- Embryo banking
Surgery
Male to Female

- Breast/chest surgery
  - augmentation mammoplasty (implants/lipofilling);

- Genital surgery
  - penectomy, orchiectomy, vaginoplasty, clitoroplasty, vulvoplasty;

- Nongenital, nonbreast surgical interventions:
  - facial feminization surgery, liposuction, lipofilling, voice surgery, thyroid cartilage reduction, gluteal augmentation (implants/lipofilling), hair reconstruction
Female to Male

- Breast/chest surgery: subcutaneous mastectomy,

- Genital surgery:
  - hysterectomy/salpingoooophorectomy, reconstruction of the fixed part of the urethra, metoidioplasty, phalloplasty, vaginectomy, scrotoplasty, testicular prostheses;

- Nongenital, nonbreast surgical interventions
  - voice surgery, liposuction, lipofilling, pectoral implants
Chest/Breast Surgery
Trans Male Genital Surgery
Trans Female Genital Surgery


Dr Sava Perovic
Vaginoplasty
Other Therapies

- Speech Therapy
- Reduction thyroid chondroplasty
- Voice modification
- Lipoplasty, rhinoplasty,
- Facial bone reduction, face-lift, and blepharoplasty
- Pectoral implants.
Cancer Screening

- Not enough evidence to determine appropriate type and frequency of cancer screenings.

- MtF- Mammogram, PSA/Prostate, Testicular, Colonoscopy

- FtM- Mammogram, PAP/Pelvic, Colonoscopy
Transgender Care at Northwell Endocrinology
Our Patient Experiences

• https://vimeo.com/217715465
My Patient Cohort

• 125 Patients. 84 under my care
  ▫ 44 FtM
  ▫ 40 MtF
    • 37 on prior treatment

• Underlying Psychiatric Disorder- 99%

• Hypogonadism (MtF)- 25%

• PCOS (FtM)- 30%

• ADHD/OCD- 16%

• Autism/Spectrum- 4%
What Do I Do?
Initial Visit

- Discuss patient’s history and their “story.”
- Discuss physical transition and goals
- Obtain health history and exam
- Discuss the expected effects of feminizing/masculinizing medications
- Risks vs. Benefits
- Confirm capacity to understand the risks and benefits of treatment
- STI awareness and prevention
- Smoking Cessation
What Do I Do?
Initial Workup

- CBC
- CMP
- Testosterone/Estradiol
- LH and FSH
- 17-OHP
- DHEA-S
- TFTs
- Lipids
- A1c
- Prolactin
- HIV
- STD Screen
What Do I Do?
Cross-Gender Treatment

• Male to Female
  ▫ Estradiol 1mg oral BID or Injectable 0.3ml weekly
  ▫ Transdermal if >40; 0.1mg 2x/week
    • ? Withdrawal for surgery
  ▫ Spironolactone 100mg daily (up to 400mg daily)
    • Goal Testosterone <50
  ▫ Micronized Progesterone if needed
  ▫ Can use GnRH analogs
  ▫ Increase doses in 4 weeks based on results
  ▫ Consider Aspirin 81mg
Progesterone

- Breast Growth? Libido? Mood?
- Controversial

- “Risks and Benefits of Estrogen Plus Progestin in Healthy Postmenopausal Women” JAMA 2002
Follow-up

- **Male to Female**
  - Monitor for feminization or adverse reactions
  - Goal serum testosterone <50
  - Estradiol levels should not exceed peak physiologic range (250-300)
  - Check Testosterone, Estradiol, LFTs, Lipids, Prolactin, Lytes (especially if on spironolactone)
  - Post-op- dose adjustment may be needed.
What Do I Do?
Cross-Gender Treatment

• Female to Male
  ▫ Testosterone Cypionate 100mg every 2 weeks or lower if SQ
  ▫ Gels, Transdermal or Pellets if covered
  ▫ Repeat in 4 weeks to increase dose as needed then again 4 weeks later.
Follow-up

• Female to Male
  ▫ **Monitor testosterone**
    • Goal male range (500-600 ug/dl)
  ▫ **Check Lipids, CBC, LFTs, Testosterone**
  ▫ **Check estradiol until no uterine bleeding x 6 months**
  ▫ **Post-op- dose adjustment may be needed**
Managing Abnormalities

• Anemia
• Erythrocytosis
• Hyperprolactinemia
• Elevated Transaminases
• Hair Loss
Research On The Horizon

- How to effectively dose hormones?
- Testosterone Pellets
- Egg Banking/Freezing
- What side effects are we noticing?
- Demographic Data
Take Home Points

- Treatment involves a multidisciplinary approach

- Estrogen treatment goal of suppressing testosterone and maintain estrogen at feminine levels.

- Anti-androgen esp. if testosterone difficult to suppress with estrogen alone

- Testosterone for goal of mid-male range

- Close monitoring and yearly reevaluation

- Further studies are needed
THANK YOU!
Works Cited


5. The World Professional Association for Transgender Health. Standards of Care for the Health of Transsexual Transgender, and Gender Nonconforming People 7th Version | www.wpath.org


