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laboratory medicine.*

PEARLS OF LABORATORY MEDICINE

Laboratory Testing for Transgender Individuals

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DOI: 10.15428/CCTC.2019.311480



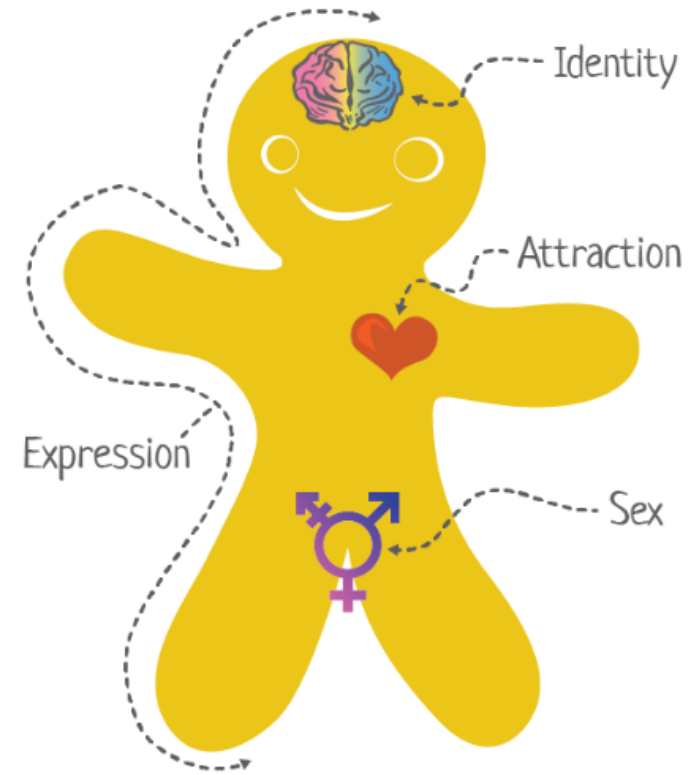
Outline

- Terminology
- Laboratory Testing for Hormone Therapy
- Expected Changes to Reference Intervals and Laboratory Calculations



Terminology

- **Sex:** assigned at birth as male or female, usually based on the appearance of the external genitalia²
- **Gender identity:** a person's sense of being male, female, neither, or a combination of both²

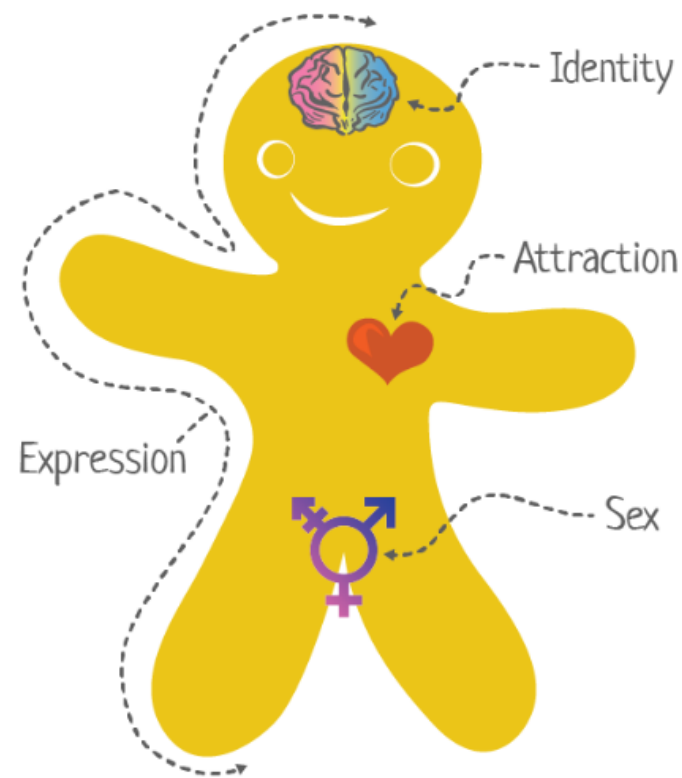


Identity \neq Expression \neq Sex
Gender \neq Sexual Orientation

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Terminology

- **Cisgender:** sex assigned at birth is *congruent* with gender identity
- **Transgender:** sex assigned at birth is *incongruent* with gender identity
- **Transwoman:** assigned male at birth (AMAB) but identifies as female
- **Transman:** assigned female at birth (AFAB) but identifies as male



Identity \neq Expression \neq Sex
Gender \neq Sexual Orientation

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Terminology

- **Gender dysphoria:**
 - Defined by the American Psychiatric Association in their Diagnostic and Statistical Manual of Mental Disorders (2013) as:
 - “Marked incongruence between one’s experienced/expressed gender and assigned gender” that is “associated with clinically significant distress or impairment in social, occupational, or other important areas of functioning”
 - Lasts at least 6 months
 - Only affects some transgender or gender nonconforming people
- Gender nonconformity is not a disorder

Guideline Resources

- Endocrine Society
- WPATH: World Professional Association for Transgender Health



Possible Treatment Options for Gender Dysphoria

- Social transition
 - Changes in gender expression in public, at work, etc.
 - Voice therapy
- **Hormone therapy (HT)**
 - Treatment with masculinizing or feminizing hormones/
androgen blockers
- Surgery to change primary or secondary sex characteristics

Laboratory Testing for Hormone Therapy

- **Purpose:** monitor hormone concentrations during HT
 - Aim to maintain concentration **within reference interval** of the affirmed gender^{1,2}
 - Test methods:
 - *Immunoassay* recommended for elevated concentrations
 - *Mass spectrometry* generally has improved performance at low concentrations
 - Test timing depends on hormone formulation¹

Laboratory Testing for Hormone Therapy

- **Feminizing HT**

- May include estrogens and anti-androgens
- Measure estradiol, testosterone¹
- Possibly measure SHBG (sex hormone binding globulin)

- **Masculinizing HT**

- Includes various formulations of testosterone
- Measure testosterone¹
 - Free testosterone measurement not routinely recommended

Laboratory Testing for Hormone Therapy

- **Purpose:** monitor potential risks of HT
- **Risks:**
 - **Feminizing** and **masculinizing HT**
 - Cardiovascular disease, diabetes
 - **Feminizing HT**
 - Thromboembolism, liver damage, prolactinoma
 - **Masculinizing HT**
 - Polycythemia
 - Relative risk of side effects depend on formulation
- Other routine monitoring is also needed^{1,2}



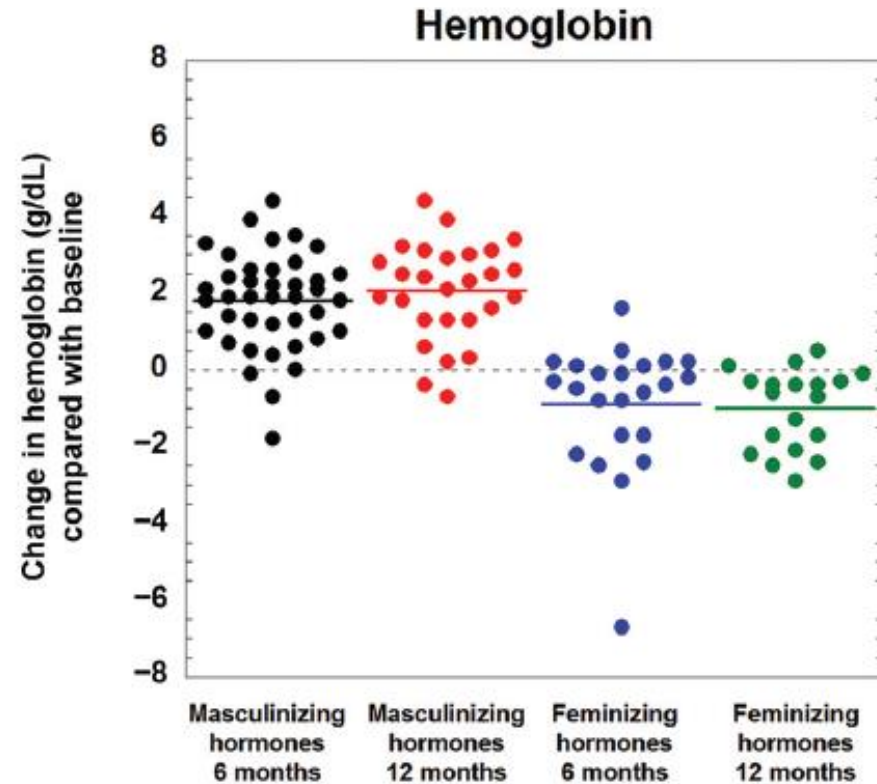
Laboratory Testing for Hormone Therapy

			Months after starting treatment					
HT Type	Tests to perform	Baseline	3	6	9	12	18	24
Feminizing HT	Estradiol		X	X	X	X	X	X
	Testosterone	X	X	X	X	X	X	X
	Prolactin	X				X		X
	Electrolytes (K ⁺) *If on spironolactone	X	X	X	X	X		X
Masculinizing HT	Testosterone		X	X	X	X	X	X
	Hematocrit/ hemoglobin	X	X	X	X	X	X	X

- Also perform lipid testing and diabetes screening as recommended by guidelines¹

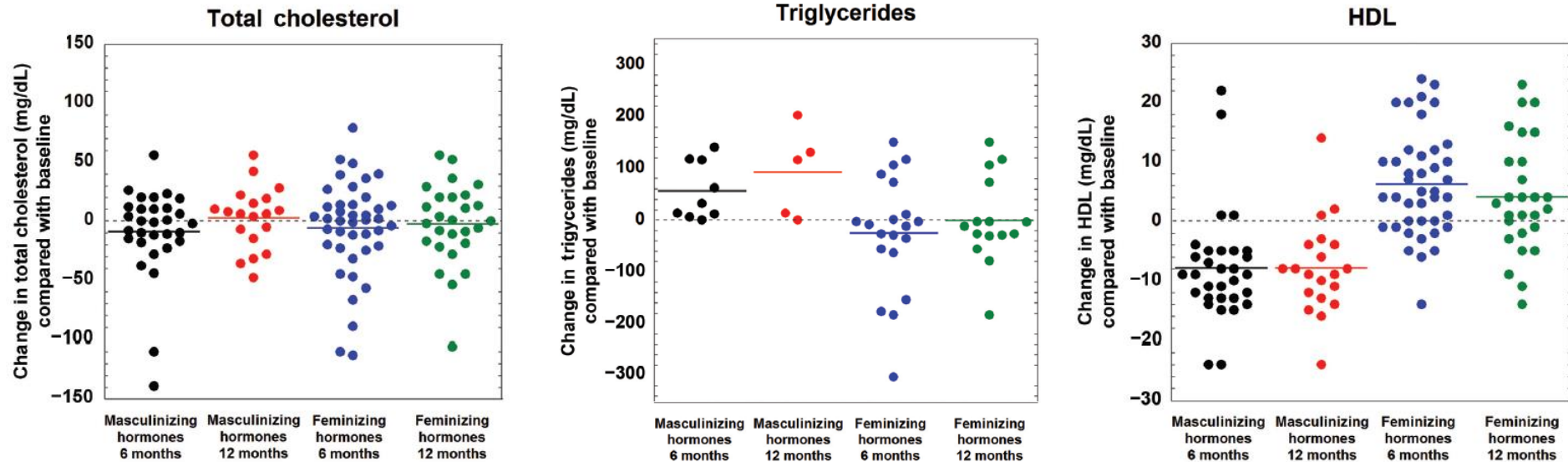
Changes in Hematology Parameters

- Consistently altered by HT
- Reference intervals from transgender individuals on HT agree almost completely with cisgender reference intervals



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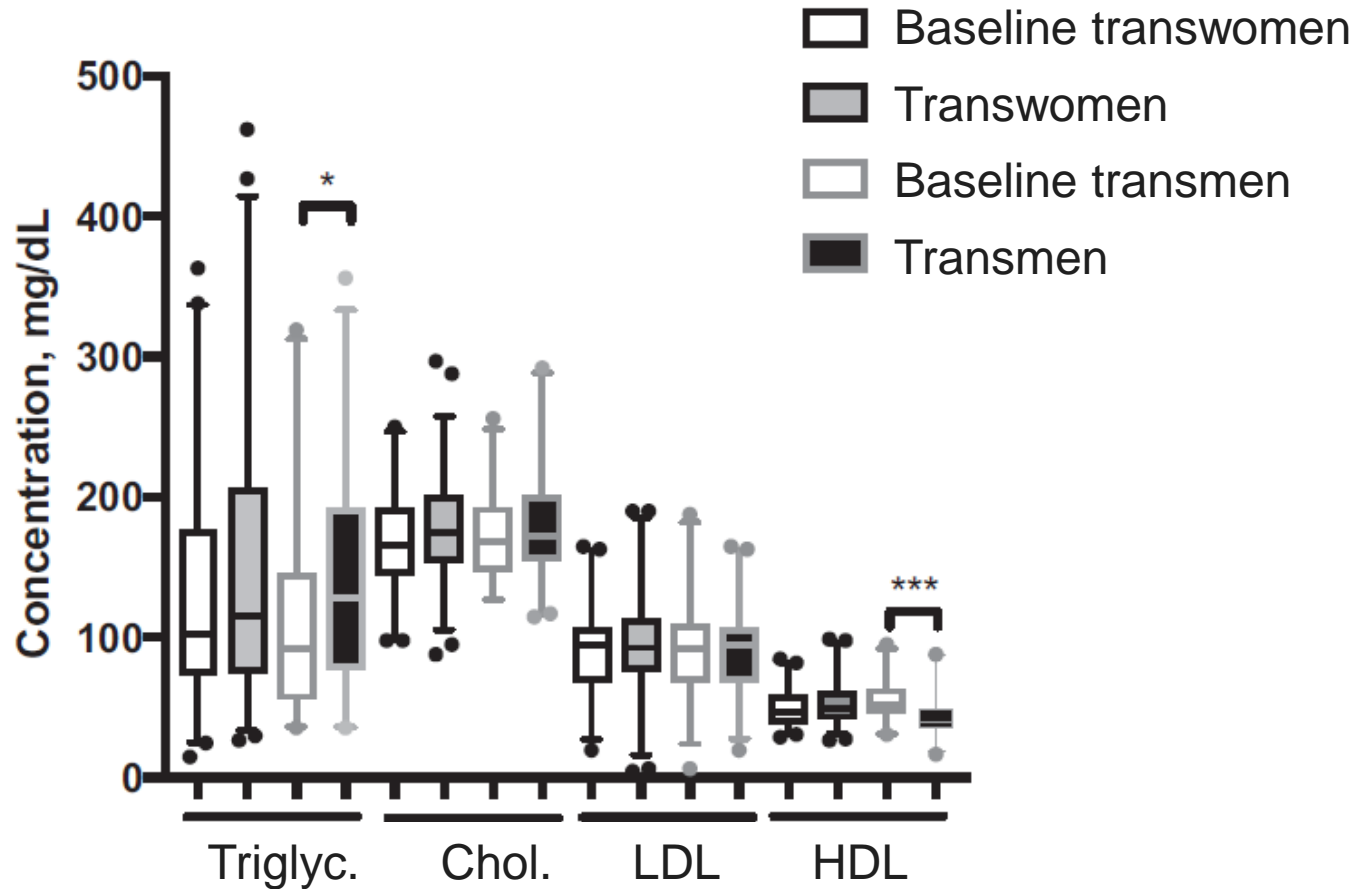
Changes in Lipid Parameters



- Demonstrate variable response to HT

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Changes in Lipid Parameters



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Summary of Analyte Changes with HT^{3-6,8-12}

HT			Inconsistent findings
Feminizing	SHBG	hematocrit, hemoglobin	creatinine, cholesterol, HDL-C, LDL-C, triglycerides, fasting glucose
Masculinizing	hematocrit, hemoglobin, creatinine	SHBG	cholesterol, HDL-C, LDL-C, triglycerides, fasting glucose

- Must consider HT duration/formulation and inter-individual variability

Take-Home Points

- Guidelines provide recommendations on testing for hormone concentrations and monitoring potential risks of HT
- Hematology parameters usually show consistent changes in individuals on HT
- Lipid panel analytes do not show predictable changes in individuals on HT



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Disclosures/Potential Conflicts of Interest

Upon Pearl submission, the presenter completed the Clinical Chemistry disclosure form. Disclosures and/or potential conflicts of interest:

- **Employment or Leadership:** No disclosures
- **Consultant or Advisory Role:** No disclosures
- **Stock Ownership:** No disclosures
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