Transgender Medicine 101:

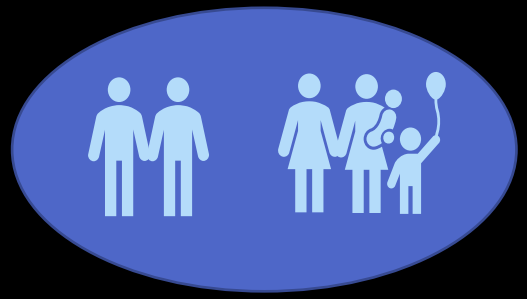
A Basic Approach to providing Compassionate and Evidence-based care to the Transgender Community

Erika Anne Sullivan, MD, MS, MS

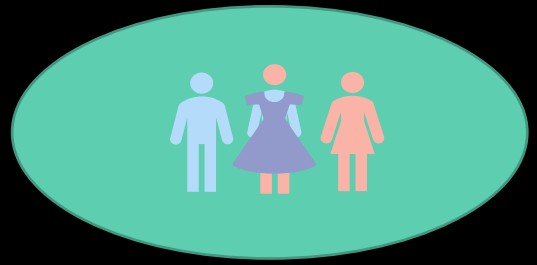
January 15, 2021

Objectives:

Healthcare Disparities in Sexual and Gender Minorities



Creating a “Trans-friendly” Clinic Environment



Transgender Hormone Therapy

Photo Source: https://bit.ly/2SbX0lf Sarah Rice

Photo Credit: https://bit.ly/2Oi7PkA

ACEs

Adverse Childhood Experiences

PEDIATRICS®

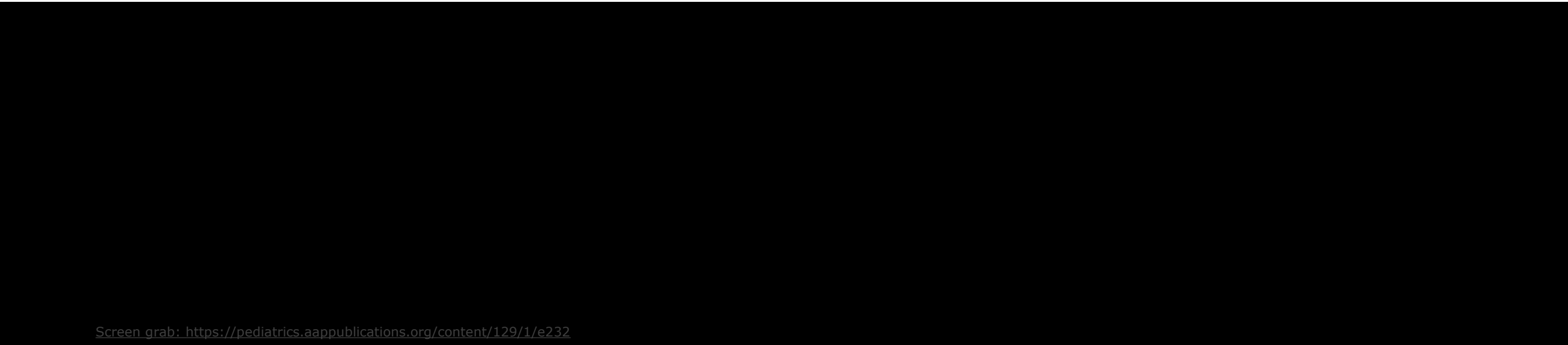
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

A statement of reaffirmation for this policy was published at **e20162595**

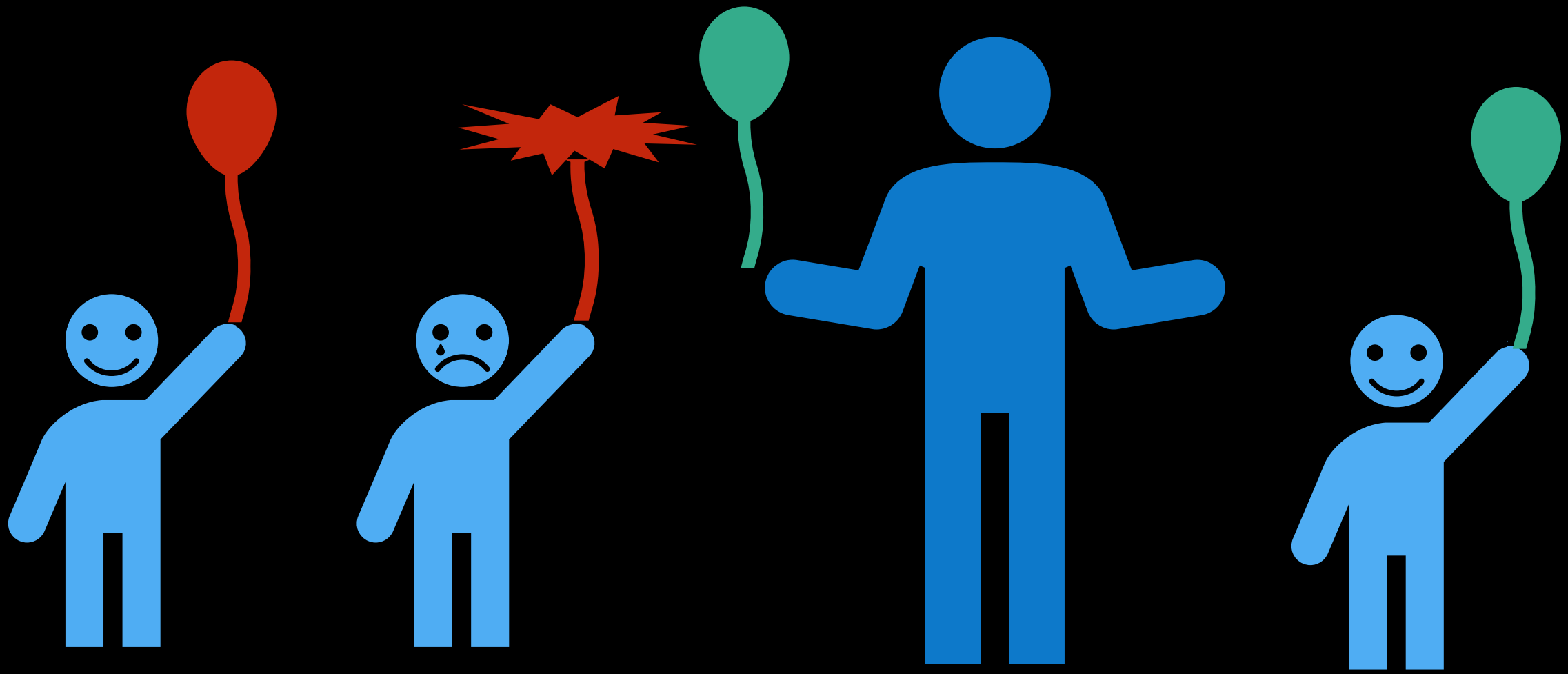
From the American Academy of Pediatrics Technical Report

The Lifelong Effects of Early Childhood Adversity and Toxic Stress

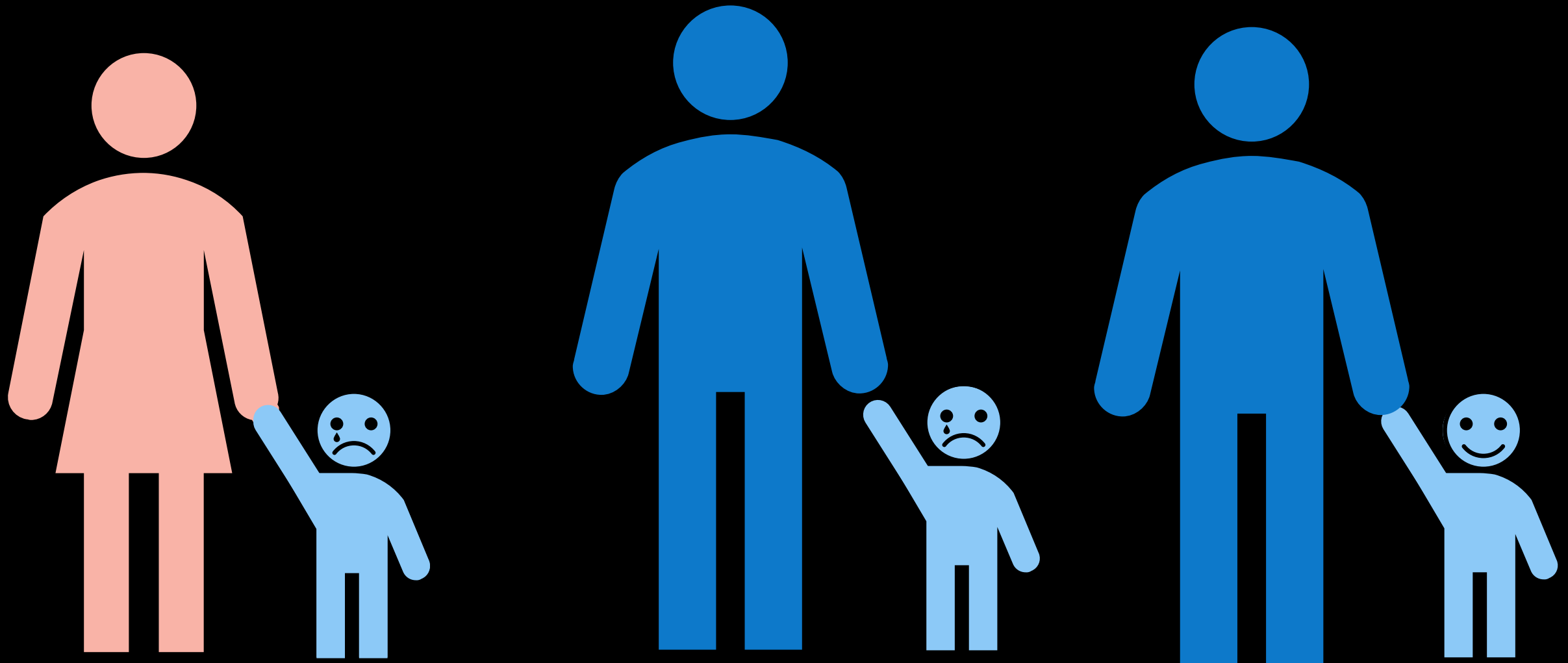
Jack P. Shonkoff, Andrew S. Garner,



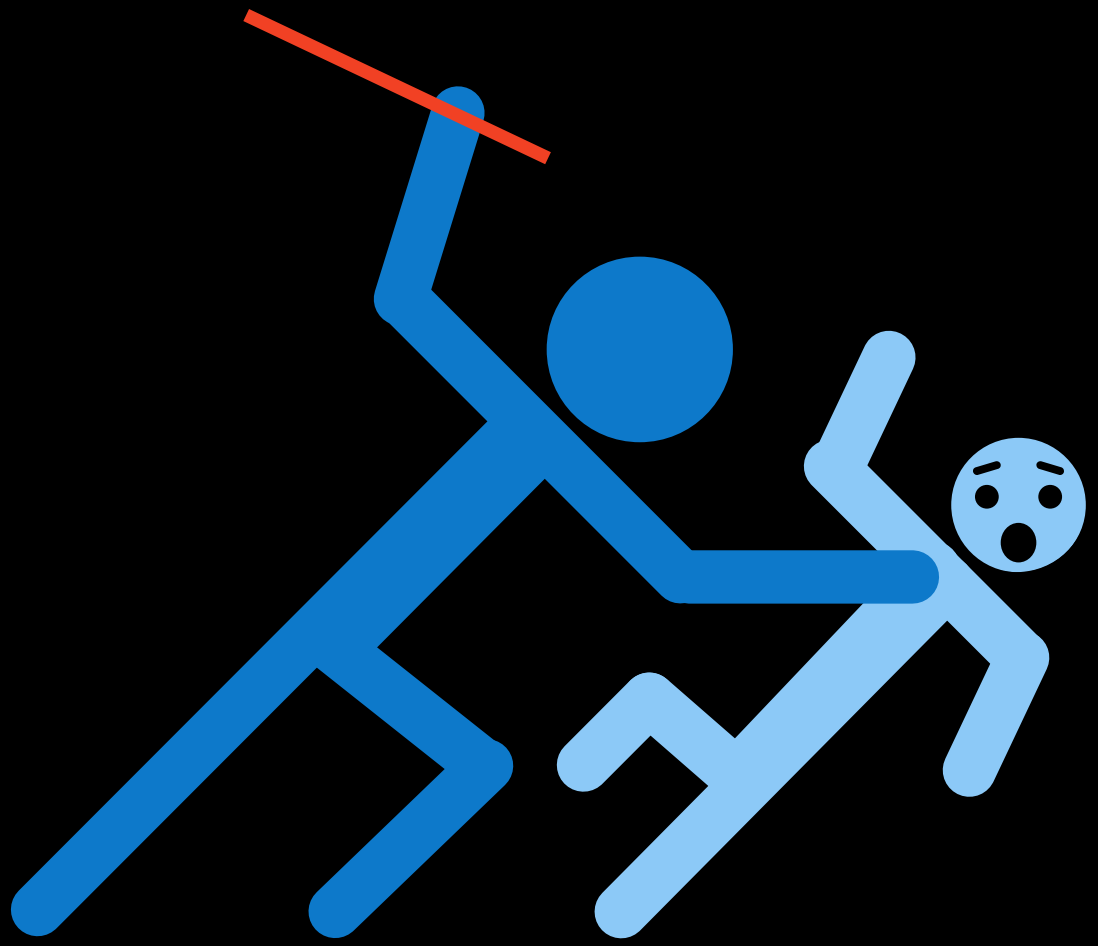
Screen grab: https://pediatrics.aappublications.org/content/129/1/e232



Positive Stress Response



Tolerable Stress Response



Toxic Stress

Photo source: https://pixabay.com/illustrations/shame-child-small-criticism-799097/

Photo source: https://bit.ly/2EZOOMo

Photo source: https://pixabay.com/photos/one-against-all-all-against-one-1744093/

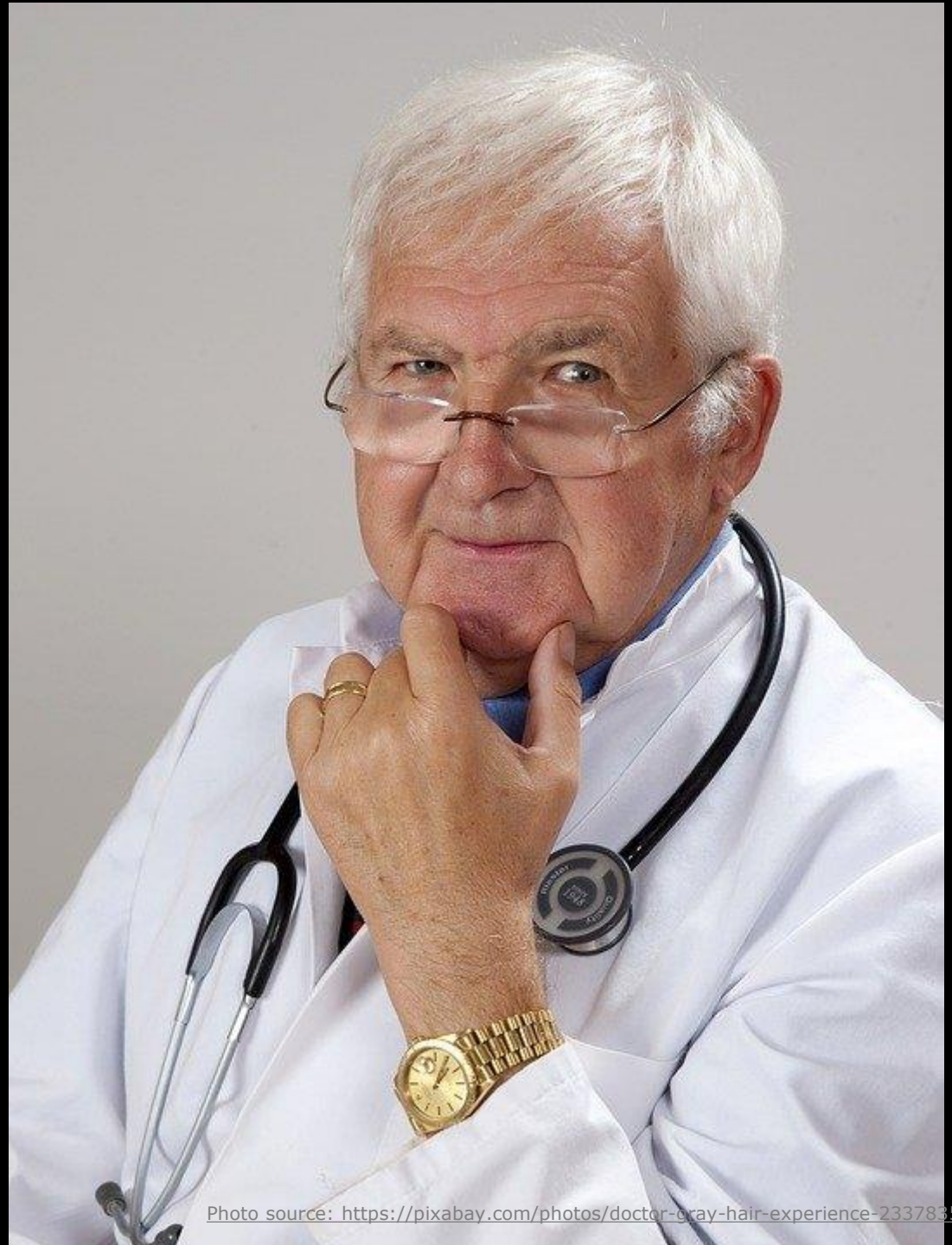
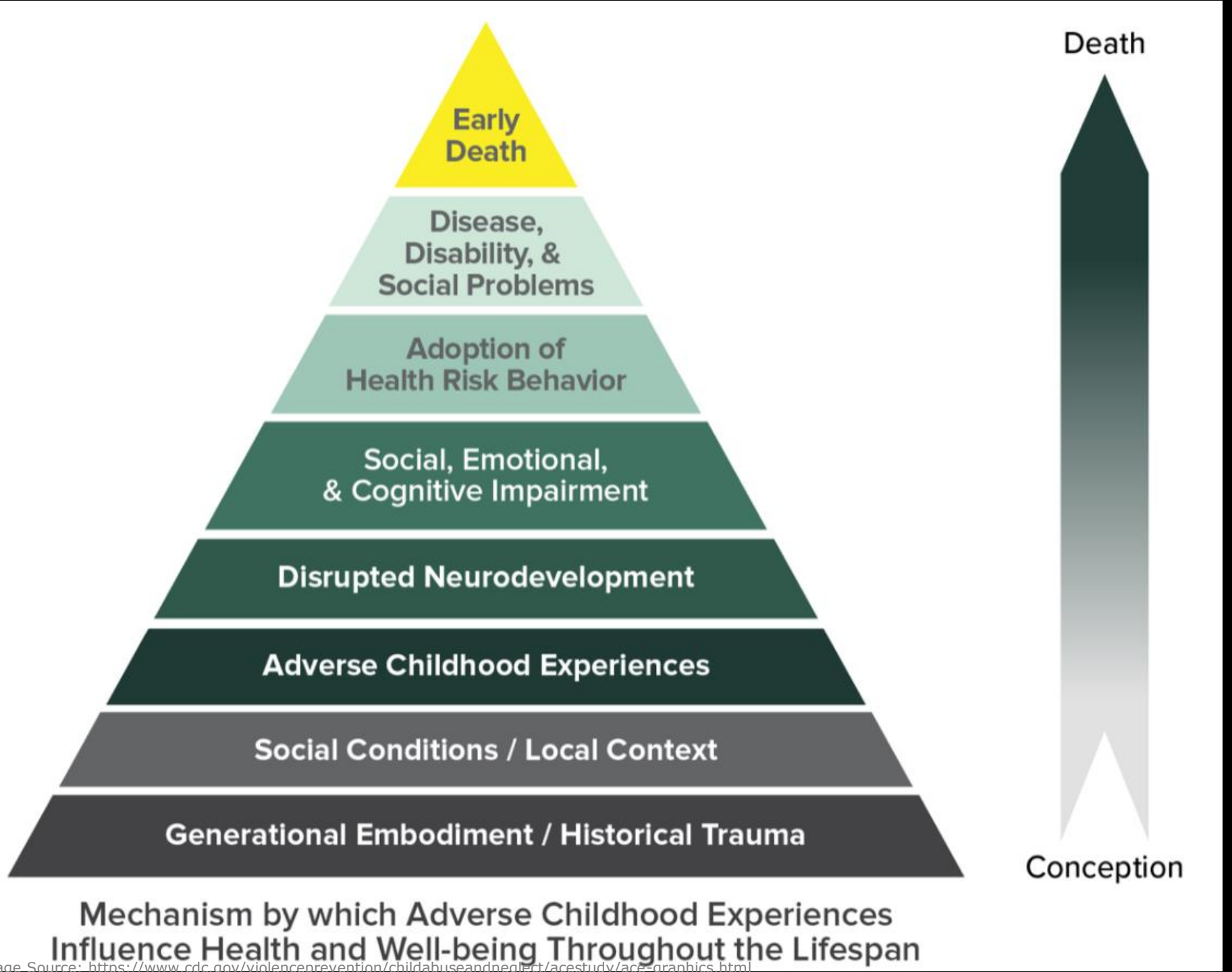


Photo source: https://pixabay.com/photos/doctor-gray-hair-experience-2337835/


Toxic Stress
Racial Stress
GSM Stress
Socio-economic Stress



Mechanism by which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan

Image Source: https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/aces-graphics.html

2x mental health conditions

2x risk of suicide attempts

NSDUH SAMHSA 2016 https://bit.ly/2OT5LQx
King et al, 2008
Photo source: https://bit.ly/3bb0P31

Photo source: https://bit.ly/31khlc7

Photo Source: https://bit.ly/38ZEV0w

Youth start younger

Youth 3x odds of substance use

Persist into adulthood

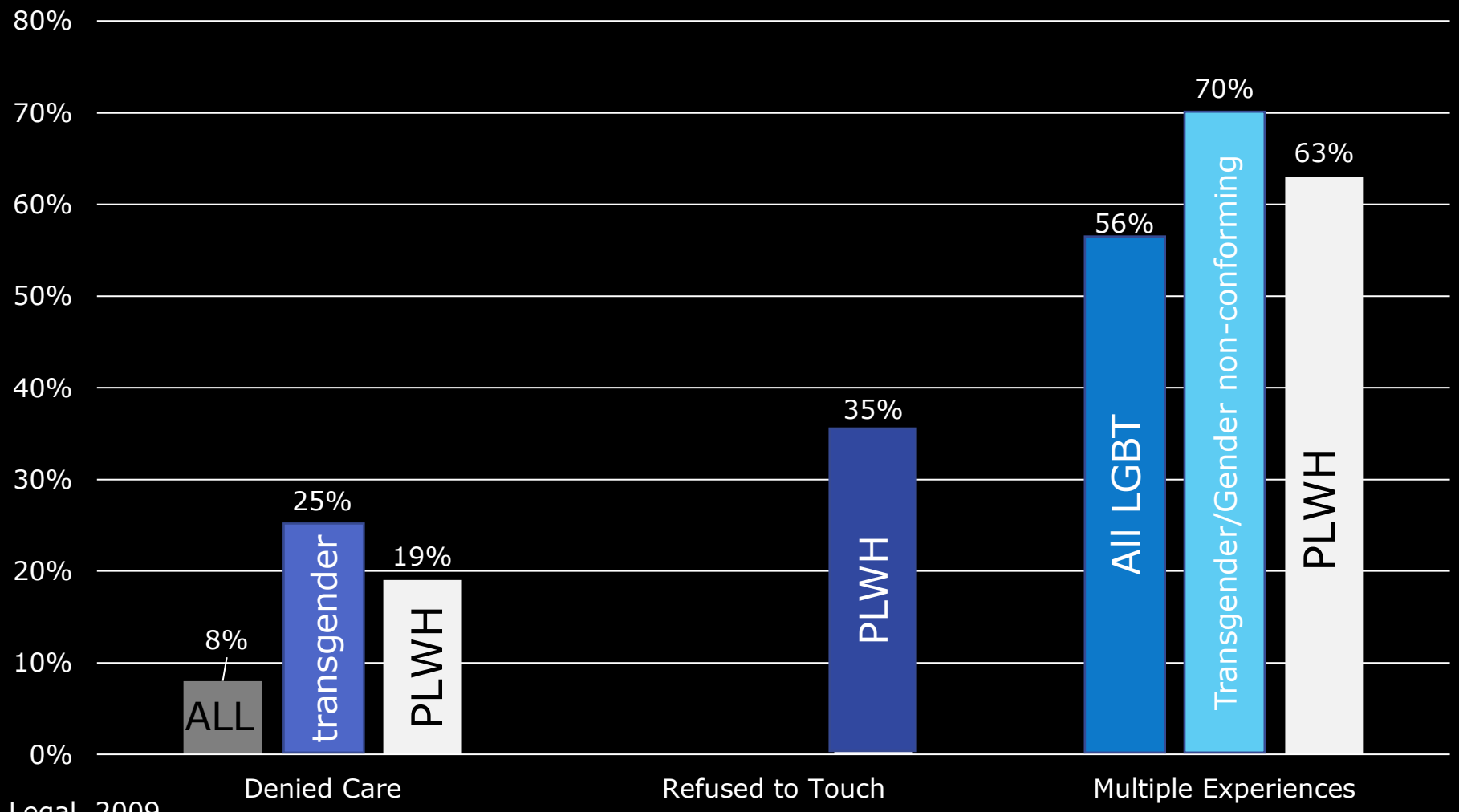
Schuler et al 2018

Photo source: https://bit.ly/2Umhdr5

Photo source: https://bit.ly/31ryf92

Photo source: https://bit.ly/3b1J7Pn

Barriers to Health Care Among LGBT and HIV Communities



Source: Lambda Legal, 2009

Photos source: https://n.pr/2tmvk4H Hanna Barczyk for NPR

Photo source: https://pixabay.com/photos/man-male-face-people-person-4825091/


QUESTION YOUR
ASSUMPTION

Photo Source: https://bit.ly/2SbX0lf Sarah Rice

Photo source: https://wapo.st/39GzAeY

Photo source: https://bit.ly/37TiOsy

If You Don’t Know, Ask

Source: Instagram/@saltyrachel

Nomenclature

Know where to go…

LGBT terminology

All | Images | News | Shopping | Videos | More | Settings | Tools

About 2,250,000 results (0.46 seconds)

When discussing adolescents or youth we use LGBTQ: Lesbian, Gay, Bisexual, Transgender, Queer. Other acronyms may use any combination of the following: LGBTQQIAAP2S: Lesbian, Gay, Bisexual, Transgender, Queer, Questioning, Intersex, Asexual, Ally, Pansexual, Two-Spirit.

www.lgbthealtheducation.org › uploads › LGBT-Glossary_March2016 PDF

Glossary of LGBT Terms for Health Care Teams

About Featured Snippets | Feedback

www.hrc.org › resources › glossary-of-terms

Glossary of Terms | Human Rights Campaign

Cisgender | A term used to describe a person whose gender identity aligns with those typically associated with the sex assigned to them at birth. Closeted | Describes an LGBTQ person who has not disclosed their sexual orientation or gender identity. ... Gay | A person who is ...

lgbtqia.ucdavis.edu › educated › glossary

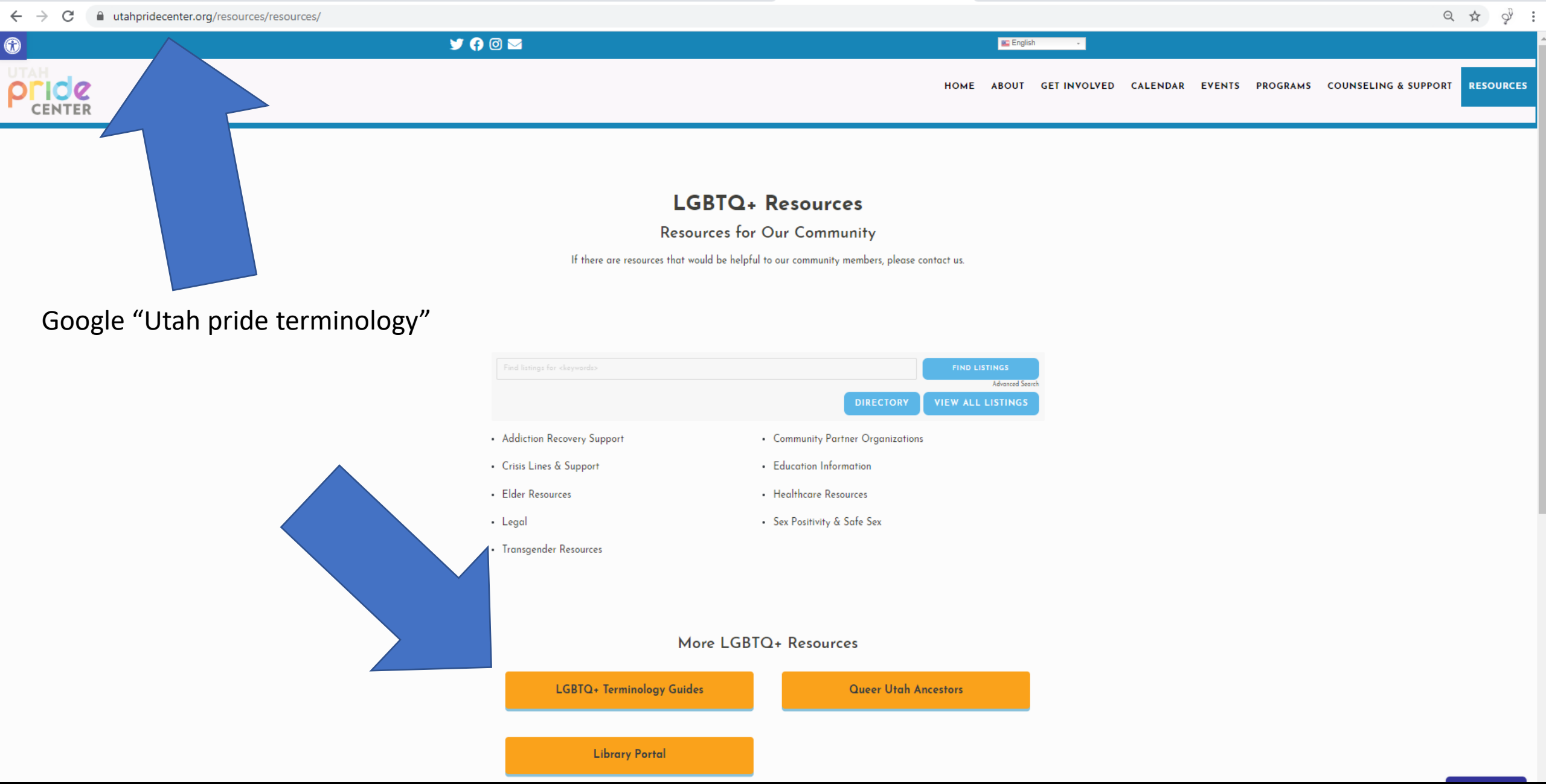
LGBTQIA Resource Center Glossary

Jan 14, 2020 - **GLOSSARY** The **terms** and definitions below are always evolving and ... **LGBT**: Abbreviation for Lesbian, Gay, Bisexual, and Transgender.

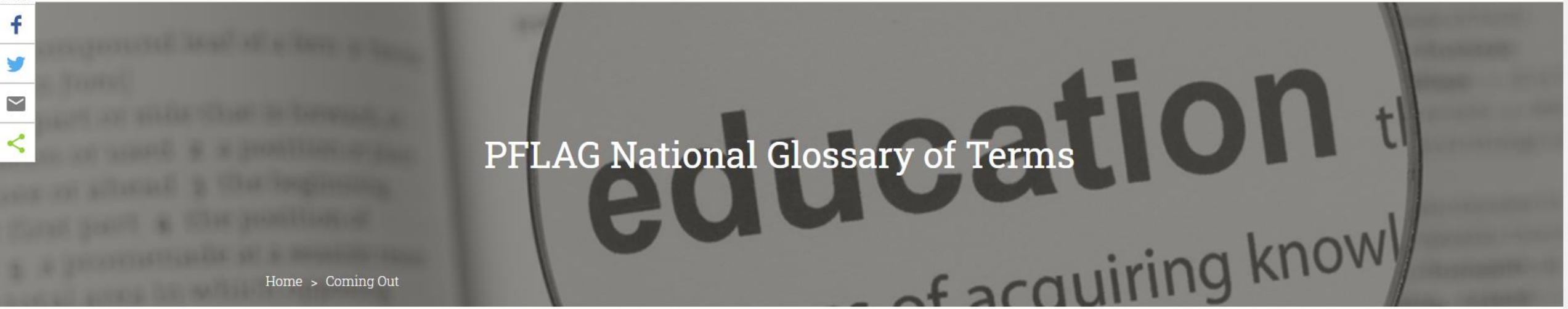
www.itspronouncedmetrosexual.com › 2013/01 › a-comprehensive-li...

Comprehensive* List of LGBTQ+ Vocabulary Definitions - It's ...

With identity **terms**, trust the person who is using the term and their definition of it above ... Other options include the initialism GLBT or **LGBT** and the acronym ...



Google “Utah pride terminology”



PFLAG National Glossary of Terms

Updated July 2019.

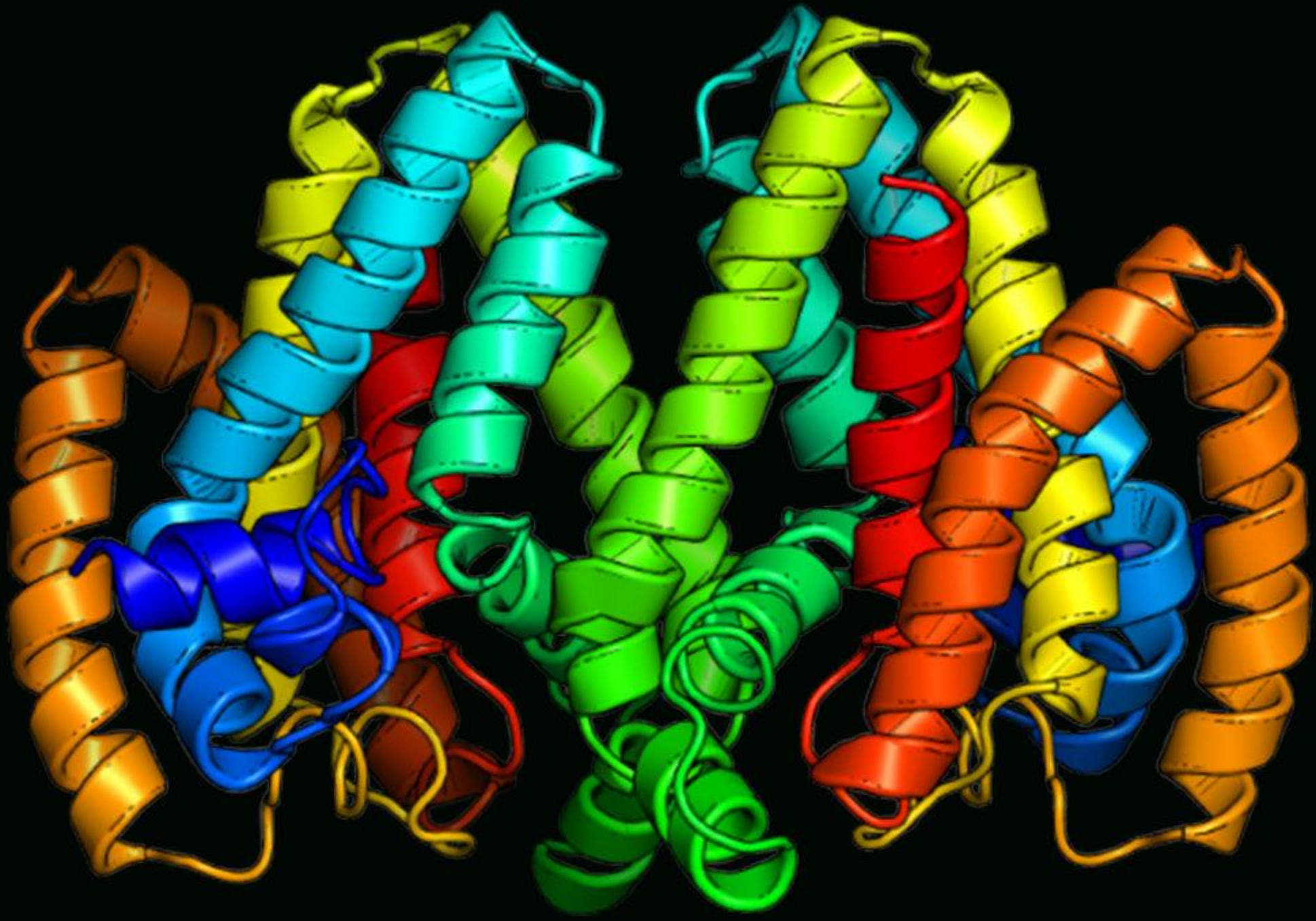
The power of language to shape our perceptions of other people is immense. Precise use of terms in regards to gender and sexual orientation can have a significant impact on demystifying many of the misperceptions associated with these concepts. However, the vocabulary of both continues to evolve, and there is not universal agreement about the definitions of many terms. Here are some working definitions and examples of frequently used (and misused) terms as a starting point for dialogue and understanding.

AFAB: Acronym meaning *Assigned Female at Birth*. AFAB people may or may not identify as female some or all of the time.

Affirmed Gender: An individual's true gender, as opposed to their gender assigned at birth. This term should replace terms like *new gender* or *chosen gender*, which imply that an individual's gender was chosen.

Agender: Refers to a person who does not identify with any gender

Cis and trans = chemistry



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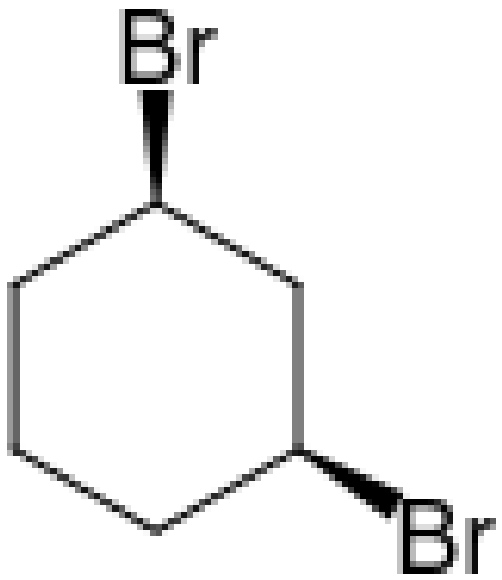
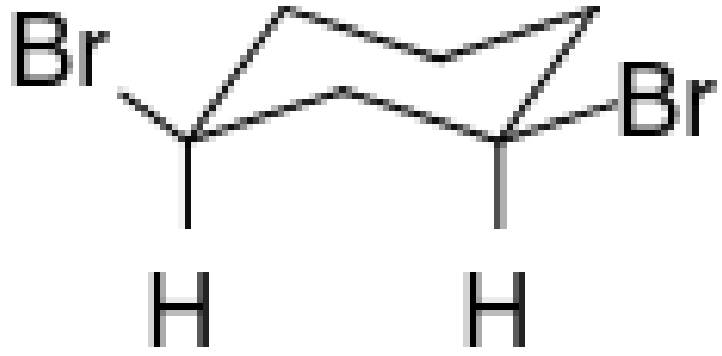
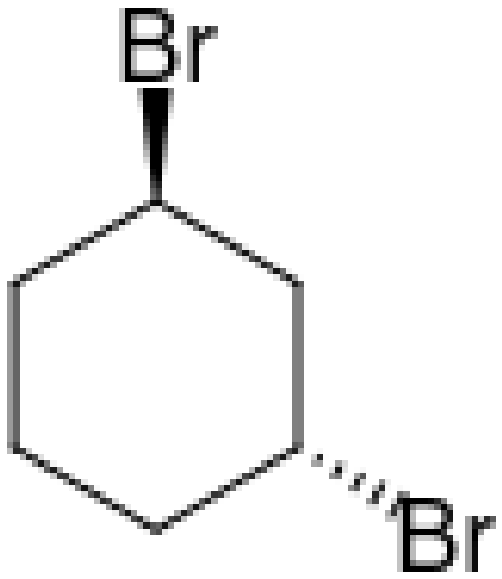
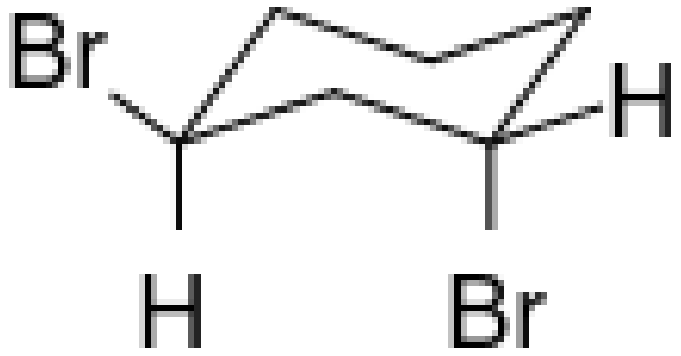




cis





trans

Assigned male at birth

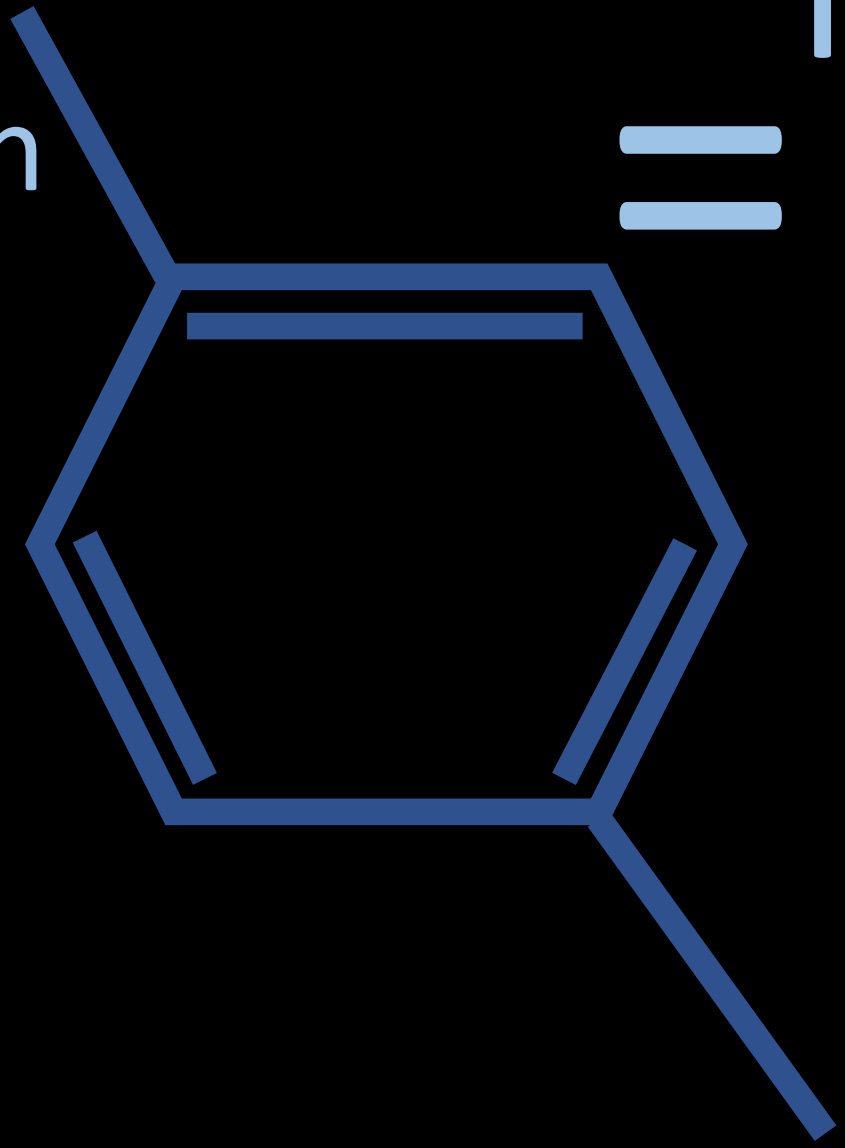
Identifies as a male

=

Cisgender male

(male)

Assigned male at birth (AMAB)



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Transgender female

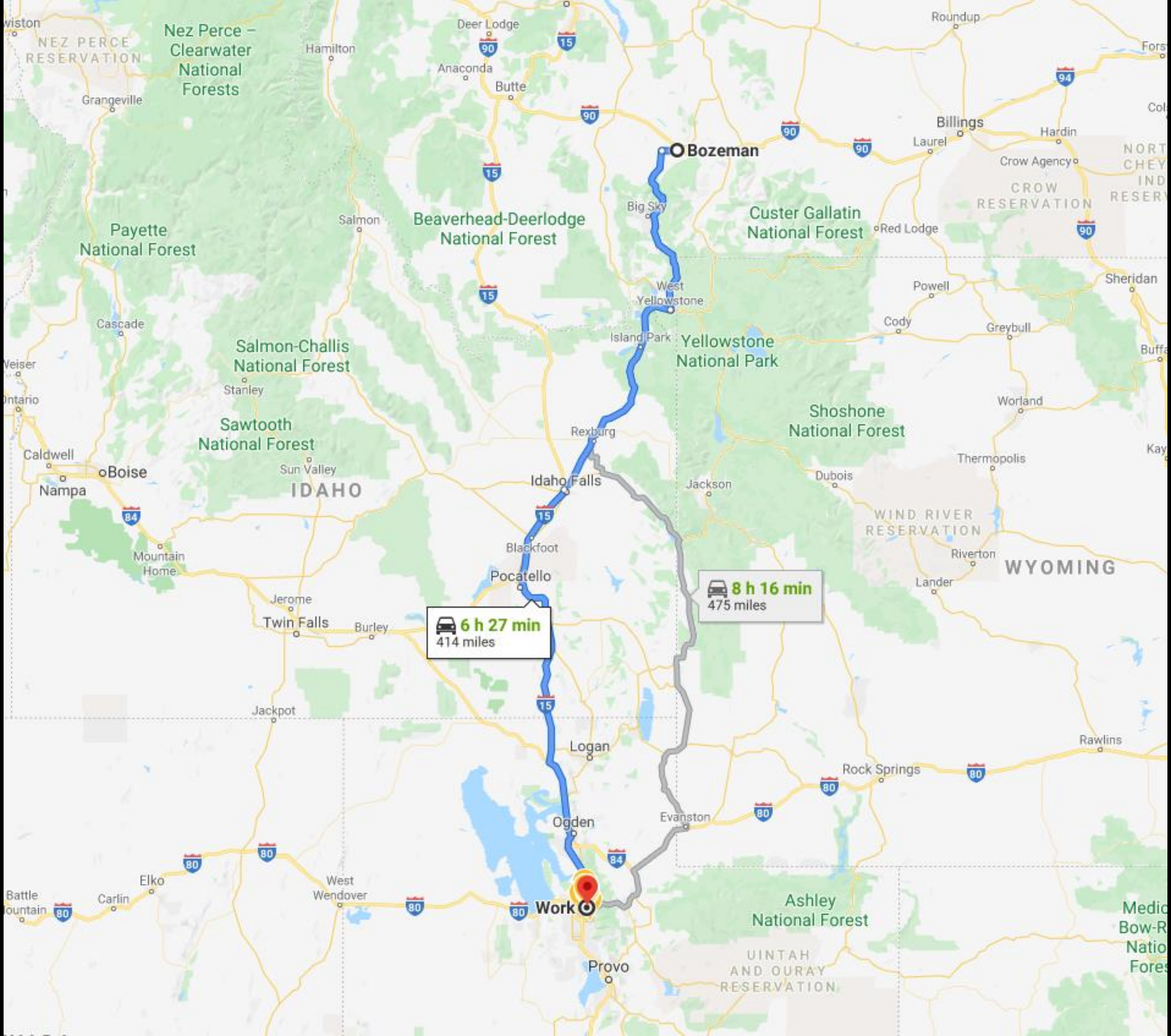
Transfemale

(Female)

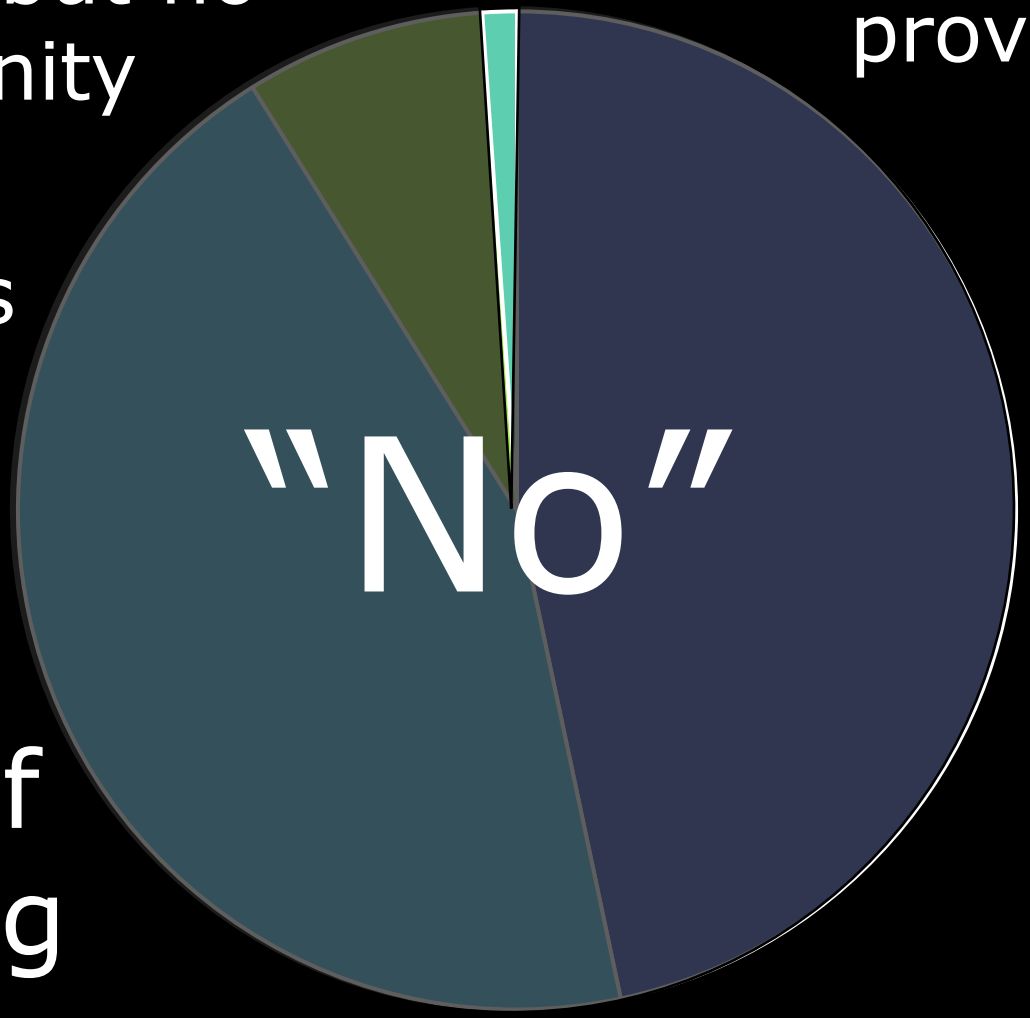
MTF/M2F

Identifies as a female

Transgender Hormone Therapy


Bozeman
Work
6 h 27 min
414 miles
8 h 16 min
475 miles
Big Sky
West Yellowstone
Island Park
Rexburg
Idaho Falls
Blackfoot
Pocatello
Logan
Ogden
Provo
Evanston
Jackson
Billings
Butte
Anaconda
Deer Lodge
Hamilton
Salmon
Boise
Nampa
Caldwell
Twin Falls
Jerome
Burley
Jackpot
Elko
West Wendover
Rock Springs
Rawlins
Lander
Riverton
Cody
Powell
Red Lodge
Laurel
Hardin
Crow Agency
Sheridan
Greybull
Worland
Thermopolis
Dubois
Roundup
IDAHO
WYOMING
Yellowstone National Park
Custer Gallatin National Forest
Beaverhead-Deerlodge National Forest
Salmon-Challis National Forest
Sawtooth National Forest
Payette National Forest
Nez Perce – Clearwater National Forests
Shoshone National Forest
Ashley National Forest
NEZ PERCE RESERVATION
CROW RESERVATION
WIND RIVER RESERVATION
UINTAH AND OURAY RESERVATION
Grangeville
Cascade
Stanley
Sun Valley
Mountain Home
Carlin
Weiser
Ontario

Why Do Providers Refuse To Care for Transgender Individuals? My Ideas…



Willing, but no opportunity

Seeing TG pts, providing hormones

Seeing TG pts (but not providing hormones)

Lack of training

Religious or Moral Objections

WPATH Standards of Care Guidelines

1. Gender dysphoria
2. Capacity
3. Medical/mental health reasonably well controlled
4. Legal age of consent (18)

Photo source: https://bit.ly/2HdaLeq

The Absolute Basics of Feminizing Hormone Therapy

100-200 pg/ml

17 β estradiol
2 – 8 mg PO/IM

Adult male testosterone*

<50 ng/ml

Spironolactone 100mg BID*

Photo source: https://bit.ly/2Smm2hs

The Absolute Basics of Feminizing Hormone Therapy

- Informed consent
- Check K (spiro) and hormones (estradiol and total adult male testosterone every 3 months (first year)
- Sexual history (PrEP?)

The Absolute Basics of Masculinizing Hormone Therapy

300-1000 ng/ml

Adult male testosterone

Testosterone cypionate*
50-100mg IM/SQ weekly

Photo source: https://nbcnews.to/2SLfadU

The Absolute Basics of Masculinizing Hormone Therapy

- Informed consent
- Check CBC (Hct <50%) and adult male testosterone every 3 months (first year)
- Sexual history (PrEP/ contraception)

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UCSF Transgender Care

For Patients | For Providers | Our Team | Schedule an Appointment

Welcome!

NOTICE REGARDING STATUS OF SERVICES DURING THE COVID-19 PANDEMIC RESPONSE

Schedule an appointment

Surgical assessment process

UCSF Transgender Care Guidelines

For Providers

- Refer a patient
- e-Consult
- Clinical rotation/experience

UCSF Transgender Care is a multidisciplinary program consisting of experts in transgender medicine and surgery at UCSF Medical Center. Our aim is to provide evidence-based, cutting-edge clinical care for transgender and gender non-binary communities, as

UCSF

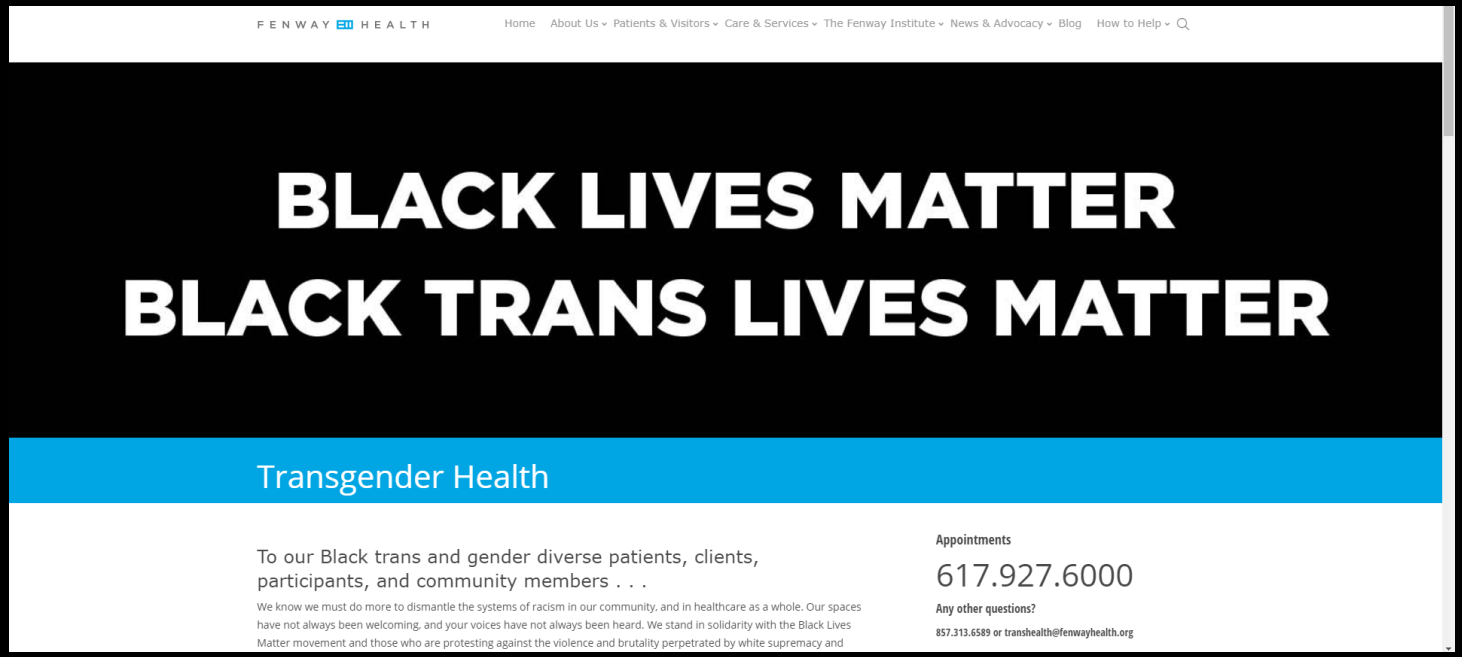
Transline

Gender Affirming Hormone Therapy Guidelines

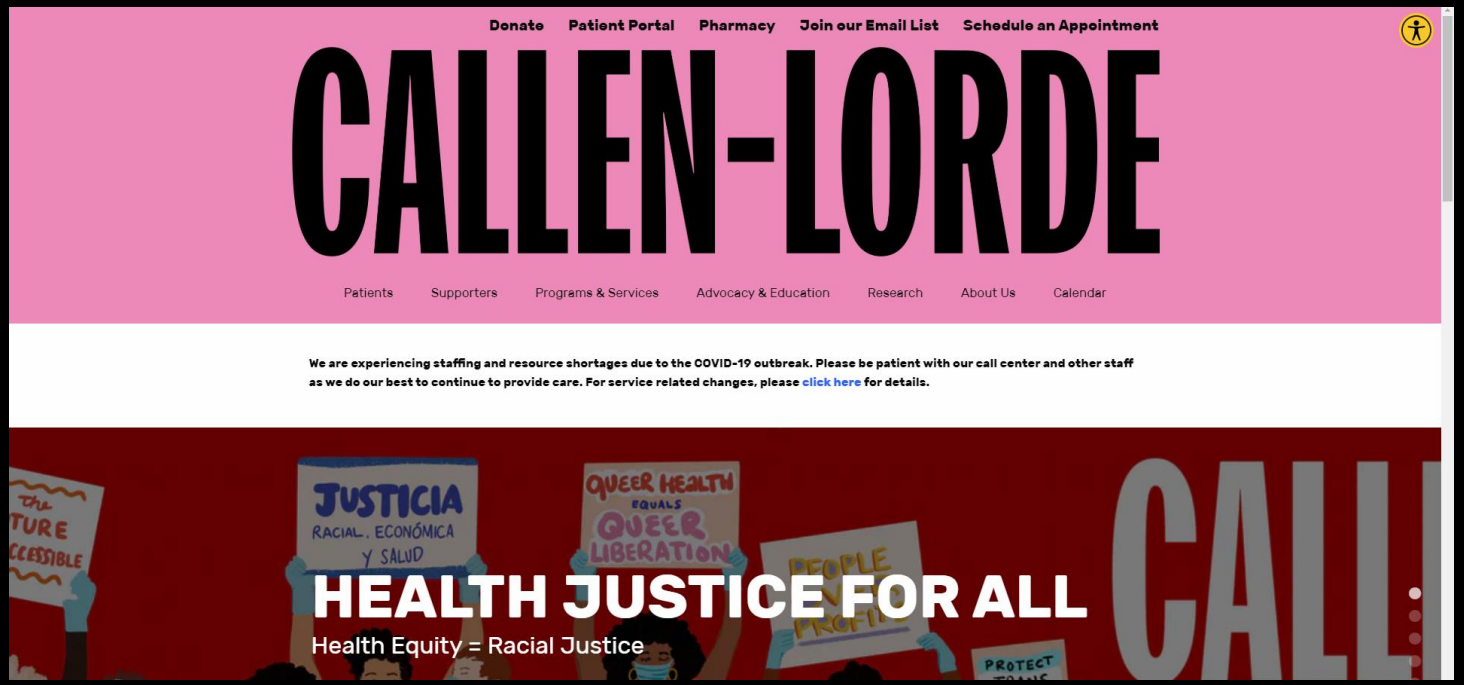
TRANSGENDER MEDICAL CONSULTATION SERVICE
TRANSLINE

Trans Masculine: Exogenous Testosterone Dosing

Medication	Start/Usual Dose	Typical Max Dose	Frequency	Pros	Cons	Notes
Intramuscular or Subcutaneous[1] Injectable Testosterone **(Testosterone Cypionate or Testosterone Enanthate)**	50mg – 80mg (0.25mL - 0.4mL of 200mg/mL solution or 0.5mL - 1.0mL of 100mg/mL solution)	100mg (0.5mL of 200mg/mL solution)	Weekly[2]	• Less frequent administration compared with transdermal • Peak of injectable may better suppress endogenous hormone production	• Peak/trough fluctuation effect • Self-injection or frequent in-office injections • Needle use	• Cypionate formulated in cottonseed oil (use if allergic to sesame) • Enanthate formulated in sesame oil (use if allergic to cottonseed) • Enanthate has slightly shorter half-life than cypionate
Transdermal Testosterone Topical Gel **(Androgel, Axiron, Testim)**	20mg – 62.5mg • Androgel 1%, 12.5mg/actuation, 2-5 pumps • Androgel 1.62%, 20.25mg/actuation, 1-3 pumps • Axiron, 30mg/actuation, 1-2 pumps • Testim, 50mg/5g, 2.5g-5g	100mg • Androgel 1%, 12.5mg/actuation, 8 pumps • Androgel 1.62%, 20.25mg/actuation, 5 pumps • Axiron, 30mg/actuation, 3 pumps • Testim, 50mg/5g, 10 g	Daily	• No needle use • Less fluctuation in levels • Good for more gradual effects	• Slower to stop menses and may not fully stop at lower doses • Risk of transferring to others/pets so must instruct how to apply per package insert • Some products are scented and may not be appropriate for those with scent-sensitivities • Daily application • May be expensive if not covered by insurance	• Consider using higher doses for those with more adipose tissue
Transdermal Testosterone Patch **(Androderm)**	2mg – 6mg (1 - 3x 2mg patches)	8mg (2x 4mg patches)	Daily	• No needle use • Less fluctuation in levels • Good for more gradual effects • Less risk of transfer to others	• Slower to stop menses and may not fully stop at lower doses • Adhesive irritation, can fall off with sweat[3] • Daily application • May be expensive if not covered by insurance	• Consider using higher doses for those with more adipose tissue
Testosterone Pellets **(Testopel)**	450mg – 600mg (6 - 8x 75mg pellets)	750mg (10x 75 mg pellets)	Every 3-4 months	• No needle use • Less frequent administration • Less fluctuation in levels	• More invasive, requires minor surgery to implant • May be expensive if not covered by insurance	• Lab draw frequency: Baseline draw prior to starting, once at 1 month, then at 3 months prior to next insertion • Consider using higher doses for those with more adipose tissue
Testosterone Undecanoate IM **(Aveed)**	750mg (3mL of 750mg/3mL solution)	N/A	Initial injection, at 4 weeks, then every 10 weeks thereafter	• Less frequent injection • Less fluctuation in levels	• Pulmonary oil embolism risk • PCP and facility need registration • May be expensive and unlikely to be covered by insurance at present	• Formulated in castor oil
Testosterone Undecanoate Oral **(Jatenzo)**	316mg – 474mg (1x 158mg capsules BID 1x 198mg capusultes BID 1x 237mg capsules BID)	790mg (1x 158mg + 1x 237mg capsules BID)	Daily	• No needle use • Less fluctuation in levels	• First pass metabolism • Daily dose	• Recommend divided doses (BID) to decrease first pass effect and hepatotoxicity. • Starting dose 237mg BID, then adjust dose to min of 158mg BID, with a max of 395mg BID
Testosterone Nasal Gel **(Natesto)**	33mg (2 pump actuations, one 5.5mg actuation per nostril = 11mg TID)	N/A	Daily	• No needle use • Less fluctuation in levels	• Administration three times per day	• Not recommended for use with other nasally administered drugs other than sympathomimetic decongestants



[Fenway Health]

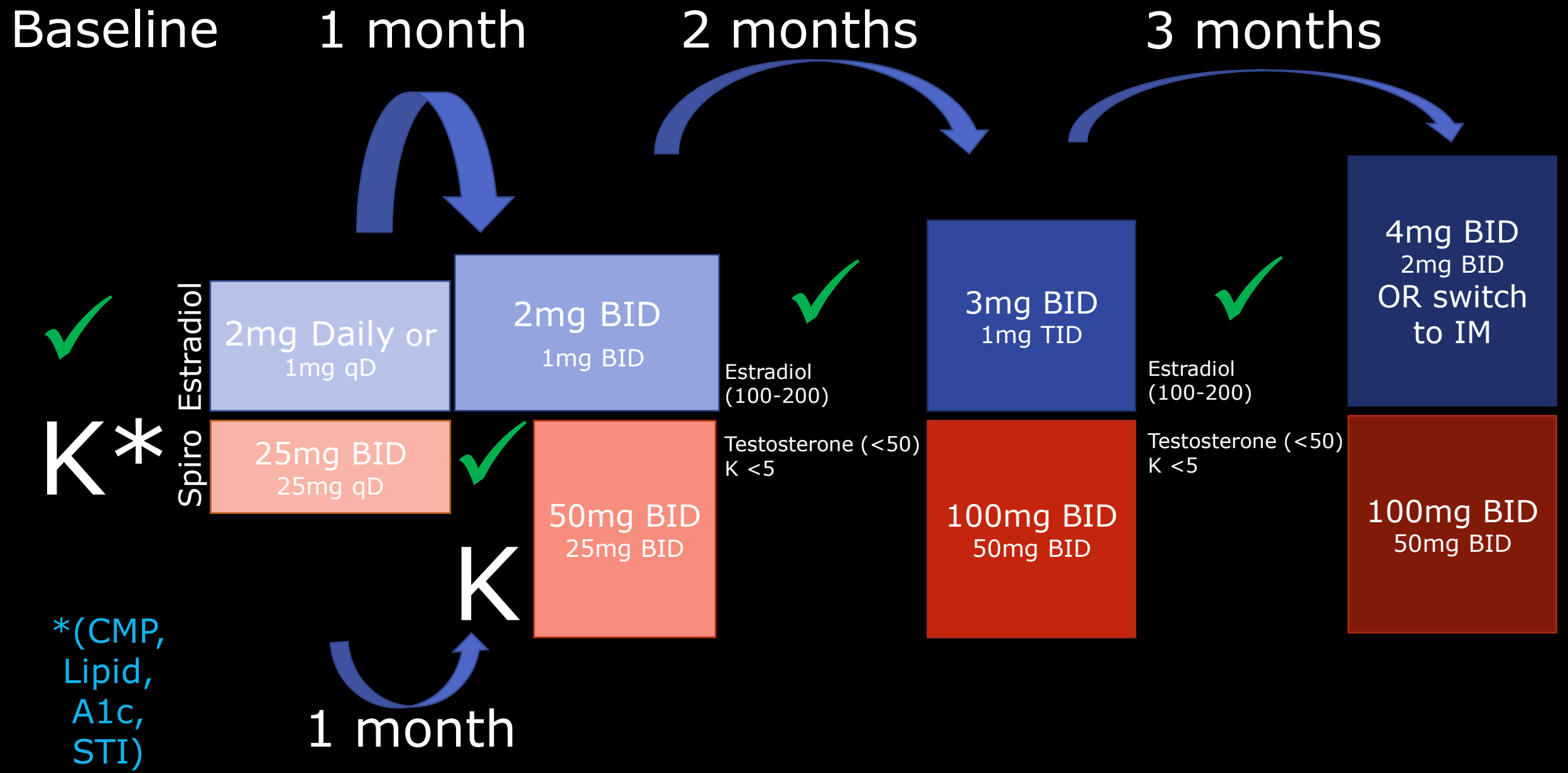


[Callen-Lorde]

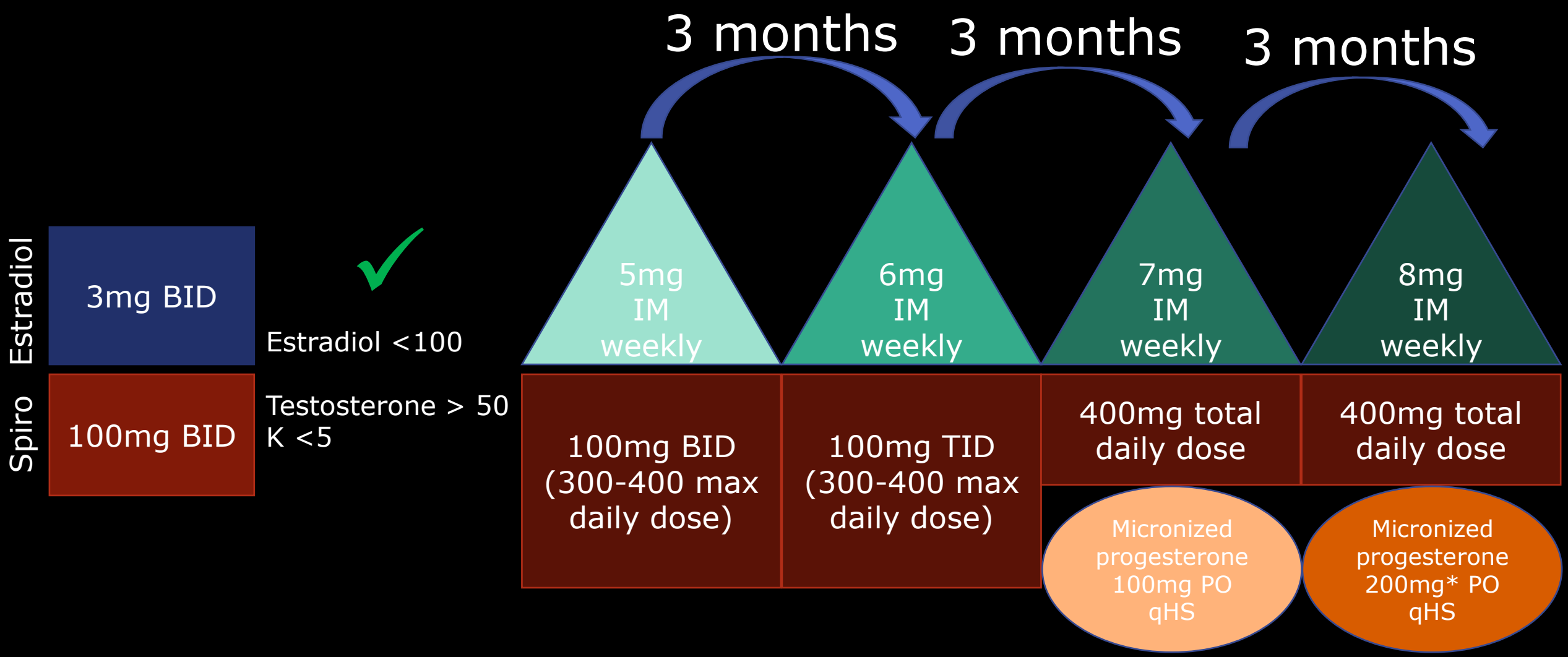
Feminizing Hormone Therapy Monitoring Protocols

	Callen-Lorde[1]	Endocrine Society[2]	Fenway[3]	WPATH[4]	UCSF[5]	Transline[6]
Baseline	CBC CMP Hepatitis A/B/C Syphilis HIV	+/- A1c, lipid	Lipid CMP +/- Testosterone/prolactin HIV* Hep A/B/C* Syphilis* GC*	Feldman & Safer, 2009: Total and/or free Testosterone Lipids Fasting glucose CMP	BMP -- +/- Prolactin +/- Lipids/A1c (based on USPSTF guidelines)	BMP -- +/- Prolactin
Ongoing monitoring during the first year	Labs collected 4-5 weeks after dose changes, @3 months of full dose and then every 6 months: CMP* if taking spiro CBC* if taking flutamide Prolactin Lipids	Every 3 months: Estradiol Testosterone CMP *if on spiro +/- Prolactin (periodically?) +/- Lipids/HgbA1c	BMP 2-8 weeks after starting or changing dose of spiro Testosterone @6 mo after stabilization +/- Serum estradiol Serum prolactin annually	Feldman & Safer, 2009: Total and/or free testosterone ~q3 mo or with dose changes Lipids @ 3 mo and with dose changes CMP every 3 mo if on spiro +/- estradiol	Every 3 months BMP * if on spiro @3 and 6 months, then q6-12 months or PRN: BMP Serum Estradiol Total Testosterone +/- SHBG, Albumin	6-8 weeks after initiation and change in dosing and +/- after 6 months on maintenance dose: Testosterone Estradiol
After 1st Year	Every 6 mos: CBC CMP Lipids ?Prolactin	Every 6-12 months Estradiol Testosterone CMP annually +/- DEXA at baseline and at age 60	Lipid/BMP every 6-12 months +/- Testosterone and estradiol	Total and/or free testosterone ~q6 mo Lipids q12 mo CMP every 6 mo if on spiro +/- estradiol	BMP PRN: +/- Lipids, Estradiol, Testosterone, SHBG, Albumin, Prolactin	Q12 months when stable: Testosterone Estradiol BMP Prolactin
Goal hormone ranges:	Generally does not recommend surveillance of hormone levels	Serum estradiol 100-200 pg/ml Serum total testosterone <50 ng/ml	Serum estradiol 100-200 pg/ml Serum total testosterone <50 ng/ml	No specific endorsements (Refer to literature)	Consult local lab for reference ranges	Use cisgender female follicular/pre-ovulatory phase reference range. Total Testosterone 50 – 75ng/dL is ideal

Feminizing Hormone Therapy



Feminizing Hormone Therapy - Switch to IM



FEMINIZING HORMONE THERAPY

Accept

- [ ] Comprehensive Metabolic Panel
  Routine, Clinic Collect, Qty-12, Expires: 1 Year, Count: 12
- [x] Testosterone, Adult Male
  Routine, Clinic Collect, Qty-12, Expires: 8/12/2021 Manual-release, Count: 12, Resulting Agency - ARUP
- [x] Estradiol, Adult Premenopausal Female
  Routine, Clinic Collect, Qty-12, Expires: 8/12/2021 Manual-release, Count: 12, Resulting Agency - ARUP
- [ ] Lipid Panel
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Hgb A1C
  Routine, Clinic Collect, Expected: Today, Expires: 3 Months
- [ ] Prolactin
  Routine, Clinic Collect, Expected: Today, Expires: 3 Months
- [ ] Sex Hormone Binding Globulin
  Routine, Clinic Collect, Expected: Today, Expires: 3 Months
- [ ] Human Immunodeficiency Virus (HIV) Combo Antigen/Antibody (HIV-1/O/2) by CIA, Reflexive Panel
  Routine, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Rpr With Reflex To Titer And TP-PA Conf
  Routine, Expected: Today, Expires: 1 Year
- [ ] Chlamydia T & N Gonorrhoeae By TMA - Urine
  Routine, Expected: Today, Expires: 1 Year, Urine-General
- [ ] Chlamydia T & N Gonorrhoeae By TMA - Pharyngeal
  Routine, Expected: Today, Expires: 1 Year, Pharyngeal
- [ ] Chlamydia T & N Gonorrhoeae By TMA - Rectum
  Routine, Expected: Today, Expires: 1 Year, Rectum
- [ ] Hepatitis A Virus Antibodies, Total
  Routine, Expected: Today, Expires: 1 Year
- [ ] Hepatitis B Virus Surface Antibody
  Routine, Expected: Today, Expires: 1 Year
- [ ] Hepatitis C Virus Antibody by CIA with Reflex to HCV by Quantitative NAAT
  Routine, Expected: Today, Expires: 1 Year
- [ ] estradiol (ESTRACE) 1 mg tablet (SL route)
- [ ] estradiol (ESTRACE) 2 mg tablet (SL route)
- [ ] progesterone micronized (PROMETRIUM) 100 mg capsule
- [ ] spironolactone (ALDACTONE) 50 mg tablet

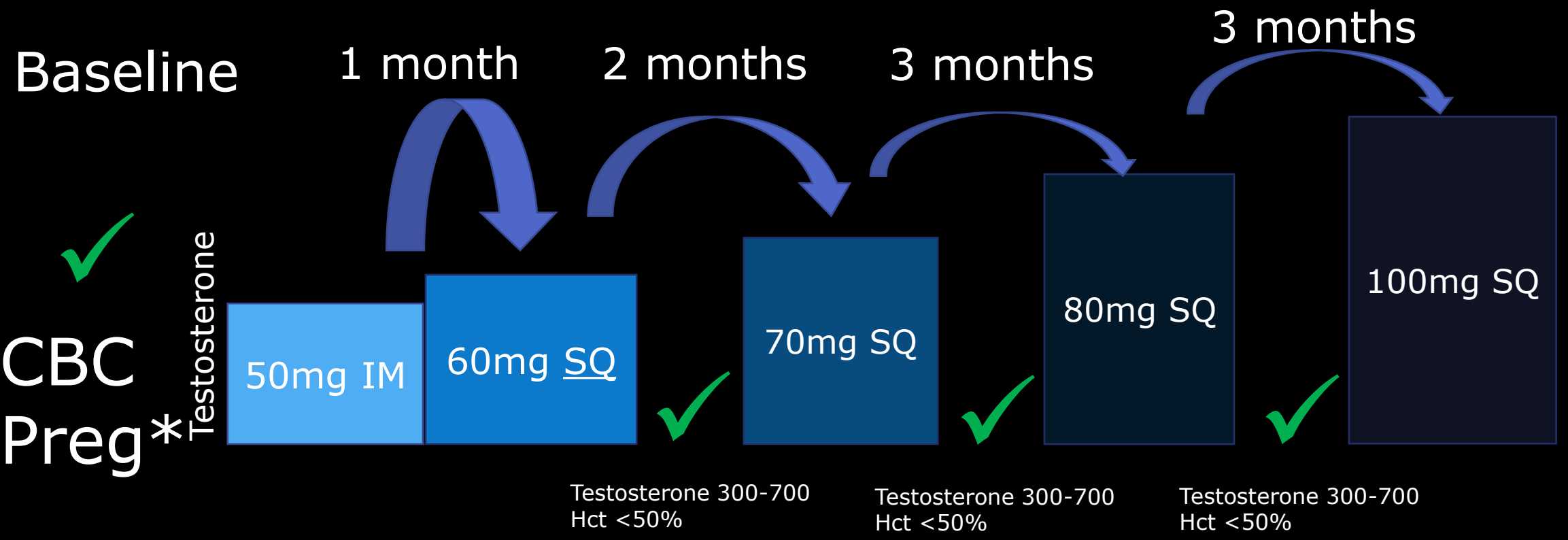
Feminizing Hormone Therapy Labs

- Baseline: CMP, Lipid, A1C + STI or HIV PrEP labs
- Every three months for 1st year: adult male testosterone, premenopausal estradiol, CMP and +/- HgbA1c, lipid and STI/PrEP labs
- Every six months for Years 2-3: testosterone, estradiol, CMP and +/- HgbA1c, lipid and STI/PrEP labs
- Annual labs after three years: testosterone, estradiol, CMP, A1c, +/- lipid and STI/PrEP labs

Masculinizing Hormone Therapy Monitoring Protocols

	Callen-Lorde[1]	Endocrine Society[2]	Fenway[3]	WPATH[4]	UCSF[5]	Transline[6]
Baseline	CBC CMP Hepatitis A/B/C, Syphilis, HIV	H/H Lipid* Testosterone +/- A1c, lipid	CBC LFT Lipid +/- testosterone, +/- A1c uhCG, STI,	Feldman & Safer, 2009: H/H LFT Fasting lipid Fasting glucose	H/H +/- Lipid* +/- A1c* (based on USPSTF guidelines)	CBC CMP
Ongoing monitoring during the first year	LFT (1 mo after starting half-dose) LFT, lipid (1 mo after starting full-dose) @ 5-9 months: LFT, lipids	CBC Every 3 mo Testosterone every 3 mo ?Estradiol suppression? Lipids	@ 6 mo: CBC, LFT, lipid, +/- A1c, testosterone @ 12 mo: CBC, LFT, lipid, +/- A1c, testosterone	H/H (1-3 mo after menses cease) Testosterone (1-3 mo after starting and with dose Δ) Lipid (q3 mo) LFT (q 3mo)	H/H Testosterone every 3 mo +/- SHBG, albumin, other labs at provider discretion)	Total testosterone (once amenorrhoeic or 2-3 mo after start and1-3 months after dose change) CBC, total testosterone (6 months after achieving maintenance dose)
After 1st Year	Every 6 mos: CBC, CMP, lipids, ?prolactin	Every 6-12 mos: H/H Testosterone	CBC, LFT, lipid, +/- A1c, testosterone (Every 6 mos for 2-3 years, then annually)	Every 6-12 mos: H/H Testosterone Fasting lipid LFT	H/H Testosterone +/- SHBG, albumin, other labs at provider discretion)	12 months after: CBC, total testosterone, CMP*, lipids**
Goal Hormone Ranges:	Does note check testosterone	Typically 320-1000ng/dL AND 400-700 ng/dL	300-700 ng/dL	No specific endorsements, refer to literature	Consult local lab for reference ranges AND 350-1100 ng/dL	References Fenway, Endocrine Society and UCSF

Masculinizing Hormone Therapy



*(CMP, Lipid, A1c, STI)

MASCULINIZING HORMONE THERAPY

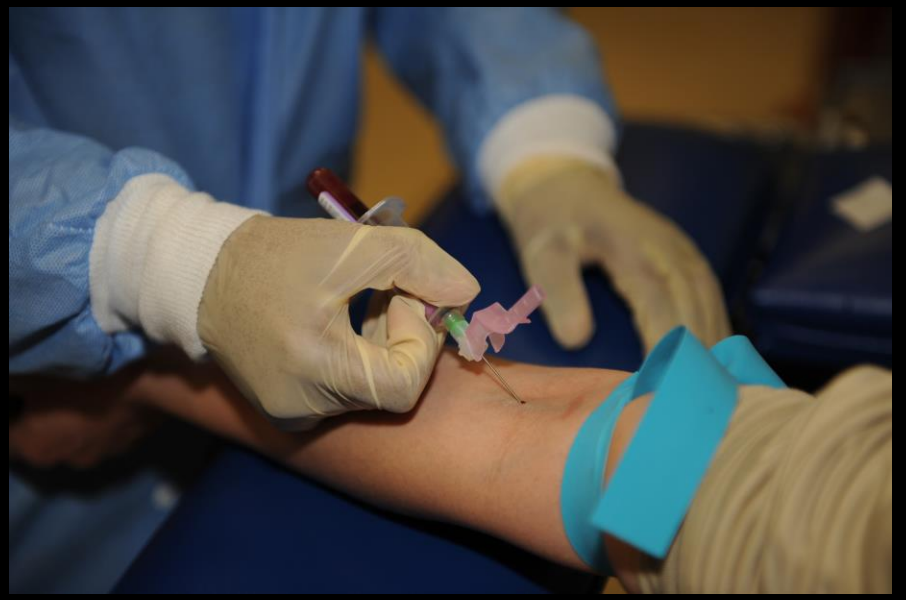
- [x] POC Pregnancy Test (Urine)
  Routine, Clinic Performed, Qty-12, Expires: 8/12/2021 Manual-release, Count: 12, Resulting Agency - SHC INTERNAL LAB
- [x] CBC w/Platelet
  Routine, Clinic Collect, Qty-12, Expires: 8/12/2021 Manual-release, Count: 12, Resulting Agency - U HOSPITAL LAB (ARUP)
- [x] Comprehensive Metabolic Panel
  Routine, Clinic Collect, Qty-12, Expires: 8/12/2021 Manual-release, Count: 12, Resulting Agency - U HOSPITAL LAB (ARUP)
- [x] Testosterone, Adult Male
  Routine, Clinic Collect, Qty-12, Expires: 8/12/2021 Manual-release, Count: 12, Resulting Agency - ARUP
- [ ] Lipid Panel
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Hgb A1C
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Sex Hormone Binding Globulin
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Human Immunodeficiency Virus (HIV) Combo Antigen/Antibody (HIV-1/O/2) by CIA, Reflexive Panel
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Rpr With Reflex To Titer And TP-PA Conf
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Chlamydia T & N Gonorrhoeae By TMA
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year, Urine-General
- [ ] Hepatitis A Virus Antibodies, Total
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Hepatitis B Virus Surface Antibody
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] Hepatitis C Virus Antibody by CIA with Reflex to HCV by Quantitative NAAT
  Routine, Clinic Collect, Qty-1, Expected: Today, Expires: 1 Year
- [ ] testosterone cypionate injection 200 mg/mL (SQ route)
- [ ] finasteride (PROSCAR) 5 mg tablet
  Disp-45 tablet, R-3

Masculinizing Hormone Therapy Labs

- Baseline: urine pregnancy test, CBC, CMP +/- lipid, A1c, HIV, HepC, GC/CT and other STI labs
- Every three months for 1st year: testosterone, CMP, CBC, urine pregnancy (if *potentially* sexually active with individuals who produce sperm) and +/- HgbA1c, lipid and STI/PrEP labs
- Every six months for Years 2-3: testosterone, CBC, CMP and urine pregnancy (if potentially sexually active with sperm producers) and +/- HgbA1c, lipid and STI/PrEP labs
- Annual labs after three years: testosterone, CBC, CMP, urine pregnancy, A1c, +/- lipid and STI/PrEP labs

Clinical Pearls

Timing of labs is CRITICAL – midweek for injectables and in the morning for orals/sublingual (don’t take your meds morning of getting your labs drawn)



Monday Tuesday Wednesday Thursday

- Syringe/needles are CRITICAL
  - SQ (testosterone) 23-25G 5/8 inch on **1 cc LUER LOCK syringe**
  - IM (testosterone/estradiol) 22-23G 1-1.5 inch on **1 cc LUER LOCK syringe**


Photo source: https://bit.ly/2tyGjbw

FIRST DOING NOTHING IS HARM

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Photo Credits

- Girl Riding a bike: danielfoster437 https://www.google.com/url?sa=i&source=images&cd=&ved=2ahUKEwjQ75f-gbPiAhWLjFQKHceoC2gQjRx6BAgBEAU&url=https%3A%2F%2Fwww.flickr.com%2Fphotos%2Fdanielfoster%2F73145432 58&psig=AOvVaw1v9-vEOVLGUQ5EINFOfw-L&ust=1558747736438842
- Polar bear on melting ice: https://science.howstuffworks.com/environmental/conservation/issues/point-no-return-for-climate-action-is-2035.htm
- Environmental scientist male: https://www.agcareers.com/career-profiles/environmental-scientist---specialist.cfm
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