**WHAT IS ASSIGNED SEX?**

Assigned sex is the sex designation that individuals are assigned at birth based on physical and genetic characteristics such as reproductive organs and chromosomes. People are typically assigned as male or female, but around 1.7% of cases, individuals may have variations that make the assignment more complex. These people are intersex.

**WHAT IS GENDER IDENTITY?**

Gender identity refers to a person’s deeply felt sense of their own gender, which may be different from the sex assigned to them at birth. It is an individual’s internal understanding and experience of being male, female, or another gender, which may or may not align with societal expectations or biological characteristics.

Most people’s gender identity matches the sex they were assigned at birth. These people are cisgender. Transgender people identify as a gender different from the one assigned to them at birth. Some transgender people identify with a binary gender (“man” or “woman”). Others are nonbinary or multigender. Nonbinary is a term that is often used to describe a broad spectrum of labels and experiences outside of the binary gender categories of “man” and “woman.”
EXAMPLES OF GENDER IDENTITIES

**AGENDER** – Literally translates to “without gender.” Some agender people identify as nonbinary, while others experience it as a complete lack of gender.

**BIGENDER** – A term used by people that experience two gender identities, either simultaneously or in sequence.

**CISGENDER WOMAN** – A term that describes a woman that was assigned female at birth.

**CISGENDER MAN** – A term that describes a man that was assigned male at birth.

**GENDERFLUID** – A term used by people whose gender varies or changes over time. The time span can be hours, days, or years at a time.

**GENDERQUEER** – An umbrella term is often used by people who have nonnormative or queer experiences with their gender.

**GENDER VARIANT** – Someone (cisgender, transgender, or otherwise) that acts or expresses themselves in a way that does not match masculine or feminine gender norms.

**NON-BINARY** – An umbrella term used to describe people that do not fit the male and female gender binary.

**QUEER** – An inclusive umbrella term that refers to a diverse range of sexual orientations, gender identities, and expressions that challenge and go beyond traditional societal norms and expectations related to sexuality and gender.

**TRANSGENDER** – An umbrella term used to describe people who have a gender identity that does not match the one assigned to them at birth.

**TRANSGENDER MAN** – A man who was not assigned male at birth. Most trans men were assigned female at birth (AFAB).

**TRANSGENDER WOMAN** – A woman who was not assigned female at birth. Most trans women were assigned male at birth (AMAB).

WHAT IS GENDER EXPRESSION?

Gender expression refers to the way individuals outwardly express their gender identity to others through behaviors, clothing, hairstyles, and other aspects of appearance or presentation. It encompasses the way individuals communicate and manifest their gender identity to the world, which may align with or differ from societal expectations or stereotypes associated with their assigned sex at birth. Gender expression is a personal and individual expression of gender identity.

WHAT IS SEXUAL ORIENTATION?

Sexual orientation refers to a person’s enduring pattern of emotional, romantic, and/or sexual attractions towards individuals of the same gender (homosexuality), opposite gender (heterosexuality), both genders (bisexuality), or neither gender (asexuality). It is an inherent and deeply ingrained aspect of a person’s identity, relating to the gender(s) to which they are emotionally, romantically, and/or sexually attracted. Sexual orientation is independent of gender identity and should not be confused with it.

WHAT IS GENDER DYSPHORIA?

Gender dysphoria is a psychological condition where individuals experience distress or discomfort due to a significant incongruence, or mismatch, between their gender identity and their assigned sex at birth. It involves a deep and persistent sense of unease, dissatisfaction, or distress about the incongruity, which may manifest in various ways, such as emotional distress, social discomfort, or a desire to transition to align their physical appearance with their gender identity. It is important to note that gender dysphoria is recognized as a medical condition, and individuals experiencing it may seek support, including medical interventions, to alleviate their distress and live in accordance with their gender identity.

WHAT IS GENDER-AFFIRMING CARE?

Gender-affirming care refers to medical, psychological, and social support provided to individuals seeking to align their physical characteristics and social identity with their affirmed gender identity. It aims to affirm and support individuals in their self-identified gender, improving their well-being and reducing gender dysphoria. Gender-affirming care can include various interventions such as hormone therapy, surgical procedures (such as gender confirmation surgeries), voice training, mental health support, and social transition support. The specific approach to gender-affirming care can vary based on individual needs and preferences, and it is typically provided by healthcare professionals with expertise in transgender healthcare. The goal is to empower individuals to live authentically in their affirmed gender identity, promoting their overall health and quality of life.

GENDER CONFIRMING HORMONE TREATMENTS CAN INCLUDE:

**PUBERTY BLOCKERS:** During puberty, the body undergoes significant changes such as the development of breasts, facial hair, and menstruation. Puberty blockers, also known as hormone blockers or gonadotropin-releasing hormone analogs (GnRHa), suppress the release of the hormones that trigger puberty and give trans patients more time to explore their gender identity without the added stress of developing physical characteristics that may not align with their true selves. This treatment gives them the opportunity to make more informed decisions about their gender transition later in life.
Puberty blockers are reversible, and their effects can be stopped by discontinuing the treatment. They are often used as part of a comprehensive treatment plan, including therapy and ongoing medical support, to ensure the well-being of transgender youth.

**FEMINIZING HORMONE THERAPY:** Trans women and some nonbinary people may use feminizing hormone therapy to create changes that are triggered by female puberty hormones. These changes include growing breasts and redistributing body fat. Feminizing hormone therapy includes estrogen, administered via a patch or injection, and a drug to reduce testosterone.

**MASCULINIZING HORMONE THERAPY:** Trans men and some nonbinary people may use masculinizing hormone therapy to create changes that are triggered by male puberty hormones. These changes include growing more facial and body hair, having a deeper voice, and stopping menstruation. Masculinizing hormone therapy includes testosterone, usually administered via patch or injection.

**GENDER CONFIRMING SURGICAL TREATMENTS CAN INCLUDE:**

**FOR A MORE MASCULINE APPEARANCE:**
- Breast reduction (also called top surgery): A procedure to remove breast tissue.
- Hysterectomy: A procedure to remove the uterus.
- Oophorectomy: A procedure to remove the ovaries.
- Vaginectomy: A procedure to remove all or part of the vagina.
- Phalloplasty (also called bottom surgery): A multistage procedure to create an aesthetic penis with a urethra for standing urination and construct a scrotum with testicular implants.

**FOR A MORE FEMININE APPEARANCE:**
- Breast augmentation (also called top surgery): A procedure to increase breast size for a more feminine appearance
- Tracheal shave: The surgery that reduces the size and appearance of the Adam’s apple.
- Facial Feminization: A broad group of surgeries that change facial structure to look more feminine.
- Vaginoplasty (also called bottom surgery): A procedure to remove the testicles and use the original penis to construct a vagina and clitoris.

**ROLE OF LABORATORY TESTS IN GENDER-AFFIRMING CARE**

*Reference ranges are set by individual laboratories for their specific populations so reference ranges might differ slightly.*

Laboratory testing is essential for people undergoing hormone therapy to monitor the effects of hormones on organ function, especially during the first year of treatment. The tests required will vary depending on a patient’s medications, but most patients can expect to get some of these tests.

**CREATININE:** This test measures the level of creatine in the blood. Normally, kidneys filter our creatinine, a waste product created through the metabolism of muscle and certain foods. Higher levels of creatinine can indicate an issue with your kidneys. Spironolactone, a common medication in feminizing hormone therapy, requires healthy kidney function. This test is used to make sure a patient can safely take the medication. A typical reference range* for adults is between 0.84 and 1.21 mg/dL.

**POTASSIUM:** This test measures the level of potassium in the blood. Potassium is an electrolyte that helps balance the body’s acids and bases. Spironolactone, a common medication in feminizing hormone therapy, can cause dangerously high potassium levels, so it is important to monitor potassium levels. A typical reference range* for adults is between 3.7 and 5.2 mEq/L.

**HEMATOCRIT (HCT):** This lab test measures the proportion of red blood cells in a blood sample. Testosterone can increase red blood cell counts in patients undergoing masculinizing hormone therapy. High red blood cell counts increase the risk of blood clots.

**HEMOGLOBIN (HGB):** This lab test measures the amount of hemoglobin you have in your blood. Hemoglobin carries oxygen to organs and tissue. This test is important because hemoglobin helps monitor the risk of blood clots in patients taking testosterone. Estradiol (E2): This blood test measures the levels of estradiol, which is the type of estrogen monitored in people using feminizing hormone therapy. For most patients, the appropriate range* is 100–200 pg/mL.

**TESTOSTERONE:** This blood test measures the level of testosterone, which is important for people undergoing both feminizing and masculinizing hormone therapy. For masculinizing hormone therapy, the appropriate range* is 320–900 ng/dL. For feminizing hormone therapy, the goal level* is less than 55 ng/dL.
HEMOGLOBIN A1C (HBA1C): This test measures Hemoglobin A1C level, the average level of glucose (blood sugar) in your blood. This test can monitor if a patient has diabetes and how well diabetes is being managed. Some people on hormone therapy are at a higher risk of developing diabetes. The typical reference range* for both children and adults is less than 6%. If A1c levels are higher than 6.4%, it indicates diabetes; levels between 5.7-6.4% are indicative of prediabetes.

LIPID PANEL (LP): This test measures the fats and fatty substances as a source of energy called lipids. Lipids include cholesterol, high- and low-density lipoprotein, and triglycerides. This test is important because it indicates a patient's chances of developing cardiovascular disease. Some people on hormone therapy are at a higher risk of developing cardiovascular disease.

<table>
<thead>
<tr>
<th>LIPID TEST</th>
<th>ROLE IN HEALTH</th>
<th>RECOMMENDED REFERENCE RANGES*</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH-DENSITY LIPOPROTEIN (HDL) CHOLESTEROL</td>
<td>The “good” cholesterol that removes fatty deposits</td>
<td>60 mg/dL and above</td>
</tr>
<tr>
<td>LOW-DENSITY LIPOPROTEIN (LDL) CHOLESTEROL</td>
<td>The “bad” cholesterol that reduced blood flow associated with depositing “plaques”</td>
<td>Below 70-100 mg/dL</td>
</tr>
<tr>
<td>TOTAL CHOLESTEROL</td>
<td>Sum of your cholesterol</td>
<td>Below 200 mg/dL</td>
</tr>
<tr>
<td>TRIGLYCERIDES</td>
<td>Type of fat in the blood related to recent meals</td>
<td>Below 150 mg/dL</td>
</tr>
</tbody>
</table>

THE EFFECT OF GENDER-AFFIRMING CARE ON LABORATORY TESTS

*Reference ranges are set by individual laboratories for their specific populations so reference ranges might differ slightly.

Gender-affirming hormone therapy has a wide range of effects on the body. As transgender individuals gain more visibility and societal acceptance, doctors and scientists have been able to better understand these effects and give guidance on how the lab can keep transgender patients safe and healthy.

REFERENCE RANGES: Recent research has shown that hormone therapy can affect the reference ranges for transgender patients on common lab tests. These tests include:

- Hemoglobin and hematocrit, which measure how many red blood cells are in the blood
- Creatinine, which is a measure of kidney health
- Platelets, which help clot the blood
- Low-density lipoprotein (LDL) cholesterol, the “bad” cholesterol
- Alkaline phosphate, a marker for liver and bone health

Transgender patients should work with their doctors to determine what their correct reference ranges are for these tests.

SEX-BASED HEALTH SCREENINGS: There are several preventative health screenings that are based on the presence of sexual organs that are important for transgender patients but may cause heightened levels of gender dysphoria. These include:

- Pelvic exams and cervical cancer screening (pap tests) for patients with a vagina, cervix, and/or uterus.
- Breast cancer screening for patients with breast tissue, even if they have had a breast reduction.
- Prostate cancer screening for patients with a prostate.

Transgender patients can seek out trans-affirming providers who can help them navigate these exams. They may also benefit from additional support in the form of mental health care and community groups.

QUESTIONS TO ASK YOUR DOCTOR

- Which lab tests are recommended for transgender patients?
- How often should I undergo these lab tests?
- What specific markers or hormone levels will these tests assess?
- How will the results be interpreted in the context of my transition?
- How will the results inform any adjustments or modifications to my hormone therapy regimen?
- What support is available for transgender patients at your practice?
- What steps are you taking to make this a safe environment for trans patients?
Julie (She/Her/They/Them/Siya) is a medical laboratory scientist and humanitarian aid worker. When she was 24, she started her medical transition while living in the Philippines. She was unable to find a gender-affirming provider, so she started self-medicating hormone therapy. Hormone therapy affects organ systems throughout the body and needs to be closely monitored through routine blood tests. Since Julie worked in a clinical laboratory, she was able to monitor her hormone levels and organ function.

After she moved to the United States, Julie was able to find an endocrinologist to manage her care. It was challenging to find someone who was trauma informed with experience with trans patients, and she often had to advocate for herself and ask for specific tests that she knew were affected by her treatment.

When Julie first began hormone therapy, she got monthly blood tests to monitor her treatment. Now that she and her doctors have found a treatment that works for her, she gets annual blood tests to monitor her hormones and organ function.

“The lab saves my life every time that rainbow of draw tubes is collected to check if my organs are functioning well with all the medications I am taking with hormone treatment.”