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## Using Estrogen and/or Androgen Blocking Medications

The goal of this guide is to provide the most up-to-date information about the expected effects of gender affirming hormone therapy, including both the desired effects as well as possible unwanted side effects. This guide will provide information to help you make decisions about your care. Please do not hesitate to ask questions and talk about any concerns you have.

Estrogen as gender-affirming hormone therapy (estradiol) results in changes to the body that some people find affirming, including softening of the skin, decreased muscle mass, changes in facial and body hair, fat redistribution, and breast growth. Some people also use an androgen blocker, a medication that can reduce or block the effects of testosterone and can sometimes enhance the effects of estrogen. There can be variation in the body's response to hormones, and it is difficult to predict some aspects of how your body might change.

Hormone therapy will not change certain body features. Bone structure and height will not change, and the Adam's apple will not shrink. The pitch of the voice also will not change. Hormone therapy is not the only way to achieve your goals – a discussion about other options could non-medical affirming products (i.e., tucking), other medications, and/or surgeries.

You and your healthcare provider will review which formulation and dose of estrogen (oral tablets, injections, topical gels, patches) and/or androgen blocker may be best for you based on your gender affirmation goals, preferences, and pertinent medical or mental health conditions. As part of this treatment, you agree to take the medications only as prescribed and to talk with your healthcare provider before making any changes in your medication. Together, you and your healthcare provider can work to create the best approach to meet your goals safely.

## Expected Physical and Emotional Effects of Estrogen Therapy

The changes in your body may take several months to become noticeable, and may take 3 to 5 years to maximize physical changes.

**PERMANENT (Changes not reversible): will not go away, even if you decide to stop taking estrogen or take a lower amount**

- Breast growth and development. Breast size on estrogen therapy varies greatly. Taking estrogen

often leads to breast growth and tenderness. Breast size tends to reach full potential after 1-2 years of continual estrogen therapy, and many people report breast size around an A or B cup. Breasts may look smaller on broader chests. If you stop taking estrogen your breasts may decrease in size, but will not go away completely.

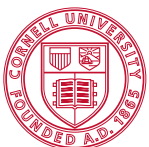
- The testicles will get smaller, softer, and will produce less sperm.

**NOT PERMANENT (Changes reversible): if stopping estradiol and/or androgen blocker, it may take a few weeks or months for the body to return to baseline prior to starting hormone therapy**

- Loss of muscle mass and decreased strength, particularly in the upper body.
- Decreased metabolism and weight gain. If you gain weight, the fat will tend to localize, or redistribute, more typically in the buttocks, hips, and thighs.
- Skin may become softer, drier, and existing acne may decrease.
- Facial and body hair will get softer and lighter and grow more slowly, but will not go away.
- Hair loss at the temples and crown/top of the head (androgenic alopecia) may slow down or stop, but hair will typically not regrow.
- Changes in mood or thinking may occur; some people may feel increased emotional reactions and others may feel more balanced or less emotional.
- Sex drive may decrease. This can range from a very slight change to a much more significant decrease.
- Decreased strength of erections or inability to get an erection. The ejaculate may become thinner and watery and there will be less of it. Over time, ejaculate may completely disappear.

## Possible Fertility Effects of Estrogen Therapy and Decreased Testosterone

- Possible loss of fertility; you may not be able to get someone pregnant after being on estrogen therapy for some time. How long this may take is unknown. Even if you stop taking estrogen, fertility may not come back. Whether this becomes permanent is difficult to predict. Some people choose to bank sperm before starting estrogen.
- Estrogen therapy is not a method of birth control. There is no way to predict when or if a person will become infertile (unable to get someone pregnant) when taking estrogen. Other birth control methods will be necessary (condoms, oral contraceptives, etc.) to prevent pregnancy if you are engaging in sex that could result in a pregnancy.



## Possible Side Effects and Risks of Estrogen Therapy

- The brain responds differently to testosterone and estrogen. Estrogen therapy may have long-term effects on the functioning or structure of the brain that we do not yet fully understand.
- Possible increased risk of developing blood clots; blood clots in legs or arms (DVT) can cause pain and swelling; blood clots to the lungs (pulmonary embolus) can interfere with breathing and getting oxygen to the body; blood clots in the arteries of the heart can cause heart attacks; blood clots in the arteries of the brain can cause a stroke. Blood clots to the lungs, heart, or brain could result in death.
- Possible increased risk of heart attack or stroke. This risk may be higher if you use tobacco products, are over age 45, or already have high blood pressure, high cholesterol, diabetes, or a family history of cardiovascular disease, and if you have low physical activity.
- Possible increase in blood pressure requiring treatment with medication.
- Possible increased risk of developing diabetes. Limited research has found an increase in insulin resistance in people taking estrogen therapy. The effect of estrogen therapy on the risk of developing or on the management of diabetes remains unclear.
- Possible nausea and vomiting, especially when first starting on estrogen therapy.
- Possible increased risk of gallbladder disease and gallstones.
- Estrogen may lead to liver inflammation and/or contribute to existing liver damage.
- May cause or worsen headaches and migraines. Migraine headaches have a clear hormonal element. Estrogen may increase the intensity or frequency of migraines.
- May cause elevated levels of prolactin (a hormone made by the pituitary gland). It remains rare, but a few people taking estrogen for hormone therapy have developed prolactinomas, a benign tumor of the pituitary gland that can cause headaches and problems with vision as well as other hormone problems.
- Some people may feel their mental health and social comfort improves, and others may feel it worsens. While affirmation of gender is associated generally with improved mental health outcomes, the effect of estrogen therapy on specific mental health conditions is unknown. There is no

clear evidence that estrogen therapy is directly responsible for causing or making any mental health condition worse. If you have a history of mental health concerns, discuss these with your healthcare provider.

- Risks of breast cancer are unclear. The risk may be higher than that in cisgender men, but does appear significantly lower than the rates seen in cisgender women. Risk factors include family and genetic history of breast cancer, length of time on estrogen therapy, age when starting estrogen therapy, and possible exposure to progesterone.
- Breast cancer screening is recommended if you develop enough breast tissue and are over the age of 50, following similar guidelines as those recommended for cisgender women.
- Smoking, inhaling second-hand smoke, and use of tobacco products may greatly increase the risks associated with taking estrogen therapy, especially the risk of blood clots and cardiovascular disease.

## Risks and Possible Side Effects of Spironolactone (Androgen Blocker)

- Increased urine production and need to urinate more frequently, along with possible changes in kidney function.
- A drop in blood pressure and feeling lightheaded, especially when standing up from sitting or lying down.
- Increased thirst and/or dehydration.
- Increase in the potassium in the blood; this can lead to muscle weakness, nerve problems and dangerous heart arrhythmias (irregular heart rhythm).
- If used without additional hormone therapy, androgen blockers may cause hot flashes and low mood or energy.
- Long-term use of androgen blockers to fully block testosterone without additional estrogen therapy may result in bone loss.

## Expectations, Rights, and Responsibilities

- Take androgen blockers and/or estrogens only at the dosage and in the form prescribed. Taking medications in doses that are higher than recommended will increase any risks from these medications. There is no evidence to suggest that higher doses than generally recommended will work better or faster.
- You may choose to stop taking hormone therapy at any time or for any reason.

Suddenly stopping estrogen after you have been on it for a long time may have negative health effects. You are encouraged to discuss medication adjustments with your healthcare provider prior to making any changes. It is recommended to make a plan for stopping with a healthcare provider familiar with hormone therapy.

- If you have or develop any condition you think may cause harm or worsen while taking hormone therapy, work with your healthcare provider to evaluate and create a plan to best manage that condition.
- Inform your healthcare provider if you are taking or plan to start taking other prescription drugs, dietary supplements, herbal or homeopathic drugs, street/recreational drugs, or alcohol to prevent or reduce potentially harmful reactions or interactions.
- Inform your healthcare provider of any new physical symptoms and any medical conditions that may develop before or while you are taking hormone therapy.
- Inform your provider if you think you are having bad side effects from the medications.
- Your provider may recommend decreasing your dose or, on rare occasions, stopping estrogen and/or androgen blockers because of medical reasons and/or safety concerns. You can expect your healthcare provider to discuss all treatment decisions with you. Some people may also need to change, decrease, and/or stop hormone therapy as they age.
- If you want or need surgery in the future, surgeons may require that you stop taking estrogen for a few weeks before and after surgery. The surgeon will determine when this is necessary.
- Keep appointments for follow-up monitoring and other preventative health care needs, as recommended by your healthcare provider.
- Blood testing may be recommended to monitor your health and hormone treatment. Your healthcare provider will discuss with you what tests are necessary and any recommendations for ongoing care and monitoring.
- Hormone therapy is not the only way to affirm your gender. Your healthcare provider and/or a behavioral health provider can talk with you about other options if you are interested.

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