- **Birth Control & Weight Gain**
    - Overall:
        - Clinical studies in this area are contradictory: Some women said that they gained weight, while others reported losing weight. This is why both weight gain and weight loss are listed as possible side effects on the product information of hormonal contraceptives (NIH, 2017)
        - Very few studies exist that compare combined hormonal contraceptive use with use of a “fake” or placebo and measure the impact on weight
        - From the very few studies that exist, no clear link between the hormonal contraceptive use and weight gain; take with a grain of salt due to low number of participants and poor study design
    - **Birth control pills and weight**
        - Many different brands and formulations on the market
        - Sometimes using the pill is like shopping, you have to try it on and see what will fit best
        - CHCs (most common birth control pill) do not cause weight gain
            - Increases in weight are due to water retention
                - Excess estrogen-causes fluid retention
                - Androgenic progestin-causes fluid retention
                    - Drosperinone-anti-androgenic and has diuretic properties
    - **Depo and weight**
        - The good: highly effective (0.2-0.3% unintended pregnancy rate); doesn’t interact with a lot of medications and conditions; long lasting but not a LARC (doesn’t require a procedure to place and remove); helpful for HMB; fairly good success rate of amenorrhea
        - The bad: decrease in BMD after 2 years of continuous use, weight gain
        - Not a hard stop but may want to consider another option if wanting to lose weight
        - Women who start Depo earlier  (in adolescence) are more susceptible to weight gain during their time on Depo; some limitations with the study, diet and exercise were not evaluated (Sims et al. 2020)
        - Depo users demonstrated statistically  significant weight and BMI increase:
            - +3.3% increase in both kg and BMI between 6-24 months (Zerihun et al. 2019)

- **Non-hormonal birth control options**
  - Copper IUD-Cu2+ destroys sperm, creates sterile inflammatory environment in the uterus where a pregnancy cannot implant
    - Approved for 10 years; effective for 12 years
    - Requires an insertion procedure
    - 99% effective
    - Can increase menstrual cramping
  - Phexxi-Vaginal gel-creates vaginal acidity which inhibits sperm motility
    - Needs prescription
    - Effectiveness-11%
  - Caya-diaphragm
    - One size fits most-needs prescription
  - Condoms
  - Fertility awareness method

- Ozempic Babies
  - No data out yet to determine if Ozempic affects birth control medications
    - Some concern that Ozempic can affect how certain contraceptives are absorbed in the body
  - Fat is not metabolically inert
  - Important to consider when starting a weight loss program
    - Ask patients about contraception and family planning
  - Obesity does not always mean that getting pregnant
  - is impossible but healthy weights are linked to increased fertility
    - Connection between weight and fertility
      - Obesity can cause excess estrogen and lead to irregular menstrual cycles
      - Increased insulin resistance and higher levels of testosterone can also make it harder to get pregnant
      - Segue into PCOS

- **PCOS** (Up to Date)
  - Believed to be one of the most common endocrine abnormalities in women
    - 5-10% of women affected
  - Common symptoms:
    - Oligomenorrhea, hyperandrogenism, obesity, glucose intolerance, dyslidemia

            - Fewer than 9 periods a year, acne, hair growth on chin/chest/upper lip/acne, sometimes hair loss in male pattern
    - 40-85% of women with PCOS are overweight or obese
    - Increased risk for Type 2 DM
    - Anovulatory cycles may make affect fertility
    - Diagnosis:
        - History, physical exam, US (look for string of pearls on imaging), testing hormone levels
    - Treatment goals:
        - Endometrial protection!!!
        - Fertility considerations
        - Improve hyperandrogenic features
        - Manage metabolic abnormalities
    - Weight management is key!-restores ovulation and improves metabolic risk
        - Diet and exercise for weight reduction is first line for overweight and obese patients with PCOS
        - Evidence does suggest that lifestyle interventions such as diet, exercise, and behavioral interventions are most effective, followed next by pharmacotherapy
        - Weight loss results in a decrease in serum androgen concentrations and can improve hirsutism
- **Menopause and Weight Gain** (Journal of Midlife Health, 2019)
    - Disclaimer-women's weight will naturally increase throughout life and it is totally ok!
    - Overall, menopause is high-risk stage for weight gain
        - Result of low estrogen levels due to decrease in ovarian function
        - Hormonal changes
        - Aging process
        - Decline in physical activity
        - Processed American diet
        - Emotional eating secondary to psychological stress
    - 39% of women undergoing menopausal transition are overweight or obese
    - Pathophysiology:
        - Lower estrogen production, increase in androgen levels
        - Hormonal imbalance alters energy homeostasis by regulating hunger and satiety signals
        - Estrogen inhibits action of hunger signals, preventing excess caloric intake

        - Menopausal women experience more intense hunger signals which encourage increased food intake resulting in weight gain
        - Change in body composition occurs as a result
        - Increase in abdominal fat due to low estrogen levels and higher androgen levels
    - Factors of menopausal obesity:
        - Aging
        - MSK disorders (joint pain, back pain make exercise difficult)
        - Not enough fiber
        - Processed foods (convenient)
        - Skipping meals
        - Vitamin D deficiency
        - Smoking/alcohol
        - Stress/anxiety
    - Importance of maintaining healthy weight:
        - Joint health (too much weight on knees is not good)
        - Decrease CV risk
        - Decrease cancer risk
    - Weight loss in menopause is difficult:
        - Adiposity is favored at this point in life
        - More challenges to weight loss exist
    - Management of Obesity:
        - Stepwise non-pharmacologic and pharmacologic approach
            - 1-Low calorie diet, increase exercise; consider pharmacologic therapy for patients who aren't successful
            - 2-3-Patient specific pharmacologic and surgical recommendations
    - Diet and Physical activity recommendations:
        - 500-750 cal reducation
            - 20% protein, <30% fat, 40%-50% carbs
            - Limit salt, sugar, processed fats
            - 150 min/week of moderate exercise
            - 2-3 times per week strength training
            - Walking is great for vasomotor symptoms
            - Yoga helps with hot flashes and sleep
    - HRT
        - Uses estradiol and progesterone to address estrogen deficiency
        - If uterus still present, must use include progesterone to avoid endometrial hyperplasia
        - Helps w/ vasomotor sx and bone health

- Contradicting studies on HRT and decrease in abdominal obesity, insulin resistance and CV risk
- Effectiveness depends on route of administration, duration, & dose
- Overall, HRTs role in reduction of body fat accumulation and metabolic risk needs more research