



The Effects of Obesity on Gynecological Health

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By the time you leave today you will.....

- Know how obesity effects the menstrual cycle
 - menorrhagia
 - Amenorrhea/oligomenorrhea
- Understand how obesity relates to female cancers
 - Breast cancer
 - Uterine cancer
 - Cervical cancer
 - Ovarian cancer

Obesity

- Of course, the issue of obesity involves men and children as well as women and involves more than gynecological conditions.
- Obesity has now passed smoking as the number one cause of preventable disease and disability in the United States

BMI & Obesity



Obesity is a medical condition defined as abnormal or excessive fat accumulation that may lead to health problems like heart disease, type 2 diabetes, obstructive sleep apnea, certain types of cancer and osteoarthritis. A person with BMI greater than or equal to 30 is considered as obese.

$$\text{BMI} = \frac{\text{Kg}}{\text{m}^2}$$

Body Mass Index

Body mass index (BMI) is a simple tool that is generally used to estimate the total amount of body fat. A change in BMI over a short period of time is often used to measure the change in one's lifestyle habits.



BMI Classification



Normal person has 30 to 35 billion fat cells. When a person gains weight, the fat cells grow in their size and as they put on more weight, the fat cells start increasing. The normal fat cells are 0.4 to 0.6 microgram in weight; the cells of an obese person can weigh as much as 1.2 micrograms.

Overweight & Obesity Worldwide



There are currently about 1.6 billion people in the world who are overweight and there are another 400 million who suffer from obesity.

BMI & Obesity

How to calculate your Body Mass Index (BMI)

$$\text{BMI} = \frac{\text{Weight (kg)}}{(\text{Height (m)})^2}$$

BMI is represented in kg/m^2 , so to use pounds and inches, a conversion factor of 703 (kg/m^2)/(lb/in^2) must be applied:

$$\text{BMI} = \frac{\text{Weight (lbs)}}{(\text{Height (in)})^2} \times 703 \text{ (kg/m}^2\text{)/ (lb/in}^2\text{)}$$

Obesity

- Body Mass Index (BMI) is the measure of fatness
- Normal BMI is 18.5 to 24.9
- Obesity is a BMI of 30 to 39.9
- Morbid obesity is a BMI of 40 or over.
- A BMI of 30-35 (obese) is associated with a 2 to 4 year decrease in life expectancy
- A BMI of 40-45 (morbidly obese) is associated with an 8 to 10 year decrease in lifespan much like smoking

BMI & You

Healthy Comes in All Shapes & Sizes

Your BMI (Body Mass Index) - Not Just Your Weight or Clothes Size - Can Be a Helpful Guide!

FOR BABIES, CHILDREN, & TEENS (through 19 years), BMI is based on AGE, WEIGHT, HEIGHT, & SEX. BMI calculations are put into 4 categories:

>95TH PERCENTILE OBESE Weight is much more than is healthy.	85TH - 95TH PERCENTILE OVERWEIGHT Weight is more than is healthy.	5TH - 85TH PERCENTILE HEALTHY WEIGHT Weight is within a healthy range.	<5TH PERCENTILE UNDERWEIGHT Weight is less than healthy.
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FOR ADULTS 20-years and up, BMI is calculated with WEIGHT AND HEIGHT. Below is the scale for adult BMI:

>30 OBESE Weight is much more than is healthy.	25-29.9 OVERWEIGHT Weight is more than is healthy.	18.5-24.9 HEALTHY WEIGHT Weight is within a healthy range.	<18.5 UNDERWEIGHT Weight is less than healthy.
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EAT WELL TO HELP MAINTAIN A HEALTHY BMI - FOLLOW THE WOAHI! SLOW! & GO! GUIDE

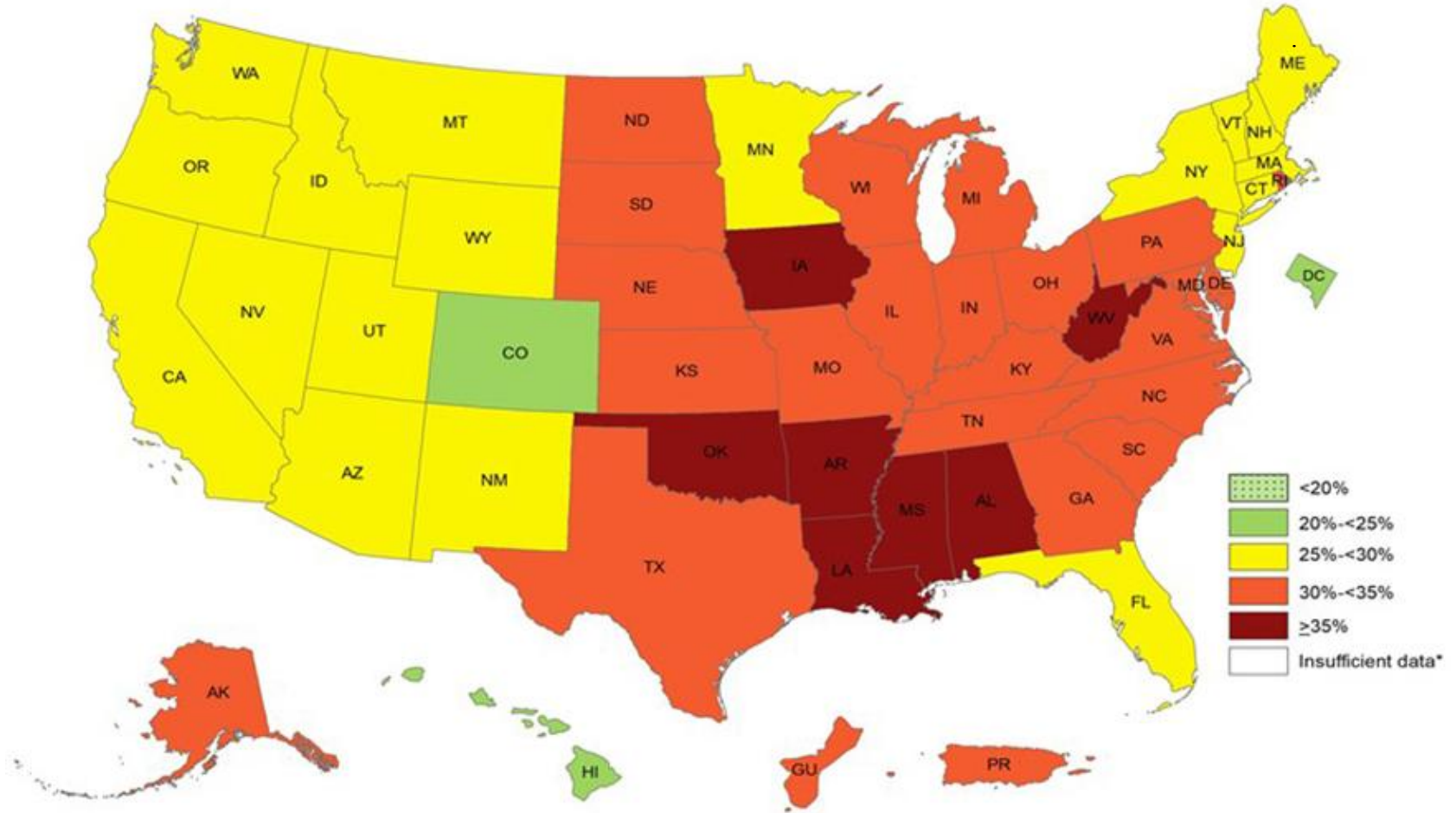
<p>WOAH! Foods</p>  <p>WOAH! FOODS SHOULD BE EATEN RARELY</p> <p>They are highest in fat & added sugar & are high in calories.</p> <p>WOAH! Foods include: deep fried foods (even fried "GO!" foods), cookies, cakes, whole milk & full-fat cheeses, mayonnaise, bacon, ribs, & other fatty meats.</p>	<p>SLOW! Foods</p>  <p>SLOW! FOODS CAN BE EATEN SOMETIMES BUT IN MODERATION/LESS OFTEN</p> <p>They are higher in fat, added sugar, & calories.</p> <p>SLOW! Foods include: pasta, refined white flour, sports drinks, & pure fruit juices.</p>	<p>GO! Foods</p>  <p>GO! FOODS ARE GREAT FOR A BALANCED DIET</p> <p>They are lowest in fat & sugar, lower in calories, & have lots of vitamins, minerals, & other important nutrients.</p> <p>GO! Foods include: fruits, vegetables, whole grains, fat-free/low-fat milk & milk products, lean meat, poultry, fish, beans, eggs, & nuts.</p>
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Obesity Epidemic

- Prevalence of obesity in the US 2015-2016?
 - 39.8%
 - 93.5 million adults in the US
- Estimated cost
 - \$147 billion in 2008 in the US
 - 1429.00 more expensive healthcare if obese
- Socioeconomics
 - The richest and the poorest men have the lowest BMI.
 - For women, just the richest have the lowest BMI.
- Ethnicity
 - Hispanics 47.2%
 - Blacks 46.8%
 - Whites 37.9%
 - Asians 12.7%
- Age
 - 35.7% 20 to 39 year olds
 - 42.8% in 40-59 year olds
 - 41% in 60+ years old

Prevalence[†] of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2017

[†]Prevalence



Obesity

- Each BMI increase of 5 points is associated with significant increase in mortality from chronic heart disease, stroke, diabetes, chronic kidney disease and cancer.
- More than 80% of type II diabetes is related to overweight and obesity

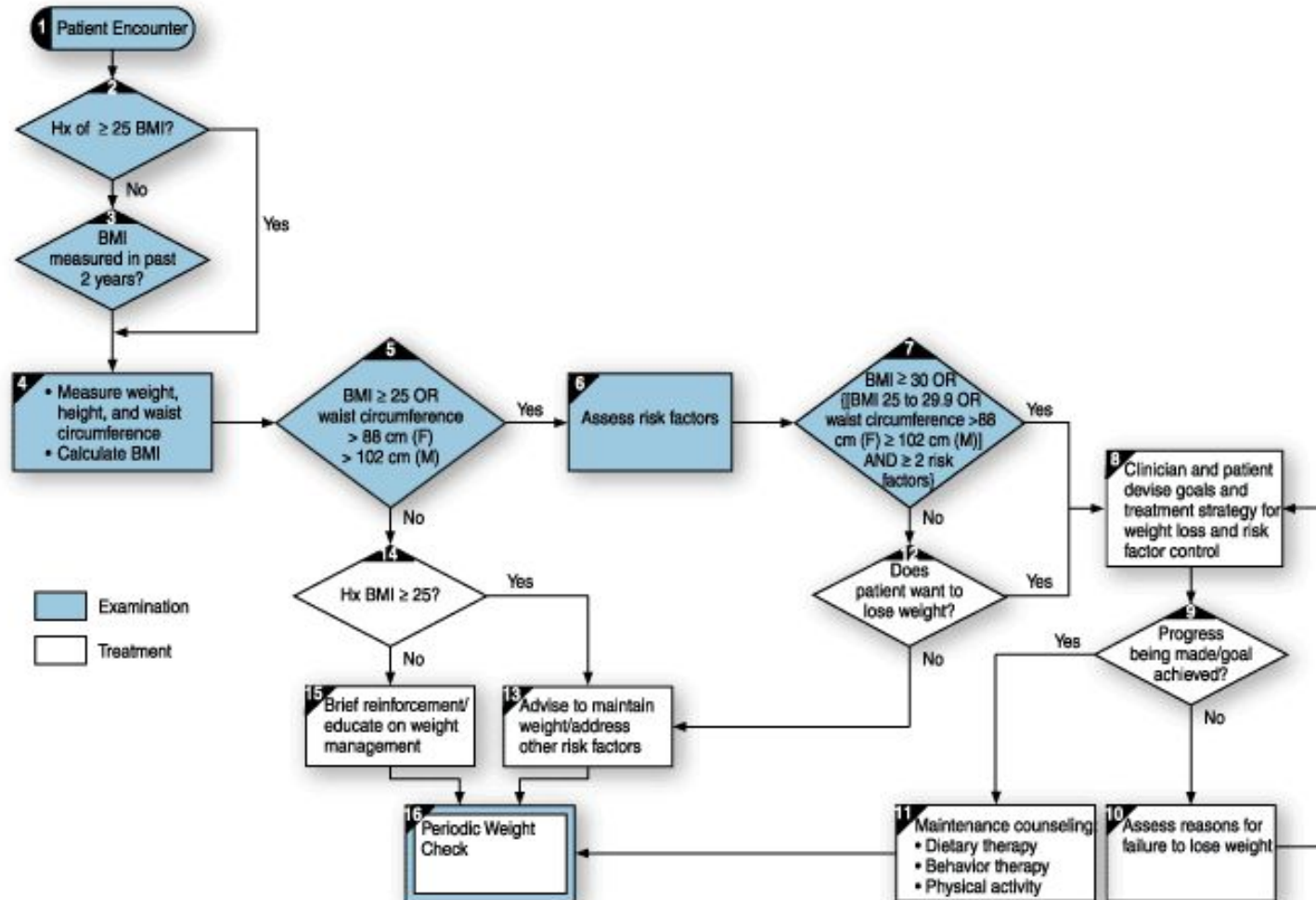
Obesity and Cancer

- Overweight and obesity are estimated to cause 40% of all cancer in the United States
- There are at least 13 types of cancer that are related to obesity and overweight including breast cancer in postmenopausal women, uterine cancer and ovarian cancer.
- Rates of cancer due to elevated BMI are higher in women than they are in men.

Obesity and Cancer

- Cancers associated with obesity seem to be related to hormones and/or inflammation caused by the obesity.
- 55% of cancer diagnosed in women relates to obesity (24% of cancers in men)
- 2 of 3 cancers occur in 54-70 year olds
- New cancers are up in blacks and whites compared to other race and ethnic groups
- More than 630,000 new cancers are related to overweight and obesity

NIH Obesity Algorithm



* This algorithm applies only to the assessment for overweight and obesity and subsequent decisions based on that assessment. It does not include any initial overall assessment for cardiovascular risk factors or diseases that are indicated.

Articles included in packet

- Obesity: When to consider medication Saunders JH et al **OBGManagement 2018;30(8):41-48.**
- Obesity and Women's Health: An Evidence Based Review Kulie T et al, **J Am Board Fam Med 2011;24:75–85.**

OBESITY increases

- All-causes of death (mortality)
- High blood pressure (Hypertension)
- High LDL cholesterol, low HDL cholesterol, or high levels of triglycerides (Dyslipidemia)
- Type 2 diabetes
- Coronary heart disease
- Stroke
- Gallbladder disease
- Osteoarthritis (a breakdown of cartilage and bone within a joint)
- Sleep apnea and breathing problems
- Chronic inflammation and increased oxidative stress
- Some cancers (endometrial, breast, colon, kidney, gallbladder, and liver)
- Low quality of life
- Mental illness such as clinical depression, anxiety, and other mental disorders
- Body pain and difficulty with physical functioning²³

Metabolic syndrome

- Glucose intolerance
- Central obesity
- Dyslipidemia (high triglyceride, low HDL)
- Hypertension

Obesity and Women's Health: An Evidence-Based Review

- J Am Board Fam Med
Jan-Feb 2011 24:75-85
- Increased risk of diabetes and coronary heart dz
- Low back pain
- Knee osteoarthritis
- Negatively effects contraception and fertility

Obesity and Women's Health cont.

- Higher C/S rates
- Gestational DM
- Hypertension of pregnancy
- Negative pregnancy outcomes
 - Neonatal mortality
 - malformations
- Decreased intention to breastfeed
- Decreased initiation of breastfeeding
- Decreased duration of breastfeeding

Obesity and Women's Health cont.

- Correlation between obesity and depression
- Higher risk of multiple cancers
 - Endometrial
 - Cervical
 - Breast
 - Perhaps ovarian

The obesity issue

- Hormones
- Inflammation

Obesity, Endogenous Hormones, and Endometrial Cancer Risk

A Synthetic Review

Rudolf Kaaks, Annekatriin Lukanova and Mindy S. Kurzer (see notes)

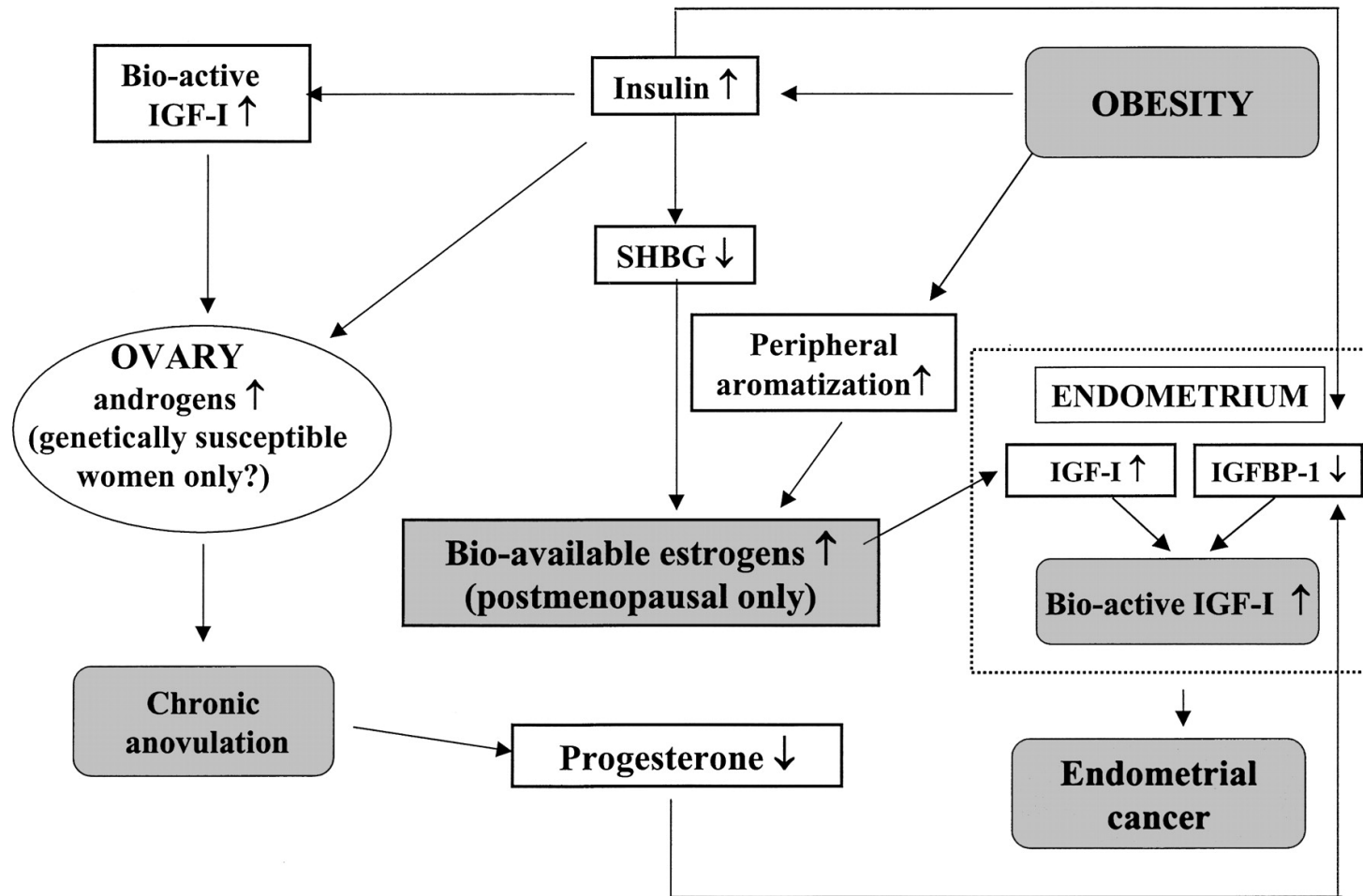


Table 1. Endogenous hormones and endometrial cancer development

Menstrual problems

- Menorrhagia
- Amenorrhea
- Oligomenorrhea
- Polycystic Ovarian Disease

Menorrhagia

- Heavy or prolonged menses
- Linked to obesity because of excess estrogen effect from adipose tissue
- Estrogen causes endometrial thickness to increase thereby increasing the menstrual flow
- Also estrogen dominance/progesterone insufficiency

Menorrhagia management

- Birth control pills
- Progesterone
- Mirena IUD
- Endometrial ablation
- Hysterectomy

Amenorrhea

- Absence of menses
 - Primary amenorrhea is lack of periods without ever starting a period.
 - Secondary amenorrhea is going without a period for more than 3 cycles in a row
- First rule out pregnancy
- Role of obesity
 - Estrogen dominance
 - Anovulation
 - High testosterone

Oligomenorrhea

- Infrequent periods
- More than 35 days from menses to menses
- Often related to obesity
- Evaluate for other conditions
- Discuss the role of obesity with patients to help them

Work up of amenorrhea and oligomenorrhea

- Primary amenorrhea
 - HCG
 - Anatomy
 - Hypothalamic dysfunction
 - Pituitary dysfunction
 - Ovarian dysfunction
 - History, exam, ultrasound, labs
 - HCG, TSH, FSH, Prolactin, Testosterone

Evaluation of Secondary Amenorrhea

- HCG
- History, exam
- Labs
 - FSH
 - TSH
 - Prolactin
 - Testosterone
 - Additional testing: E2, DHEAS
- Progesterone challenge
- Pelvic ultrasound

Endometrial biopsy

- Bleeding between periods
- Postmenopausal bleeding

Polycystic Ovarian Syndrome (PCOS)

- Which came first? Obesity or PCOS?
- PCOS
 - Anovulation
 - Obesity
 - Elevated testosterone (hyperandrogenism)
 - 5 to 12% of women
- Risk factors
 - Obesity
 - Glucose intolerance
 - Dyslipidemia
 - Fatty liver
 - Obstructive sleep apnea

Female Cancers

- Endometrial carcinoma
- Breast Cancer
- Ovarian cancer?
- Cervical cancer?

Endometrial carcinoma

- Most common gynecological cancer in the United States
- Vaginal bleeding is present in more than 90% of cases
- Increased risks include age, obesity, unopposed estrogen, PCOS, Type II Diabetes, atypical glandular cells on pap

Endometrial carcinoma

- 40% or more cases associated with obesity
- Causes related to increase in androstenedione and testosterone due to chronic anovulation, progesterone deficiency,
- Pelvic ultrasound with endometrium of less than 4mm in face of postmenopausal bleeding is 99% negative predictive value for endometrial carcinoma.

Endometrial carcinoma

- Weight loss has been shown to decrease the risk of endometrial cancer

Breast cancer

- Obesity is related to both breast cancer risk and outcome
- Increased risk of cancer.
- Worse prognosis after disease onset
- Postmenopausal women with high BMI, high weight, weight gain and high waist:hip ratio all have increase risk of developing breast cancer
- Premenopausal women have inverse risk related to weight and BMI although weight gain and central obesity increase risk.
- Obesity is related to adverse outcomes pre and post menopausally and is a poor prognosticator at diagnosis

Cervical cancer

- HPV causes 99% of cervical cancer
- How does obesity relate?

Ovarian cancer

- Possible link between chronic inflammation and cancer seeding.
- Limited inconsistent evidence (in 43 studies reviewed 14 found association between ovarian cancer risk and higher BMI, 26 found no association and 3 found negative association)

Obesity and clinical practice

- Body mass index
- Patient Education
- Patient counseling
 - Diet
 - Exercise
 - Weight loss strategies
- “Fat shaming”

Additional References

- Obesity, Endogenous Hormones and Endometrial Cancer Risk: A systematic Review. Kaaks R, et al., Cancer Epidemiology, Biomarkers and Prevention 2002;11:1531-43
- Body Mass Index and Incidence of Cancer: A systematic review and meta-analysis of prospective observational studies. Renehan AG, Tyson M, et al Lancet 2008 16:371 (9612): 569-78.

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- Obesity and Screening for Breast, Cervical and Colorectal Cancer in Women: A Review. Cohen SS, Palmieri RT et al *Cancer* 2008, May 1:112(9):1892-904.
- Chronic Inflammation in Obesity and the Metabolic Syndrome. Monteiro R Azevedo I, *Mediations Inflamm* 2010:2010: 289645

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- Obesity and prognosis of breast cancer. Carmichael AR. *Obs Rev* 2006 Nov;7(4):333-40
- Obesity and ovarian cancer risk: A systematic review. Foong KW, et al. *Post Reprod Health*. 2017 Dec;23(4):183-198