Obesity and Pregnancy

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Date: 10/12/21





Reminders

- Please complete a post webinar survey.
- Instructions on how to access the post webinar survey and obtain a Certificate of Completion will be provided at the end of the presentation.
- You must complete a post webinar survey to receive a Certificate of Completion.
- The post webinar survey will be closed on 09/30/22.
- After the survey closes, Certificates of Completion will not be issued.

Learning Objectives

- Discuss potential complications that should be anticipated in a pregnant patient who is diagnosed with obesity
- Apply concepts discussed during the presentation to improve the management of obese patients during pregnancy

Polling Question #1

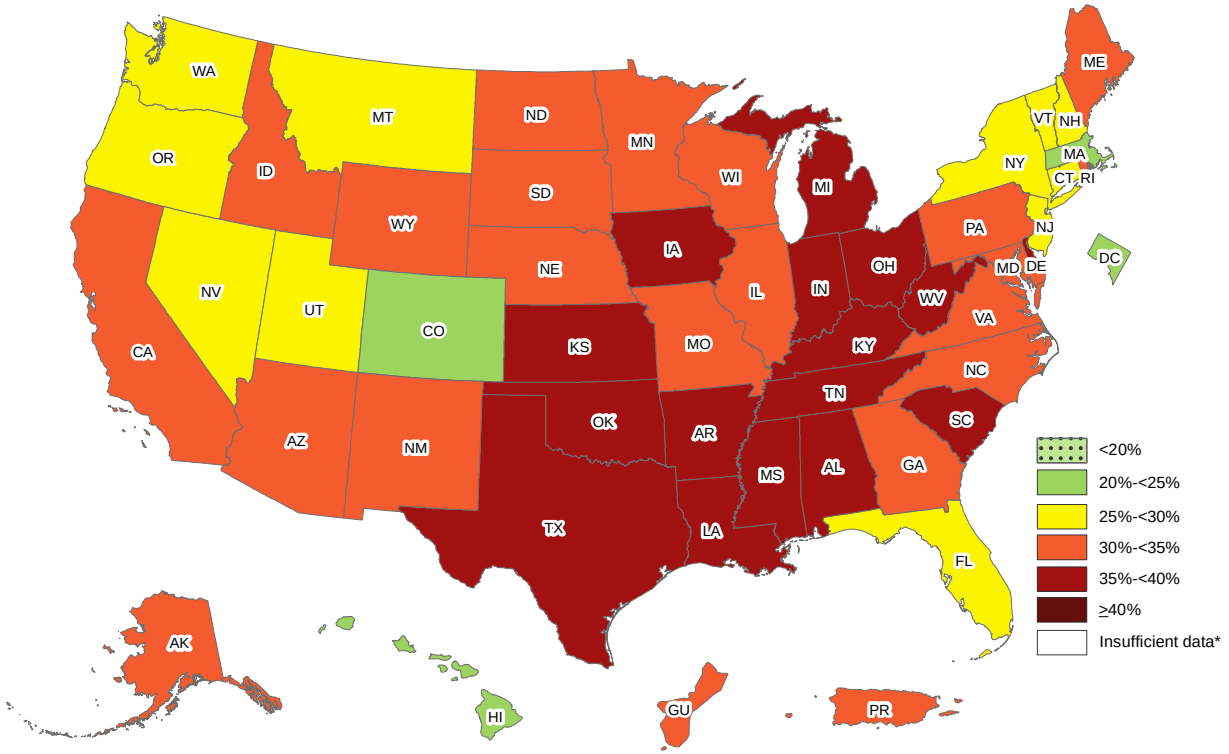
Overview of Obesity in U.S.

- Prevalence: 42.4% all adults (2018)
- Healthy People 2030 target: 36%
  Data source: National Health and Nutrition Examination Survey (NHNES)
- Obesity-related conditions: heart disease, stroke, type 2 diabetes mellitus, some cancers
- Annual medical costs: $316 billion

Medical Expenditure Panel Survey (J. Gen. Internal Medicine, April 2017)

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Prevalence of Obesity by State Among U.S. Adults (2020)

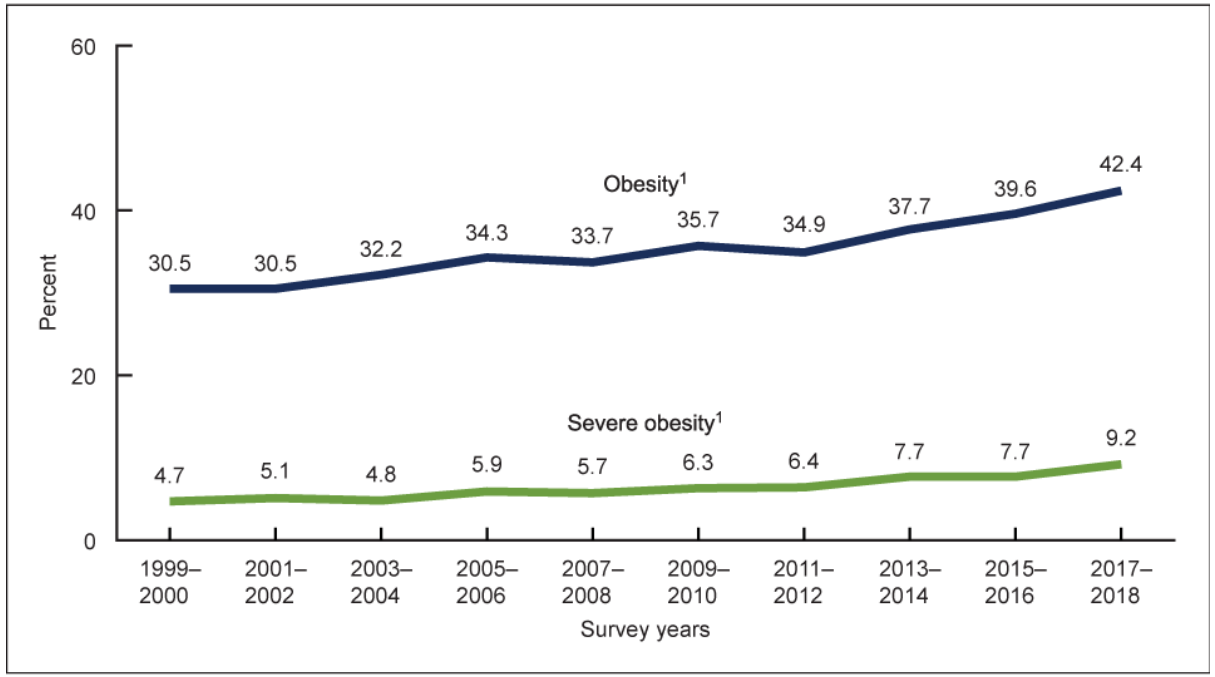


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Adult Obesity in U.S. 1999-2018

Figure 4. Trends in age-adjusted obesity and severe obesity prevalence among adults aged 20 and over: United States, 1999–2000 through 2017–2018

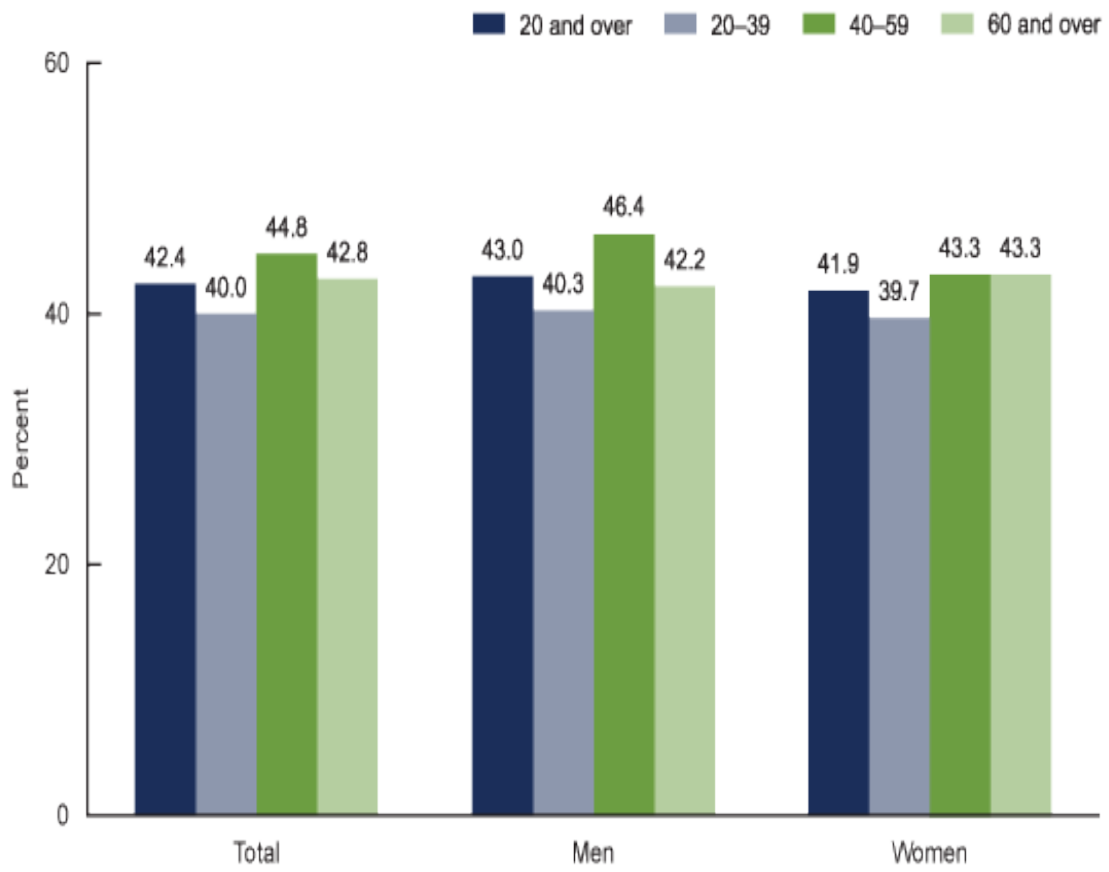


[1]Significant linear trend.
NOTES: Estimates were age adjusted by the direct method to the 2000 U.S. Census population using the age groups 20–39, 40–59, and 60 and over. Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db360_tables-508.pdf#4.
SOURCE: NCHS, National Health and Nutrition Examination Survey, 1999–2018.

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Prevalence of Obesity in U.S. by Sex and Age: 2017–2018



NCHS, National Health and Nutrition Examination Survey, 2017-2018

Defining Overweight and Obesity

Body mass index (BMI): Weight in kilograms divided by the square of height in meters

- Normal: BMI 18.5 to <25
- Overweight: BMI 25 to <30
- Obese: BMI 30 or higher

BMI Subdivisions for Obesity

- Class I: BMI of 30 to <35
- Class II: BMI of 35 to <40
- Class III: BMI of 40 or higher

BMI Subdivisions for Obesity

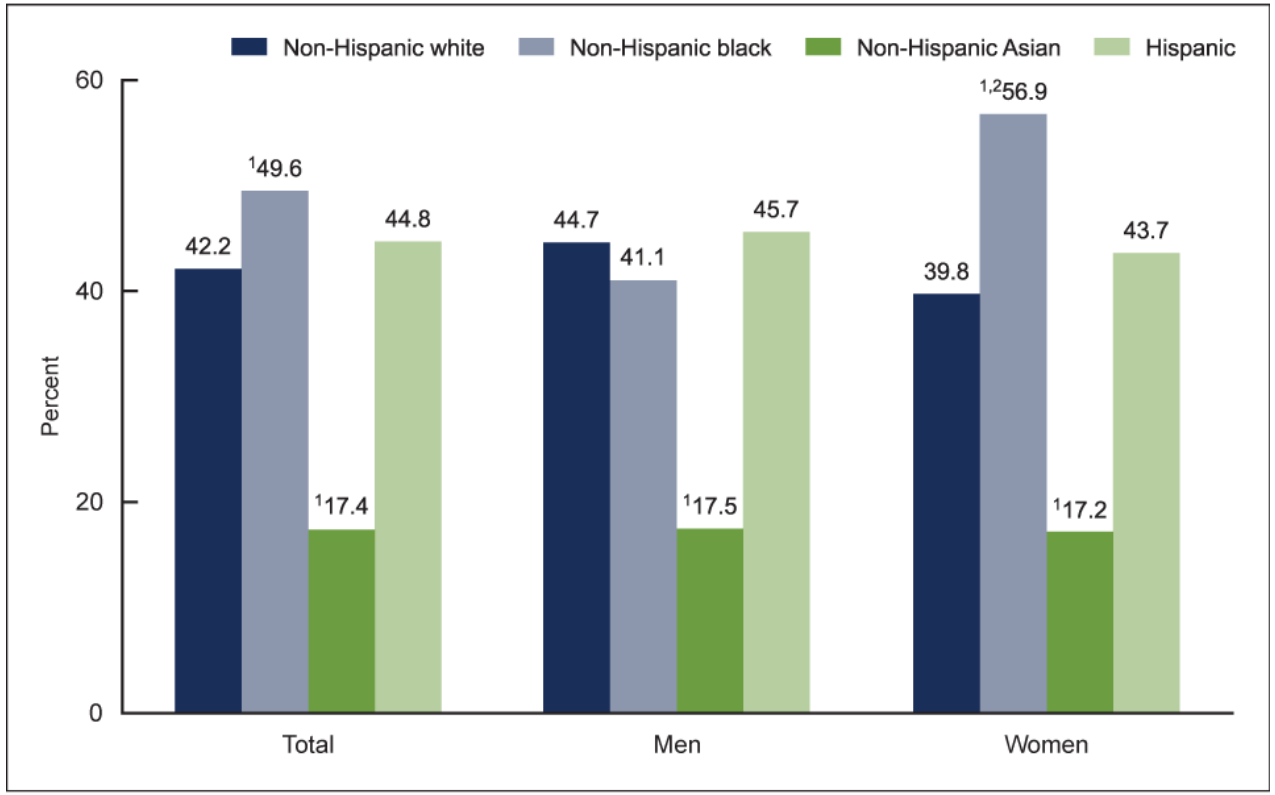
BMI HEIGHT	NORMAL						OVERWEIGHT					OBESE										EXTREME OBESITY																			
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54				
4'10"	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186	191	196	201	205	210	215	220	224	229	234	239	244	248	253	258				
4'11"	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173	178	183	188	193	198	203	208	212	217	222	227	232	237	242	247	252	257	262	267				
5'0"	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255	261	266	271	276				
5'1"	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264	269	275	280	285				
5'2"	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213	218	224	229	235	240	246	251	256	262	267	273	278	284	289	295				
5'3"	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220	225	231	237	242	248	254	259	265	270	278	282	287	293	299	304				
5'4"	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291	296	302	308	314				
5'5"	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300	306	312	318	324				
5'6"	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216	223	229	235	241	247	253	260	266	272	278	284	291	297	303	309	315	322	328	334				
5'7"	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319	325	331	338	344				
5'8"	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256	262	269	276	282	289	295	302	308	315	322	328	335	341	348	354				
5'9"	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338	345	351	358	365				
5'10"	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355	362	369	376				
5'11"	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250	257	265	272	279	286	293	301	308	315	322	329	338	343	351	358	365	372	379	386				
6'0"	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258	265	272	279	287	294	302	309	316	324	331	338	346	353	361	368	375	383	390	397				
6'1"	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378	386	393	401	408				
6'2"	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	280	287	295	303	311	319	326	334	342	350	358	365	373	381	389	396	404	412	420				
6'3"	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	303	311	319	327	335	343	251	359	367	375	383	391	399	407	415	423	431				
6'4"	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410	418	426	435	443				

Source: Adapted from Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report

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Racial and Ethnic Differences in Prevalence of Obesity: 2017 - 2018



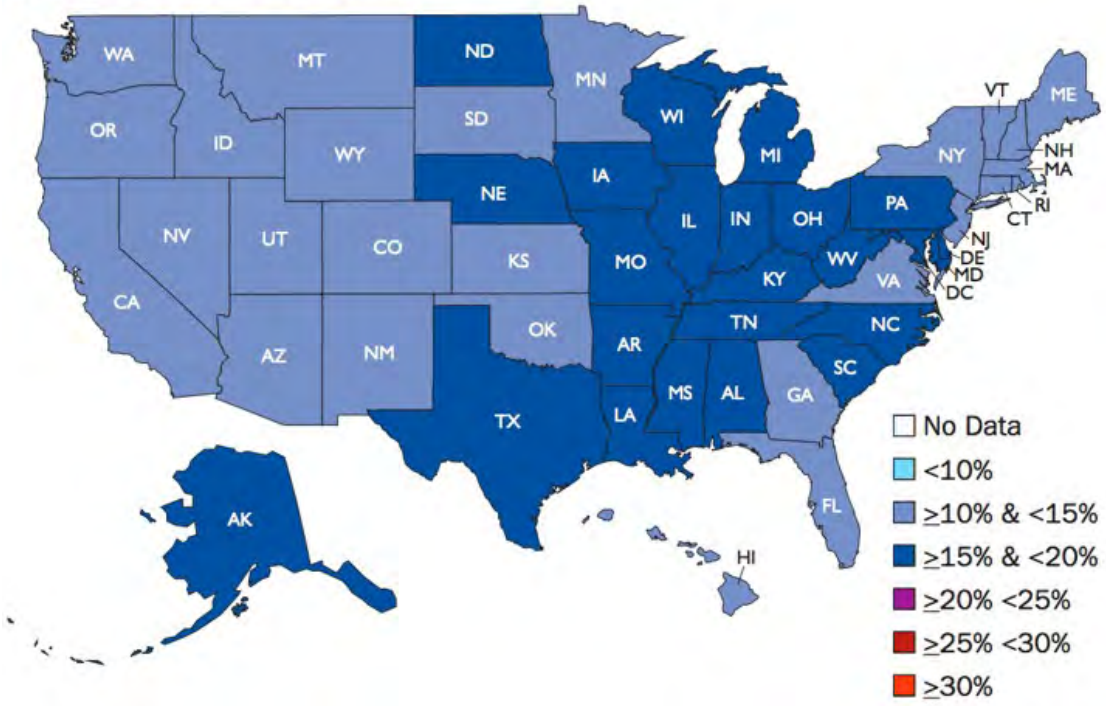
[1]Significantly different from all other race and Hispanic-origin groups.
[2]Significantly different from men for same race and Hispanic-origin group.
NOTES: Estimates were age adjusted by the direct method to the 2000 U.S. Census population using the age groups 20–39, 40–59, and 60 and over. Access data table for Figure 2 at: https://www.cdc.gov/nchs/data/databriefs/db360_tables-508.pdf#2.
SOURCE: NCHS, National Health and Nutrition Examination Survey, 2017–2018.

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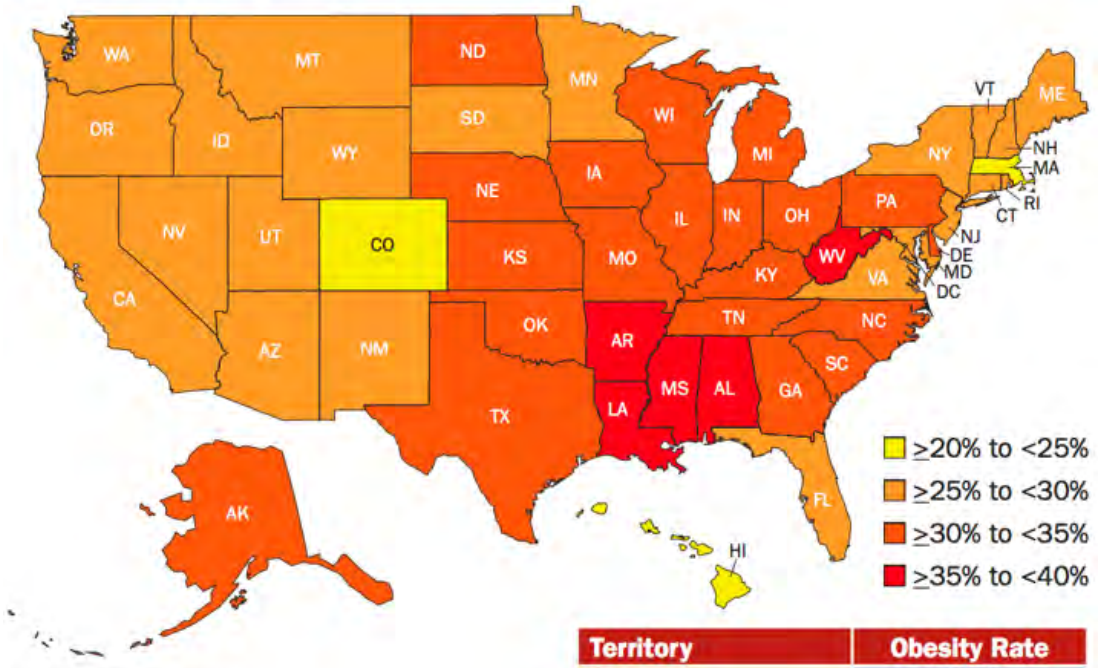
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Obesity Rates

1993–1995 Combined Data



2016 Adult Obesity Rates



Territory	Obesity Rate
Guam	28.3
Puerto Rico	30.7

Source: CDC, BRFSS

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Potential Consequences of Obesity



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Obesity in Pregnancy

- Antepartum Complications and Management
- Intrapartum Complications and Management
- Postpartum Complications and Management

Antepartum Complications and Management

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Polling Question #2

Obesity in Pregnancy: Antepartum Complications



OR = Odds Ratio ; CI = Confidence Interval

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Spina Bifida



Obesity in Pregnancy: Antepartum Complications

- Increased stillbirths (OR 1.72)
- Increased indicated preterm deliveries (e.g., preeclampsia)
  - 22-27 weeks (OR 2.48)
  - 28-31 weeks (OR 1.91)
  - 32-36 weeks (OR 1.62)
- Increased medical complications
  - Preeclampsia (OR 1.6)
  - Gestational diabetes mellitus (GDM) (OR 2.6)
  - Large for gestational age (LGA) (OR 2.9)

Chin, et al, Obesity: Implications for Women's Reproductive Health, Curr Epidem Rep (2014), 1:17-26

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Gestational Weight Gain (GWG) Guidelines (National Academy of Medicine)

- Underweight: 28-40lbs
  1 lb/wk 2/3rd trimester
- Normal weight: 25-30lbs
  1 lb/wk 2/3rd trimester
- Overweight: 15-25lbs
  0.6 lb/wk 2/3rd trimester
- Obese: 11-20lbs
  0.5 lb/wk 2/3rd trimester

AJOG 2017

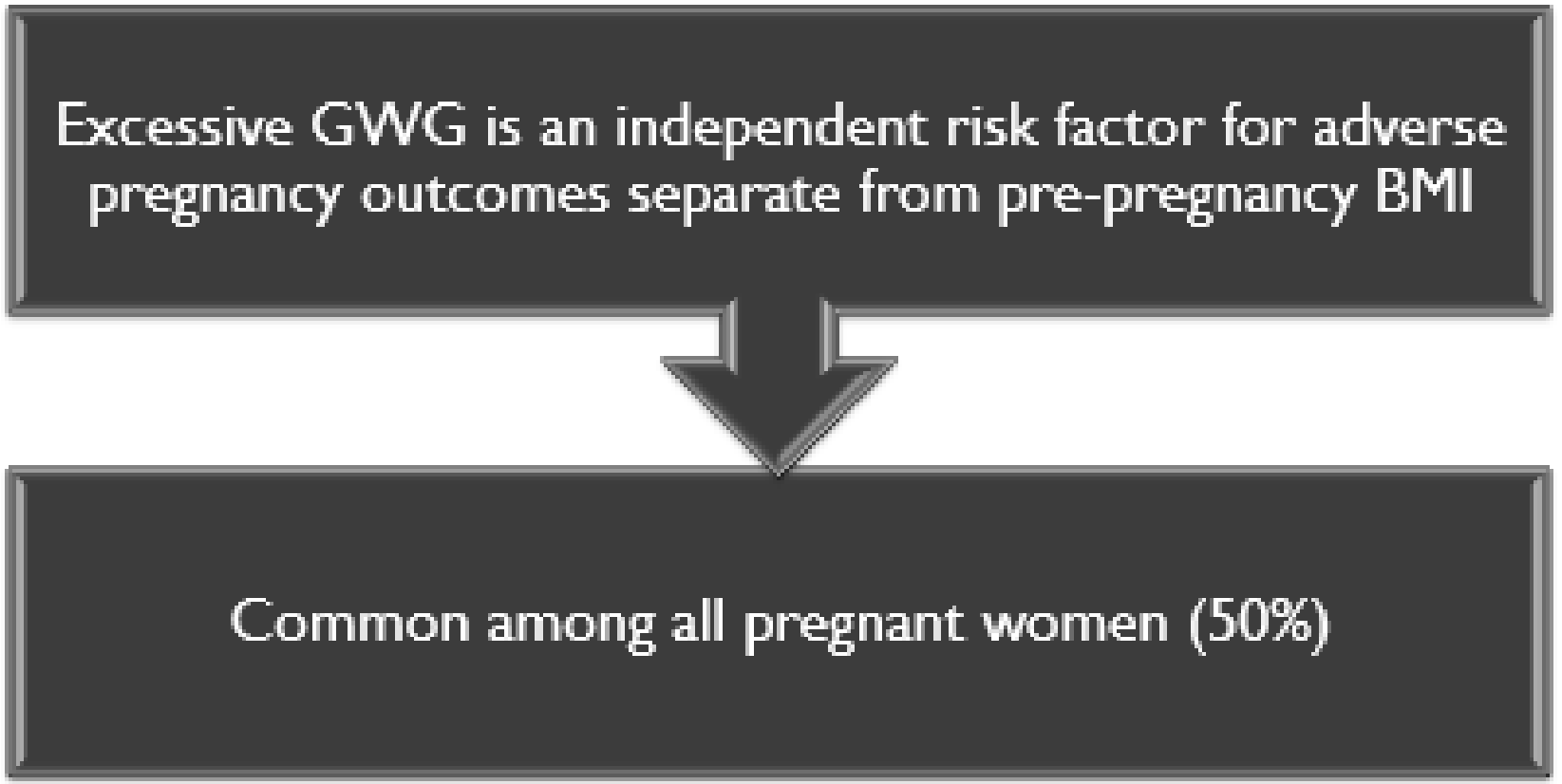
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Obesity in Pregnancy: Antepartum Management

- Determine BMI at first prenatal visit
- Weight management strategies: diet control, exercise, behavior modification
- Review Institute of Medicine (IOM) GWG guidelines
- Goal for obese patients: less than normal weight gain

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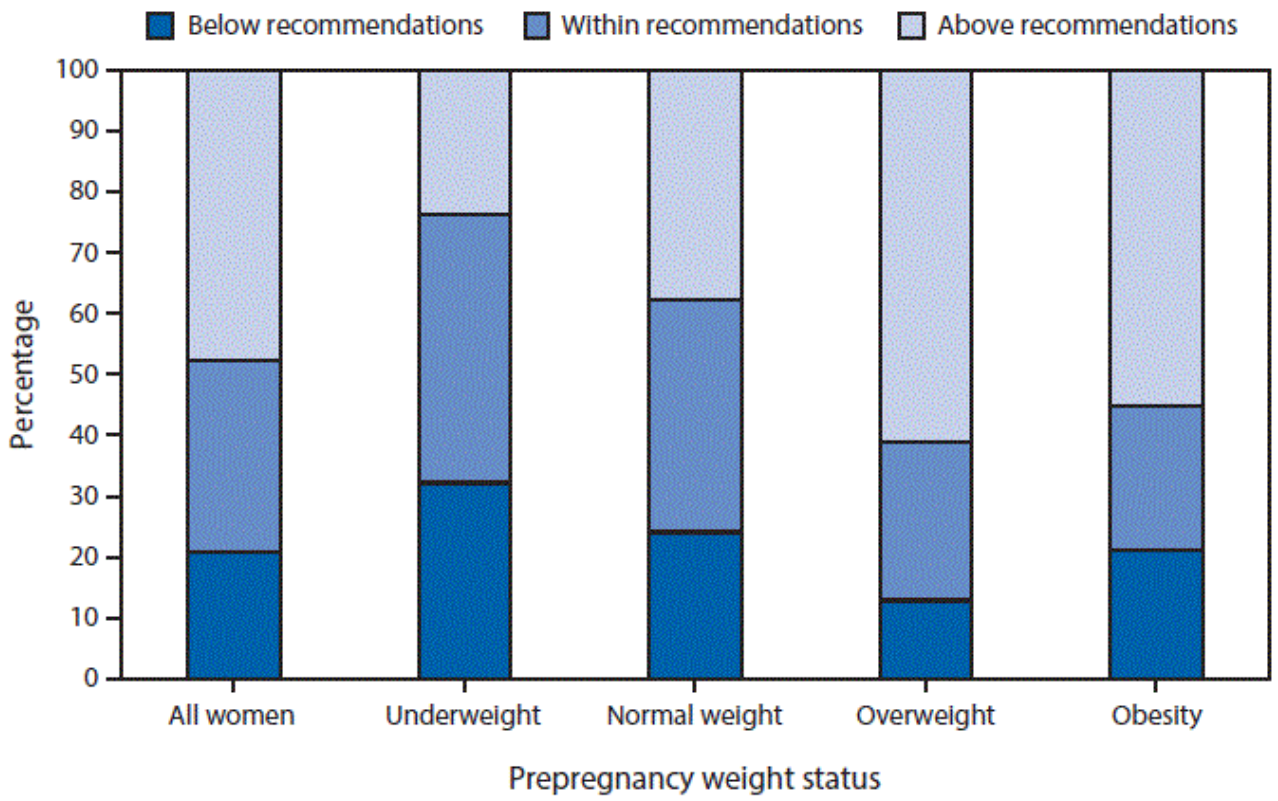
Excessive GWG: An Independent Risk Factor



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Gestational Weight Gain in Pregnancy: Highest Among the Overweight and Obese



MMWR, QuickStats: Gestational Weight Gain Among Women with Full-Term, Singleton Births, Compared with Recommendations — 48 States and the District of Columbia, 2015

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Excessive Gestational Weight Gain Associated with…

- Preeclampsia
- LGA infants
- Gestational diabetes mellitus
- Increased chance of cesarean section (C/S)
- Obesity in later life

Kominiarek et al, Gestational Weight Gain,
Am J Obste and Gynec, December 2017

Large for Gestational Age



High Risks if GWG 20 lbs Over Recommended IOM Guidelines

- 515,148 Singleton births in NYC 2008-12
- 8% Gained >20lbs over IOM guideline
- Heart failure during a procedure: OR 3.44 (95% CI 1.56-7.61)
- Eclampsia: OR 1.70 (95% CI 1.02-2.83)
- Transfusion: OR 1.14 (95% CI 1.02-1.27)
- Ventilation: OR 2.48 (95% CI 1.13-5.44)

Obstetrics and Gynecology (Platner, M. et al, March 2019)

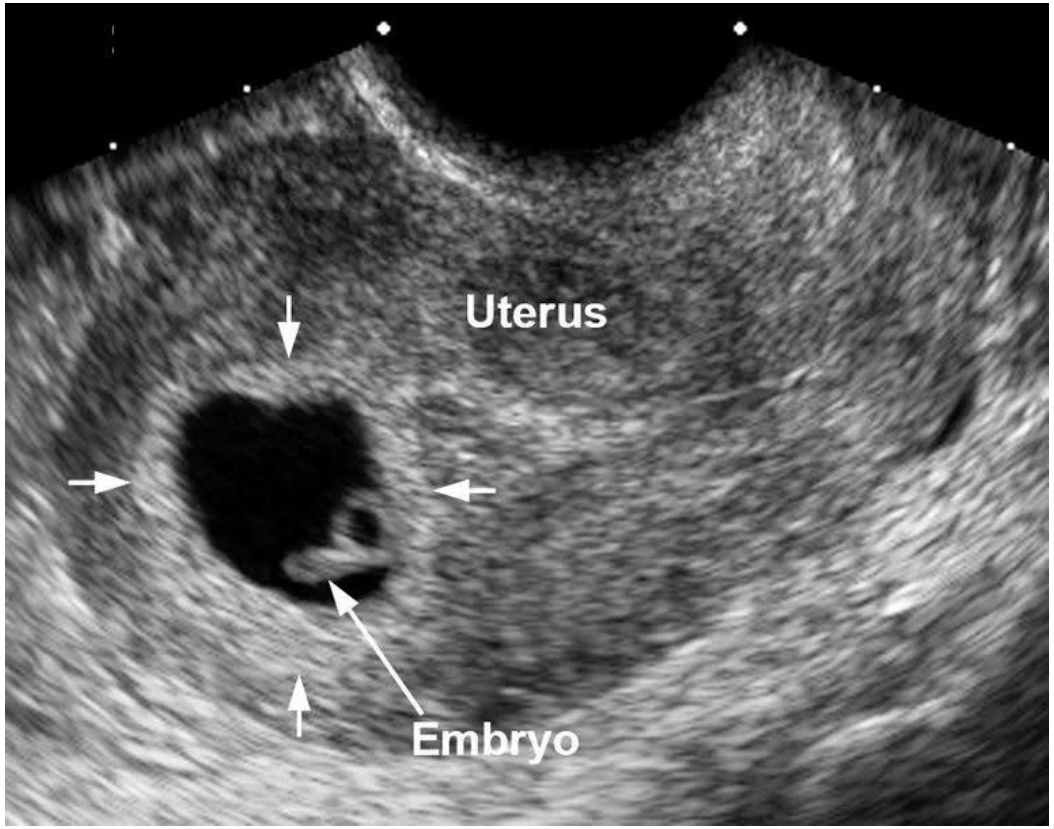
Obesity in Pregnancy: Added Tests to Consider at First Visit

- Fasting blood sugar (FBS) or glucose tolerance test → GDM
- Thyroid stimulating hormone (TSH) → hypothyroidism
- Liver function tests (LFTs) → hypertensive disorders, fatty liver
- Folic acid → 24% are deficient in obesity
- B12 → 4% are deficient in obesity
- Serum Fe → 40% are deficient in obesity

Antepartum Management of Obesity: Ultrasonography

- EARLY ultrasonography for dating, as obesity is associated with irregular ovulation, increased miscarriage rates, and increased medical inductions
- Nuchal fold, echogenic bowel, echogenic cardiac focus detection generally NOT affected by BMI

Ultrasound



Other Ultrasound Considerations in Obese Patients

- Decreased sensitivity for detecting anomalies
- Increased rates of anomalies
- Increased intrauterine growth restriction (IUGR); unreliability of fundal height measurements
- All may require repeat studies or fetal echo

Antepartum Management of Obesity: Metabolic Considerations

- Obesity linked to insulin resistance, glucose intolerance, and metabolic syndrome
- Pregnancy manifestations: Gestational diabetes mellitus (GDM), preeclampsia and obstructive sleep apnea (OSA); consider sleep study if possible OSA
- OSA underdiagnosed/associated with preeclampsia, cardiomyopathy, and pulmonary embolism

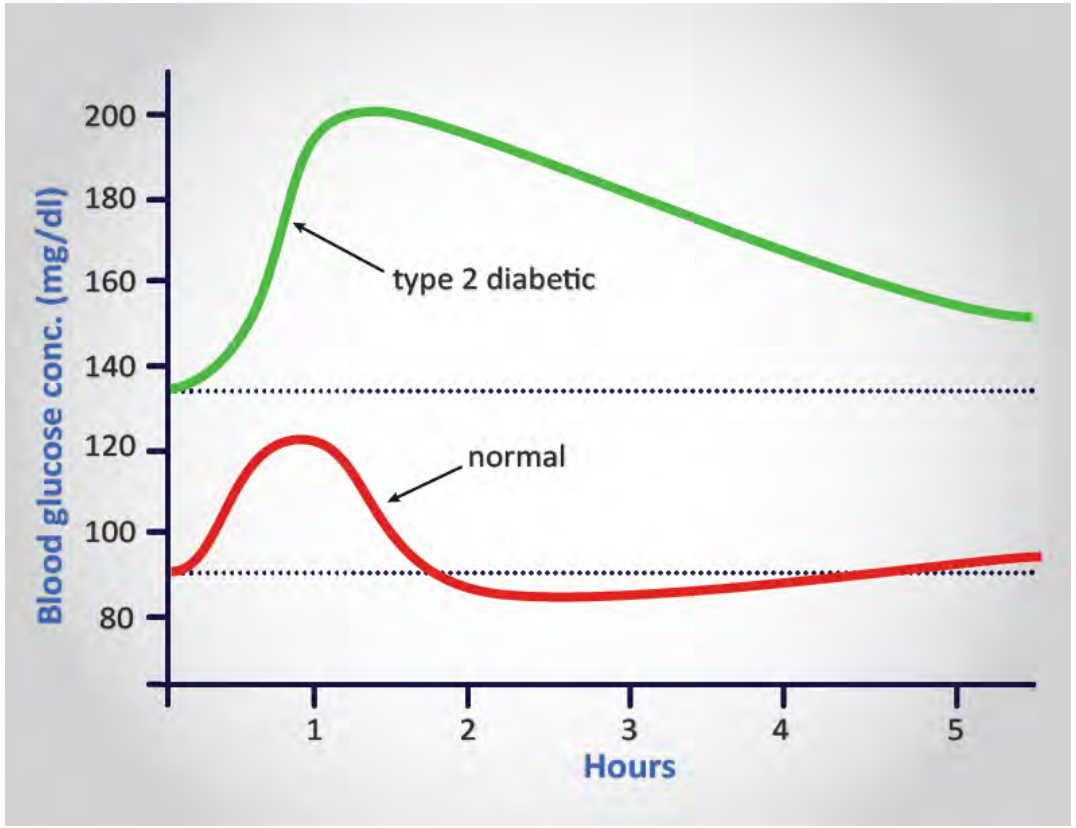
Screening for Gestational Diabetes Mellitus (GDM) in Women with Obesity

- The American College of Obstetricians and Gynecologists (ACOG) recommends early GDM screen if either obese or overweight plus one other risk factor
- Screening starts earlier than normal: first trimester (first visit)
- 2-step screen or 1-step screen
  - 2-step screen: 50gm 1h glucose tolerance test (GTT) (< 130-140 nl)
    if fails, 100gm 3h GTT
  - 1-step screen: 75gm 2h GTT

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Glucose Tolerance Test



Reproduced from http://themedicalbiochemistrypage.org/diabetes.php

Risk Factors in Overweight Women that Trigger Early GDM Screening

- Past history GDM
- First degree relative with DM
- Birth of >4000gm infant
- History of abnormal lipids
- Hypertension
- A1C >5.7
- Ethnic/racial factors: African American, Latina, Native American, Asian American
- Polycystic ovarian syndrome

ACOG Practice Bulletin #190, February 2018

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Management of Obesity with Hypertensive Disorders

- Low dose aspirin (ASA) prophylaxis should be considered with obesity PLUS one other risk factor for preeclampsia
- Consider liver function tests (LFTs) at first visit to help diagnosing HELLP (hemolysis, elevated liver enzymes, low platelet count) syndrome or acute fatty liver later in pregnancy
- Consider 24-hour urinalysis for protein at first visit

Low Dose Aspirin



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ASA Prophylaxis

- RECOMMENDED in late first trimester if high risk for preeclampsia (personal history of preeclampsia, renal disease, or chronic hypertension); this applies to ALL patients regardless of obesity
- CONSIDER in obese patients with one other risk factor (e.g., nulliparous, advanced maternal age, family history of preeclampsia)

ACOG Committee Opinion #743 (Low-dose ASA Use During Pregnancy), June 2018

U.S. Preventive Services Task Force, Aspirin Use to Prevent Preeclampsia and Related Morbidity and Mortality: Preventive Medication, 2021

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Obesity in Pregnancy: Stillbirth Risk is BMI-Related



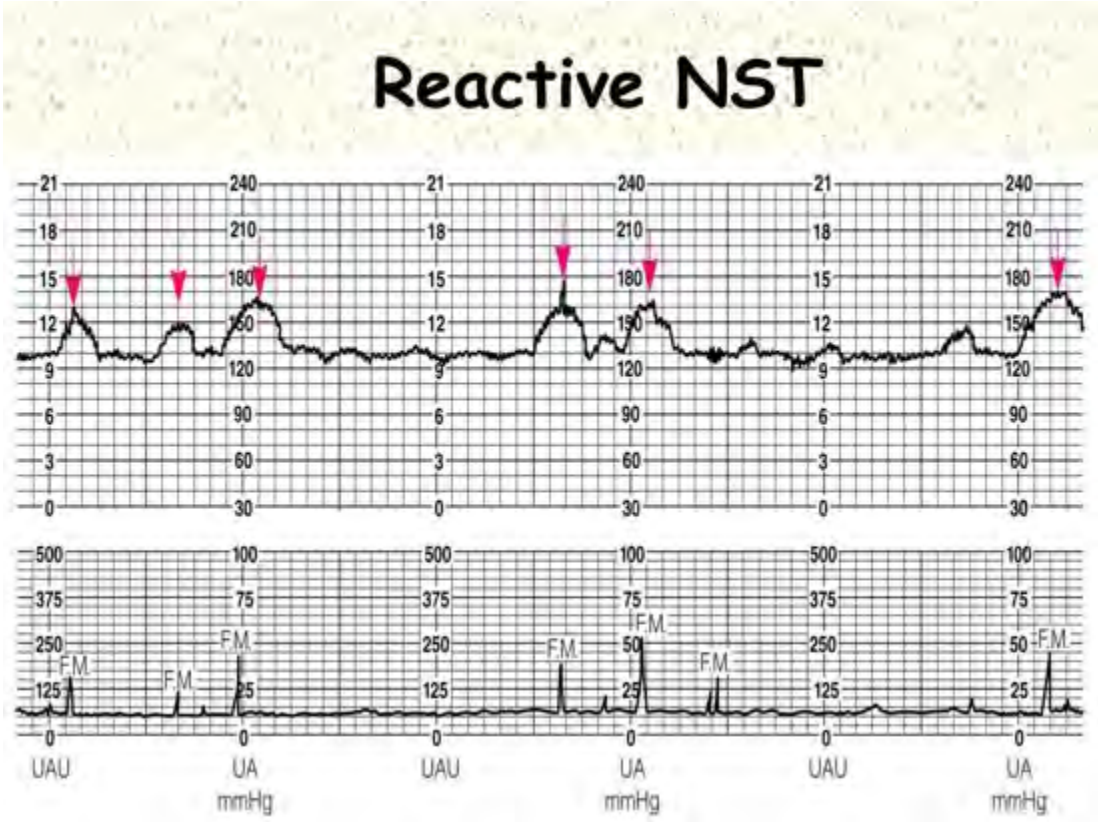
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Obesity and Fetal Testing

- Routine antenatal fetal testing for obesity alone: no evidence-based data to show improvement in stillbirth rates
- But has been proposed as indication for increased fetal surveillance
- Consider antenatal testing (non-stress tests, amniotic fluid volume) in presence of additional risk factors (preeclampsia, diabetes, advanced maternal age) in 3rd trimester

Fetal Testing



Antenatal Fetal Testing in Obesity

- BMI 35-39.9: consider weekly starting 37.0 weeks gestation
- BMI 40 or more: consider weekly at 34.0 weeks

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Intrapartum Complications and Management

Obesity in Pregnancy: Intrapartum Complications

- More cesarean sections + more blood loss
- More failed trials of labor (obesity NOT an indication for induction of labor)
- More venous thromboembolism (VTE)
- More difficult anesthesia (difficult intubations, dural punctures)
  - Consider antepartum anesthesia consult especially with OSA
- More shoulder dystocia

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Cesarean Birth



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Labor Patterns and Obesity

- Direct correlation between BMI and “failure to progress” indication for C/S
- Longer latent phase
- Longer total labor time
- More oxytocin augmentation
- But second stage of labor not increased with obesity

Why?

- Mechanism for labor patterns in obese patients is poorly understood
- But not necessarily related to decreased contraction strength

VBAC

Vaginal Birth After Cesarean

Polling Question #3

VBAC in Obesity

- “Higher BMIs” (Class II and III) have greater complications with BOTH elective C/S and VBAC
- “Shared decision-making” recommended
- VBAC not contraindicated in obesity regardless of BMI level

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Obesity and VBAC

- More failures overall
- Among morbidly obese (BMI >40)
  - 5X increased risk of uterine rupture
  - 2X increased risk of surgical complications
  - 5X increased risk of neonatal injury (fracture, brachial plexus injury, laceration)

Hibbard et al, Obstet Gynecol, 2006

Obesity in Pregnancy: Intrapartum Management

- ALLOW MORE TIME before diagnosing arrest of labor in obese patients, due to longer active phase
- Encourage LEFT LATERAL POSITION
- Use pneumatic COMMPRESSION DEVICES
- ANTICIPATE greater risk of hypotension and prolonged fetal heart tone (FHT) decelerations after epidural in type III obesity
- Consider TYPE and CROSS if BMI >40

Intrapartum Management of Obesity: Cesarean Section

- Use higher dosages of preop antibiotics
- Type of abdominal incision: not totally clear in class II/III obesity in comparing vertical v. horizontal
- Good evidence supporting closure of SQ if >2cm and AVOIDANCE of SQ drains

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Pneumatic Compression Device



Labor Pain Control in Obese Pregnant Patients

- Anesthesia consult in 3rd trimester before labor
- History of obstructive sleep apnea adds risk
- Avoid excessive use of narcotics

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General Anesthesia and Obesity

- Avoid in childbirth, if possible
  - Difficult intubations
  - Increased risk of aspiration and cardiovascular complications
- Recognize importance of preoxygenation
- Use H2 agonists

Regional Anesthesia and Obesity

- Anesthesia of choice in childbirth
- Obesity adds technical challenges with spinals and epidurals
- Consider early use of epidurals in labor
- Recognize spinals can impair respiratory function for 2 hours



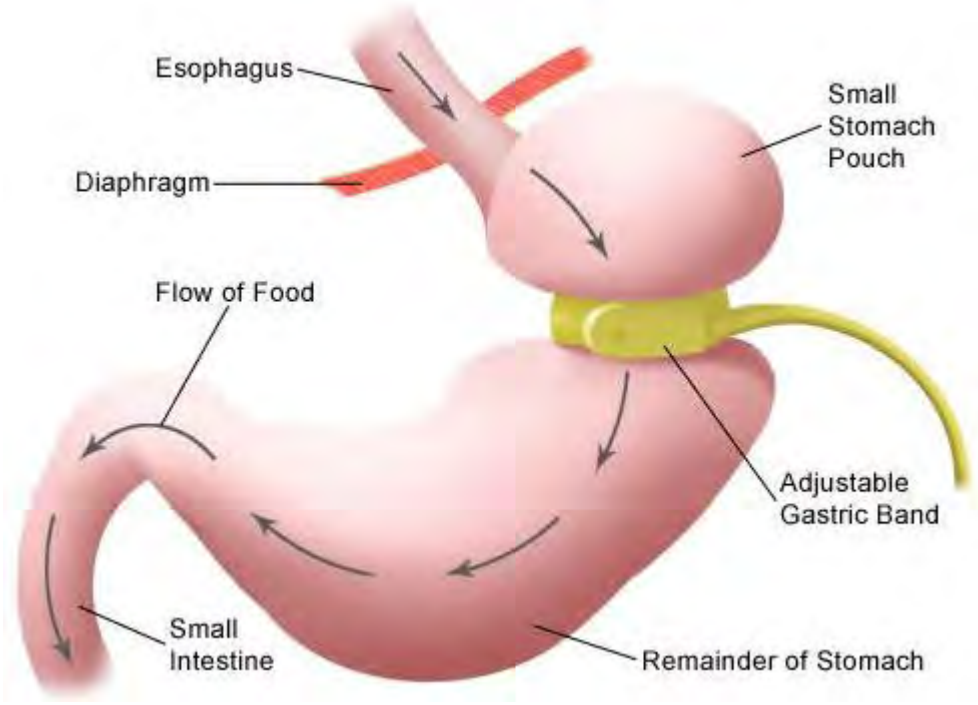
Bariatric Surgery and Subsequent Pregnancy

- Avoid pregnancy for 12 months after surgery
- Lower maternal risk for: GDM, preeclampsia
- Higher maternal risk for: nutritional deficiencies (B12, iron, folate anemia; vitamin D, and calcium) - Consult dietician
- Fetal risks: more small for gestational age (SGA) infants (but fewer LGA infants)

Bariatric Surgery and Subsequent Pregnancy

- Avoid GTT: risk of “dumping syndrome”
- Ultrasound screening for growth 3rd trimester
- Monitor CBC, comprehensive metabolic panel (CMP), Fe, Vitamins D, and B12 q trimester

Adjustable Gastric Band Procedure



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Bariatric Surgery: Linked to Fewer Congenital Abnormalities

- Swedish Study (Karolinska Institute)
- Cohort study of 3000 births among severely obese patients (2007-2014)
- Surgery group (Roux-en-y gastric bypass) had 33% fewer major birth defects
- Risk Ratio: 0.67, 95% (CI 0.52-0.87)

JAMA (2019), 322 (15): 1515-1517

Bariatric Surgery: Linked to Lower Risks in Subsequent Pregnancy

- Population studied: obese patients who had bariatric surgery between 1st and 2nd pregnancies
- Less hypertension, diabetes and preterm birth, and LGA infants in 2nd pregnancy compared to 1st pregnancy
- Improvements did not reach levels comparable to non-obese patients

Ibiebele et al, BJOG, Nov. 20, 2019

Bariatric Surgery: Linked to some possible higher risks however…

- Increased SGA births: odds ratio 2.46; 95% CI, 1.64-2.95
  Source: Getahun, et al AJOG June 30, 2021
- Increased SGA births; odds ratio 2.20; 95% CI, 1.64-2.95
  Source: Johansson, et al NEJM Feb. 26, 2015

Postpartum Complications and Management

Obesity in Pregnancy: Postpartum Complications

- Increased rates of endometritis, perineal, and wound infections
- Increased postpartum hemorrhage proportional to BMI
- Higher risk of VTE (most maternal deaths from VTE are in obese pts)
- Postpartum weight retention
- Early termination of breastfeeding (delayed lactogenesis)

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Potential Long-Term Effects of Obesity

Retained postpartum weight associated with subsequent:

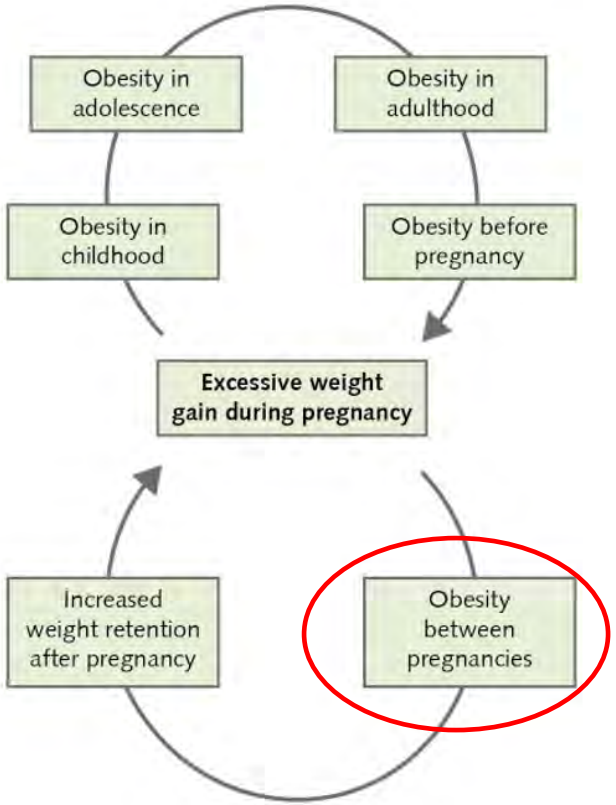
- Hypertensive disorders
- GDM
- C/S
- Stillbirth
- LGA infant

Chin et al, Obesity: Implications for Women's Reproductive Health, Curr Epidem Rep (2014), 1:17-26

Obesity in Pregnancy: Postpartum Management

- Encourage early ambulation
- Pneumatic compression devices after C/S until fully ambulatory
- Consider low molecular weight (LMW) heparin after C/S especially if BMI >40
- Encourage breast feeding (associated with less postpartum weight retention)
- Contraceptive counselling - Offer long-acting reversible contraception (LARC) after delivery
- 6-week postpartum GTT if GDM; also consider lipid profile

Vicious Cycle of Obesity in Pregnancy



Excessive GWG associated with long-term postpartum weight gain

V. E. Cnattingius, Lancet, 2006

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Losing Weight After Pregnancy is the "Window of Opportunity"

Obesity in Pregnancy: Conclusions

- Risks for MOM: increased maternal morbidity and mortality, greater length of stay
- Risks for BABY include more:
  - Neonatal ICU admissions
  - Cerebral palsy, neonatal encephalopathy
  - Developmental delay
  - Obesity in later life
- For some obese patients: bariatric surgery is an option

HRSA Resources

Perinatal and Infant Health

- Short- and long-term health risks exist for mothers and their babies before, during, and after birth
- We promote and provide essential programs and services to increase access to quality care and ultimately reduce illness and death

https://mchb.hrsa.gov/maternal-child-health-topics/perinatalinfant-health

Polling Question #4

Polling Question #5

Final Reminders

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  - Include “survey” and “Certificate of Completion” in the subject line of the email.
- After a post webinar survey is submitted, a Certificate of Completion will be sent via email from svc_powerplatform@kepro.com.
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Questions



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Thank You!