

Significantly Increased BMI in Pregnancy

Objectives

- Review the epidemiology and risks associated with increased BMI in pregnancy.
- Discuss implications for care of the laboring and postpartum patient with increased BMI.
- Apply a team-based, patient-centered approach to mitigate risks associated with increased BMI and provide safe peripartum care.

What is obesity and how do we measure it?

TABLE 12-1. Body Mass Index (BMI) Criteria for Classifying Weight Status in Adults

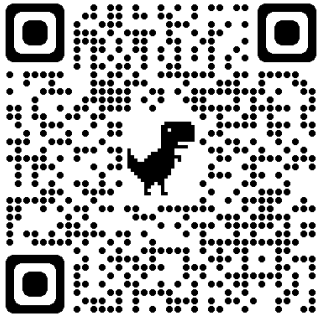
| BMI formulas | |
|---|--------------------------|
| weight (kg) / height (m ²) or weight (lb) × 703 / height (in ²) | |
| Weight classification | BMI (kg/m ²) |
| Underweight | <18.5 |
| Normal range | 18.5 to 24.9 |
| Overweight (preobese) | 25.0 to 29.9 |
| Obese | ≥30 |
| Obese class I | 30.0 to 34.9 |
| Obese class II | 35.0 to 39.9 |
| Obese class III | ≥40 |

Adapted from National Heart, Lung, and Blood Institute. (2013). *Managing overweight and obesity in adults: Systematic evidence review from the obesity expert panel, 2013*. Washington, DC: National Institutes of Health; World Health Organization. (2000). *Obesity: Preventing and managing the global epidemic* (WHO Technical Report Series, 894). Geneva, Switzerland: Author. Retrieved from http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/

$$BMI = \left\{ \frac{\text{WEIGHT (pounds)}}{\text{HEIGHT (inches)}^2} \right\} \times 703$$



Adverse Life Experiences



- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5322988/>

- <https://developingchild.harvard.edu/media-coverage/take-the-ace-quiz-and-learn-what-it-does-and-doesnt-mean/>



Weight Bias

- Refers to negative stereotypes towards individuals with obesity or excess weight that leads to discrimination.
- When people experience weight stigma or discrimination, they are at higher risk for depression, anxiety, low self-esteem, and substance abuse.

Identifying Bias

- Have you ever thought to yourself, this patient is:
 - Non-compliant
 - Dishonest
 - Lazy
 - Lacking self-control
 - Uneducated
- How do I feel when I work with patients of different body sizes?

Patient Perspective

- Research indicates that 46 percent of women affected by obesity reported that small gowns, narrow exam tables and inappropriately sized medical equipment were barriers to receiving healthcare.
- In addition, 35 percent reported embarrassment about being weighed as a barrier to care.

Another Patient Perspective



40.0 weeks 10 lbs 1 oz



37.1 weeks 7 lbs 7 oz

Why does it matter that my pregnant patient is obese?

- Pregnancy can exacerbate obesity-related comorbidities as well as result in the development of additional maternal complications during pregnancy, labor, and birth (ACOG, 2015).
- Maternal morbidity and mortality increase with increasing BMI.

What does obesity put a pregnant person at higher risk for?



DISPLAY 12-1

Risks Associated with Maternal Obesity during Pregnancy, Labor, and Birth

| Maternal | Fetal and infant |
|--|---|
| Spontaneous abortion | Congenital anomalies (neural tube defects, cardiovascular anomalies, diaphragmatic hernia, cleft lip and palate, anorectal atresia, hydrocephaly, limb reduction) |
| Antepartum hospitalization | Intrauterine growth restriction |
| Hypertensive diseases, both preexisting and gestational, preeclampsia | Prematurity related to medically indicated preterm birth due to maternal complications and comorbidities |
| Diabetes, both preexisting and gestational | Conditions associated with prematurity (intracranial hemorrhage, respiratory distress, vision, gastrointestinal, and cardiac problems) |
| Ischemic heart disease | Neonatal macrosomia |
| Sleep apnea | Fetal death |
| Multiple pregnancy | Stillbirth |
| Medically indicated preterm birth | Low Apgar scores |
| Postterm pregnancy | Birth trauma |
| Labor and birth abnormalities (labor dystocia, prolonged labor, labor induction and augmentation, unsuccessful vaginal birth after cesarean, fetal compromise, shoulder dystocia, operative vaginal birth, fourth-degree lacerations, postpartum hemorrhage, cesarean birth) | Neonatal acidemia |
| Labor anesthesia complications (difficult epidural catheter placement, inadvertent dural puncture, failure to establish regional anesthesia, insufficient duration of regional anesthesia, hypotension, postdural headaches) | Neonatal intensive care unit admission |
| Complications of cesarean birth (increased time from decision to incision, increased time from incision to birth, increased intraoperative time, general anesthesia, failed intubation, aspiration, intraoperative hypotension, increased blood loss, venous thromboembolism, surgical site infection, wound dehiscence) | Neonatal respiratory complications |
| Infection (urinary tract infection, episiotomy infection, endometritis, wound infection) | Childhood, adolescent, and adult obesity |
| Increased length of stay | |
| Breastfeeding difficulties | |
| Short duration of breastfeeding | |
| Postpartum maternal rehospitalization | |
| Maternal death | |

From American College of Obstetricians and Gynecologists. (2015). *Obesity in pregnancy* (Practice Bulletin No. 156). Washington, DC: Author; Blomberg, M. I. (2011). Maternal obesity and risk of postpartum hemorrhage. *Obstetrics & Gynecology*, 118(3), 561–568. doi:10.1097/AOG.0b013e31822a6c59; Chescheir, N. (2011). Global obesity and the effect on women's health. *Obstetrics & Gynecology*, 117(5), 1213–1222. doi:10.1097/AOG.0b013e3182161732; Ehrenberg, H. M. (2011). Intrapartum considerations in perinatal care. *Seminars in Perinatology*, 35(6), 324–329. doi:10.1053/j.semperi.2011.05.016; Gunatilake, R. P., & Perlow, J. H. (2011). Obesity and pregnancy: Clinical management of the obese gravida. *American Journal of Obstetrics & Gynecology*, 204(2), 106–119. doi:10.1016/j.ajog.2010.10.002; Jungheim, E. S., & Moley, K. H. (2010). Current knowledge of obesity's effects in the pre- and periconceptional periods and avenues for future research. *American Journal of Obstetrics & Gynecology*, 203(6), 525–530. doi:10.1016/j.ajog.2010.06.043; Marchi, J., Berg, M., Dencker, A., Olander, E. K., & Begley, C. (2015). Risks associated with obesity in pregnancy, for the mother and baby: A systematic review. *Obesity Reviews*, 16(8), 621–638. doi:10.1111/obr.12288; Ovesen, P., Rasmussen, S., & Kesmodel, U. (2011). Effect of prepregnancy maternal overweight and obesity on pregnancy outcome. *Obstetrics & Gynecology*, 118(2, Pt. 1), 305–312. doi:10.1097/AOG.0b013e3182245d49; Tan, T., & Sia, A. T. (2011). Anesthesia considerations in the obese gravida. *Seminars in Perinatology*, 35(6), 350–355. doi:10.1053/j.semperi.2011.05.021; and Thornburg, L. L. (2011). Antepartum obstetrical complications associated with obesity. *Seminars in Perinatology*, 35(6), 317–323. doi:10.1053/j.semperi.2011.05.015

Obesity-Related Peripartum Complications

| Problem/Risk | Potential Intervention |
|--|--|
| Increased respiratory work and myocardial oxygen requirement | Epidural anesthesia, supplemental oxygen, lateral laboring position |
| Increased risk of general anesthesia | Anesthesia consult prior to 3rd trimester, epidural placement prior to any induction agents |
| Enhanced risk of PPH | Blood typed and crossed, ligate large subcutaneous vessels, meticulous surgical technique |
| Enhanced thromboembolic risk | Early postop ambulation, SCDs, Heparin until fully ambulatory |
| Enhanced risk of shoulder dystocia | Near term sonographic fetal weight, caution with operative delivery |
| Enhanced risk of infection morbidity | Thorough skin preparation, adequate antimicrobial prophylaxis, avoidance of submandibular incision, meticulous surgical technique, consideration of subcutaneous drain |

From Gunatilake, R., & Perlow, J. H. (2011). Obesity and pregnancy: Clinical management of the obese gravida. *American Journal of Obstetrics & Gynecology*, 204(2), 106–119. doi:10.1016/j.ajog.2010.10.002.

Anesthesia Consult

- Prior to 3rd trimester
- Evaluation of past medical history, OSA assessment, airway exam, visualization and palpation of the back, possible US of back
- Outlay risks associated with body habitus
- Explain need for epidural prior to any induction interventions
- Discuss risk/benefit of regional anesthesia over general anesthesia and implications in emergency situations

Obesity-Related Intrapartum Complications

- Women with obesity are more likely to have an induction or augmentation of labor.
- Excessive maternal weight and obesity have a negative effect on uterine contractility and can therefore, increase the length of the labor induction.
- Labor proceeds more slowly as BMI increases, as well as labor lengthens, suggesting that labor management be altered to allow longer time for these differences.

Obesity-Related Intrapartum Complications

- Higher rate of C-section
- Increased risk of bleeding during C-section
- Increased risk of hypoxia
 - Olerich et al., 2022
- Increased risk of failed epidural (12-17%)
 - Taylor, Dominguez, & Habib, 2019

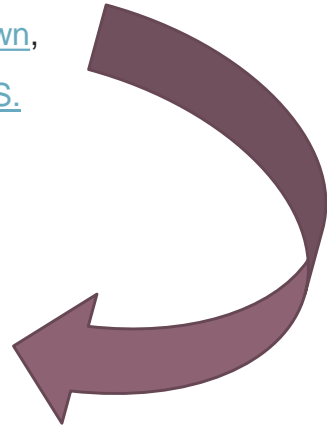
Nursing Interventions

- EFM
 - Have the provider US the patient
 - Handheld doppler vs external monitor vs NOVII
- More Staff
 - 1:1 care for hand holding US
 - To position
 - To hold legs while pushing, or consider an alternate push position
 - To complete procedures
- If other risk factors are present, consider a second IV right away
 - May need US guided IV placement or IV team
- Cesarean Section
 - Extra Chlorhexidine, extra towels
- TALK TO YOUR PATIENT

Nursing Interventions: Pitocin

Influence of Maternal Obesity on Labor Induction: A Systematic Review and Meta- Analysis

[Jessica A. Ellis](#), CNM, MSN, [Carolyn M. Brown](#),
MLS, AHIP, [Brian Barger](#), PhD, and [Nicole S.
Carlson](#), CNM, PhD



High alert medication

Half-life 10-12 min

Requires 3-4 half lives to get to a steady state

Uterine response usually occurs within 3-5 min after initiation. Within 40-60 min there is a steady-state plasma concentration

90% of women at term will have labor successfully induced with 6mu/min or LESS of oxytocin

Complications

**Too much Pitocin = irritability,
coupling/tripling, tachysystole**

PPH

D/C-14 min to resolve tachysystole

D/C & 500mL bolus-9 min to resolve tachysystole

D/C & Bolus & lateral position-6 min to resolve tachysystole

Nursing Interventions: Cuff Size

- Most common error is inappropriate cuff size
 - Cuff too small-overestimation of blood pressure
 - Cuff too large- small-underestimation of blood pressure
- If in doubt, measure arm
- Appropriate cuff size at least 1.5x length of upper arm circumference. Cuff bladder should encircle 80% of arm circumference

Figure 1: Recommended cuff sizes

| Arm circumference (cm) | Cuff size |
|------------------------|----------------------|
| 22–26 | Small Adult: 12x22cm |
| 27–34 | Adult: 16x30cm |
| 25–44 | Large Adult: 16x36cm |
| 45–52 | Adult Thigh: 16x42cm |



This figure is original content from the Improving Health Care Response to Preeclampsia: A California Quality Improvement Toolkit, funded by the California Department of Public Health, 2014; supported by Title V funds. © 2014 California Department of Public Health.



Nursing Interventions: Position Matters

Patient
Position

Cuff Size &
Cuff
Positioning

Nursing Interventions: Your Safety

- Keep your own safety in mind
 - Avoid holding legs if you can
 - Know the weight limits of the footrests
 - Roll up blankets to help support
 - Use “Sara Steady” like equipment if you have it and know the weight limits

Nursing Interventions: The Patient's Safety

- Keep her safety in mind
 - Lower Extremity Nerve Injury (LENI)
 - Intrapartum
 - Avoid hyperflexion of the knees and thighs >90 degrees and abduction when using the stirrups
 - If the above is needed, say during a shoulder dystocia, reposition the patient's legs in a neutral position as soon as possible
 - Avoid deep and prolonged pressure from fingertips, especially at lateral knee and posterior thigh areas
 - Postpartum
 - Assess for pain, paresthesia, numbness, weakness or loss of function
 - Implement fall precautions and assist with ambulation

Nursing Interventions: Infection Prevention

- Offer a shower
- If she is ruptured, keep a towel between her legs and change it often
- Educate, educate, educate

Why might it be helpful for these patients to deliver at a higher level of care?

- Bariatric scale
- Bariatric bed with 1,000-lb weight capacity and an expandable frame
- Lift equipment
- A lateral transfer device to assist with transfer after regional anesthesia
- A commode and/or toilet that will support 500+ lb
- Weight limits of room furniture-chairs etc
- OR table with a 1,000-lb capacity, extension devices to increase the width of the table and extra long surgical instruments and retractors.
- Extra staff to help position, hold legs, assist in transfers, hold monitor pieces, etc
- IV access can be difficult
- Extra large gowns, pneumatic compression devices, wheelchairs

Statistics

Pre pregnancy obesity rose from 2016 through 2019 for all age groups.

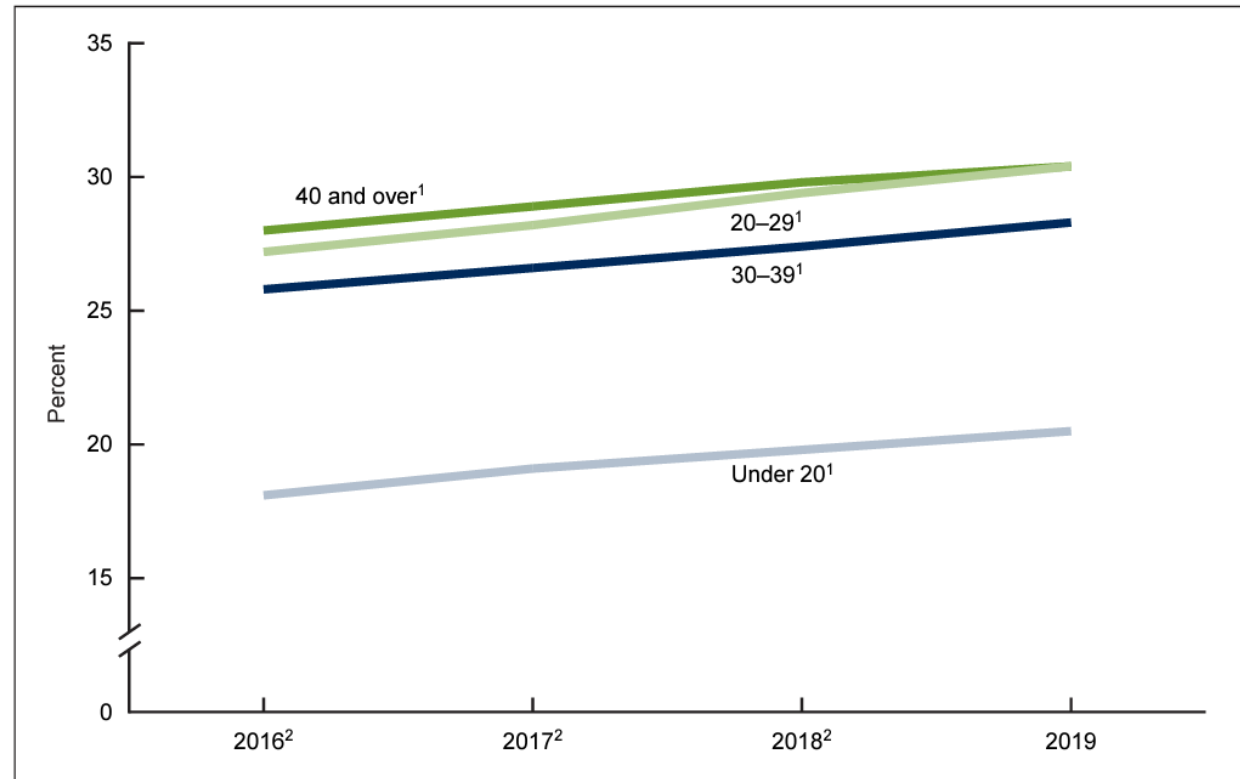
The percentage of women with pre pregnancy obesity rose:

- 13% for women under age 20
- 12% for women aged 20–29
- 10% for women aged 30–39
- 9% for women aged 40+

NCHS Data Brief



Figure 2. Prepregnancy obesity, by maternal age: United States, 2016–2019



¹Significant increasing trend from 2016 through 2019 ($p < 0.05$).

²Significant difference between all age groups ($p < 0.05$).

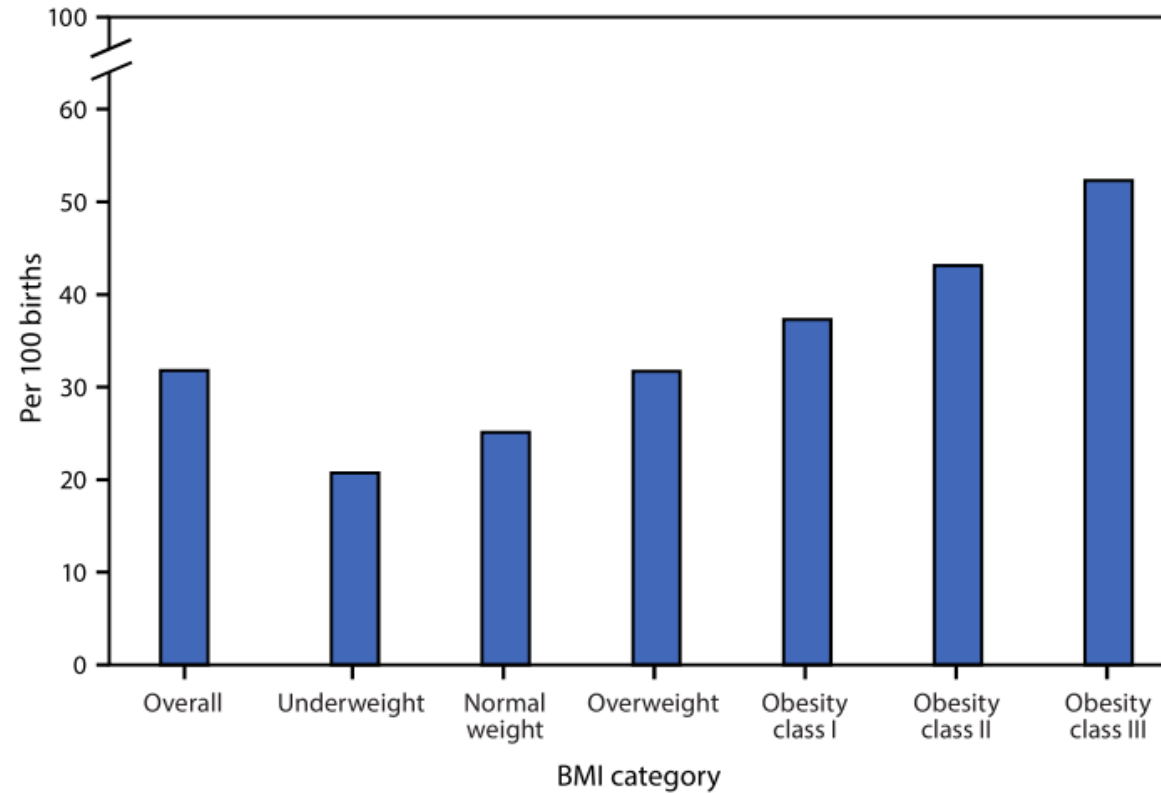
NOTES: Obesity is a body mass index of 30.0 or higher. Total includes all race and Hispanic-origin groups. Access data table for Figure 2 at: <https://www.cdc.gov/nchs/data/databriefs/db392-tables-508.pdf#2>.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality file.

Statistics

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Rate of Cesarean Delivery, by Maternal Prepregnancy Body Mass Index Category* — United States, 2020



Cesarean Sections

- Women who are obese and have cesarean birth are at increased risk of significant operative and postoperative complications, including increased blood loss, anesthesia complications, surgical technical difficulties, prolonged time from incision to birth of the baby, and wound infection and healing complications.
 - ACOG, 2015; Gunatilake & Perlow, 2011
- Why might decision to incision times & incision to baby times be longer?
- More antibiotics needed.
- Increased risk of wound breakdown & dehiscence.
 - Depth of incision a major determinate of wound issues
 - Maintain normothermia

Airway Concerns

- Compared with normal-weight women, the parturient with severe obesity is at increased risk of cesarean delivery, emergency cesarean delivery, failed epidural, and difficult intubation (see ["Obesity in pregnancy: Complications and maternal management"](#)). In one study of parturients over 300 pounds (136.4 kg), 6 of 17 women who required general anesthesia had difficult intubations, four of which were unanticipated [[21](#)].
- The airway can worsen during the course of labor, so patients should be re-examined prior to airway management if significant time has elapsed since the initial airway evaluation. In particular, the size of the tongue and uvula should be noted for women in prolonged labor or who are pre-eclamptic ([picture 1](#)).

Airway Concerns

- Always have video laryngoscopy equipment available
- Educate nursing staff on ways they can help facilitate intubation i.e., holding cricoid, helping ventilate, reducing breast mass, positioning patient, providing additional equipment
- Consider use of LMA if unable to intubate or ventilate
- Increase dosing of paralytic, 1 mg/kg actual body weight to provide optimal conditions

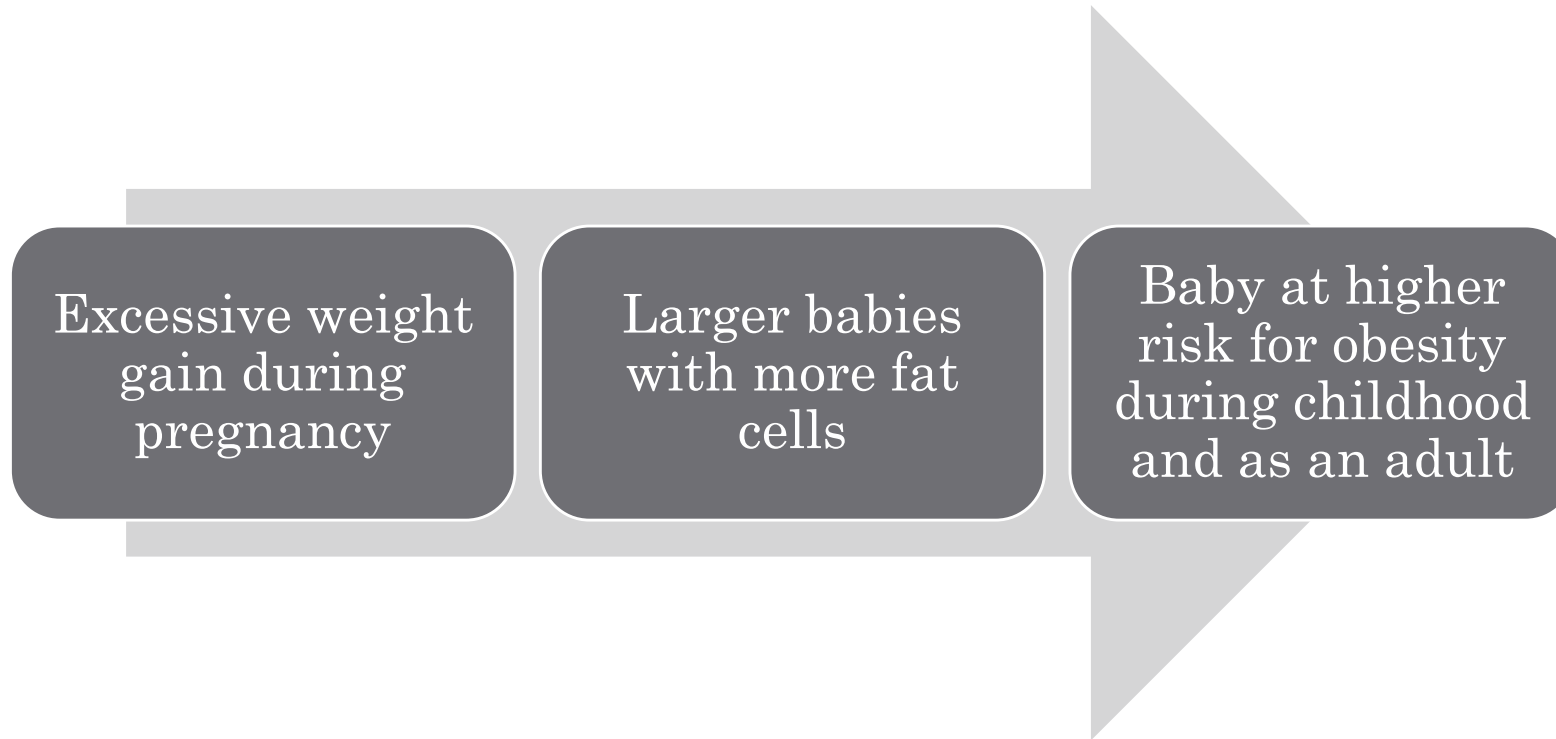
Moral Dilemmas

- The mother has a right to decisions about her care. This includes whose life should be a priority.
- During the beginning of COVID, it was decided that there would be no crash C-sections on COVID + patients.
 - Can/should this case be made in the case of severe morbid obesity?
- Multidisciplinary communication is key to the safe and smooth care of these patients.

Postpartum Care

- Postpartum obese mothers at an increased risk for
 - Respiratory complications: Atelectasis, Pneumonia, Hypoxemia
 - Cardiac complications: Postpartum cardiomyopathy
 - Surgical site infections
 - Venous thromboembolism (VTE)
 - Uterine atony & postpartum hemorrhage
 - Sleep Apnea
 - Close monitoring, awareness of opioids
- Careful assessment of fundus, lochia, and signs of infection
- After cesarean delivery get the patient moving, encourage IS use, take foley out as soon as possible, keep the wound dry.

Effect of Obesity on Newborns



Children born to obese mothers are twice as likely to develop obesity at 2 to 4 years of age.

In Conclusion

- We need to have honest and compassionate conversations with our patients.
- Interdisciplinary communication, especially with anesthesia is vital.
- Patients with an increased BMI are more likely to be induced and more likely to have a cesarean section.
- Change your patient's position often, be patient with monitoring, use good body mechanics, be aware of her safety and know weight restrictions.
- Help decrease postpartum complications by monitoring her bleeding, her respiratory status, and watching for infection.

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