### PREGNANCY COMPLICATED BY OBESITY AND/OR HISTORY OF BARIATRIC SURGERY

| **DEFINITION** | Obesity significantly increases pregnancy complications. For example, obese women face higher relative risks (RR) for gestational diabetes (RR 2.7 – 11), pre-eclampsia (RR 3-4.4), thrombosis (RR 5.3), Cesarean birth (RR 2-3) and wound infection. Fetal risk are also increased, including high-risks for recurrent abortion, neural tube defects, macrosomia (RR 2.2-2.7), low apgar scores (RR 1.4-1.9) and stillbirth (RR 1.6-1.9). Obesity in the mother may increase the risk of obesity in the offspring later in life. Postpartum, obese women are more likely to retain weight they gained during pregnancy. Recommendations for weight gain during pregnancy are markedly less in obese women than for normal weight women but most (70%) obese women gain **more** than the recommended amount of weight during pregnancy. |
| **SUBJECTIVE** | Must include:  
1. Obesity.  
2. Pregnancy.  
May include:  
1. Diabetes.  
2. Hypertension.  
3. Nutritional deficits.  
4. Depression.  
5. Other medical problems.  
| **OBJECTIVE** | BMI ≥30 |
| **LABORATORY** | See Plan below. |
| **ASSESSMENT** | Prenatal patient with obesity. |
| **PLAN** | 1. Assess the woman’s willingness to recognize her weight problem and her willingness to change eating and exercise patterns, using pregnancy as a teachable moment.  
2. Recommended weight gain during pregnancy is 11-20 pounds for obese women.  
3. Recommend a well balanced low fat diet that is culturally appropriate.  
4. Advise against any snacking or tasting of food except when sitting, so all intake can be counted. Offer advice on portion control or plates that are pre-marked with space for appropriate portion size.  
5. At each visit, monitor the woman’s success in achieving appropriate weight gain. Use diet recall and exercise diaries if they help the patient.  
6. Use words that do not offend the woman but that motivate her. Words like “weight” “BMI” “unhealthy weight” “weight problem” “excess weight” tend to motivate women whereas terms such as “obesity” “excess fat” “heaviness” “large” “fatness” are unpopular and antagonize patients.  
7. Explore with the woman what resources she has in her life to help support her and help her maintain appropriate weight gain in pregnancy. Identify challenges she faces (fast food, eating out, partner preferences, etc).  
8. Refer to nutritionist if patient not familiar with caloric counting and dietary principles or if she needs additional support for education or has specific food allergies or other dietary constraints or limitations.  
10. Recommend purchase of a pedometer and encourage patient to record daily number of steps. Interpret results for patient and set gestational age appropriate goals:  
   a. Sedentary: 5000 steps/day |
11. Recognize that the risk of excessive weight gain is greatest among young primiparous obese women.
12. Refer patient to anesthesiologist at her delivery hospital in third trimester.

PATIENT EDUCATION
1. Educate obese women about the increased risks they face in pregnancy and that tests and other measures will be undertaken throughout pregnancy to reduce their personal risks.
2. Advise against weight loss or fad diets in pregnancy.
3. Counsel about the risks following pregnancy of excessive weight gained in pregnancy, including retention of “baby weight” postpartum, higher risk of cardiovascular disease and diabetes later in life and medical complications in any future pregnancy.
4. Educate women that they are not “eating for 2” and that only a modest increase in caloric intake is needed for good fetal growth. The more accurate estimate is that the women should “eat for 1.1”.
5. At each visit, reinforce importance of appropriate weight gain and encourage appropriate healthy food intake and physical activity. Have patient plan for postpartum lifestyle changes to lose weight after delivery.
6. Provide concrete recommendations about healthy food consumption that is culturally sensitive. The My Plate website is a good resource.

**Bariatric Surgery**

**DEFINITION**
Women who have undergone bariatric surgery may face significant nutritional deficiencies before and during pregnancy, depending upon the surgical procedure they have had. Low iron and folic acid levels as well as deficiencies of fat-soluble vitamins and vitamin B12 are the most important to consider in pregnancy, especially following Roux-en-Y gastric bypass. Complications of bariatric surgery, such as hernias, adhesive bands, bowel obstruction and band erosion may develop during pregnancy.

**SUBJECTIVE**
Must include
1. History of prior bariatric surgery.
2. Pregnancy.

May include:
1. Nutritional deficits.
2. Obesity.

**OBJECTIVE**
May include:
1. Incisional hernia(s).
2. BMI > 30 (see Obesity protocol).

**LABORATORY**
See Plan below.

**ASSESSMENT**
Prenatal patient with prior bariatric surgery

**PLAN**
1. Test CBC, chem 7, iron, iron binding capacity, ferritin, vitamin B12, 25-hydroxyvitamin D.
2. Monitor closely for weight loss during pregnancy. Alter caloric intake if weight loss is detected.
3. Routine nutrient supplementation during pregnancy includes all of the following:
   a. One prenatal vitamin daily with a least folic acid 400 mcg/day.
   b. Calcium citrate (1200-2000 mg/day) with vitamin D (400-800/d).
4. For iron deficiency anemia.
   a. To prevent iron deficiency anemia, prescribe one or two tabs tablets daily on an empty
stomach of either ferrous sulfate 325 mg or ferrous fumarate 200 mg. Advise patient to avoid taking iron in close proximity to teas or calcium.

b. If the patient has iron deficiency anemia, prescribe 3 or 4 tablets daily on an empty stomach of either ferrous sulfate 325 mg or ferrous fumarate 200 mg. Advise patients to avoid taking iron in close proximity to teas or calcium.

5. Vitamin B\textsubscript{12} \geq 350 mcg daily orally (monitor serum levels).

6. Protein intake of 60g daily is not generally changed except that women who have undergone biliopancreatic diversion with or without duodenal switch need close monitoring for protein malnutrition.

7. Avoid using NSAIDs at any time due to risk of anastomotic ulceration.

8. Test drug levels when using oral medications in which therapeutic drug levels are critical.

9. If nausea, vomiting or abdominal pain develops in pregnant women following bariatric surgery, consultation with surgical team is advised to rule out complications of that surgery (adhesions, etc).

10. Following lap band procedures the following are important items to remember:
   a. Limit all pills to < 11 mm in size so they can fit through restricted areas.
   b. Consult with bariatric surgeon to determine if stoma size should be adjusted. Some experts recommend removal of some or all of the fluid from the gastric band in the first trimester to allow greater caloric absorption or to relieve nausea and vomiting in the first trimester.

11. Following Roux-en-Y procedures, the following are important items to remember:
   a. Provide all medication in oral solution or rapid release formulations. Avoid extended release formulations because the absorptive surface or the intestine is decreased.
   b. Avoid use of glucose challenge to test for gestational diabetes to avoid precipitating dumping syndrome. Other testing, such as hemoglobin A1C or fasting and post-prandial glucose levels can be used to assess for gestational diabetes.

**PATIENT EDUCATION**

1. If patient is also obese, please see Patient Education above in Obesity.
2. Advise women to go to ER for nausea, vomiting or increased abdominal pain.
3. Advise adequate hydration.
4. Remind patient to tell all providers about bariatric surgery history.
5. At each visit, reinforce importance of appropriate weight gain and encourage appropriate healthy food intake and physical activity.

**REFER to MD**

All women with weight loss, nausea, vomiting or abdominal pain.

**REFERENCES**

10. Institute of Medicine (US) and National Research Council (US) Committee to Reexamine IOM