Obesity and Pregnancy

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Objectives

- Review maternal complications of obesity and pregnancy.
- Review the fetal implications of obesity and pregnancy.
- Review management and prevention of these complications.
The Obesity Epidemic

- Incidence has risen dramatically since 1960
- 59.5% in women of reproductive age are overweight/obese
- 16% of children 6-19
- #1 contributor to mortality in U.S., surpassing tobacco, alcohol, microbial pathogens, and motor vehicles
The Obesity Epidemic

- Obesity increases the risk for
  - premature death
  - diabetes
  - hypertension
  - coronary artery disease
  - obstructive sleep apnea
  - several types of malignancy

- 30% of nonpregnant US women ages 20-39 are obese

Flegal KM JAMA 2010
Obesity

- Defined in terms of BMI
- BMI is the ratio of weight to height squared kg/m²
- Overweight is defined as BMI greater than 25 or weight greater than or equal to the 95% for age and sex
- Obesity BMI > 30 kg/m²
### Prepregnancy Weight Status

#### Obesity classifications by body mass index

<table>
<thead>
<tr>
<th>Classification</th>
<th>Obesity Class</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>----</td>
<td>( \leq 18.5 )</td>
</tr>
<tr>
<td>Normal weight</td>
<td>----</td>
<td>( 18.5 - 24.9 )</td>
</tr>
<tr>
<td>Overweight</td>
<td>----</td>
<td>( 25 - 29.9 )</td>
</tr>
<tr>
<td>Obese</td>
<td>Class 1 obesity</td>
<td>( 30-34.9 )</td>
</tr>
<tr>
<td>Severely Obese</td>
<td>Class 2 obesity</td>
<td>( 35-39.9 )</td>
</tr>
<tr>
<td>Morbidly Obese</td>
<td>Class 3 obesity</td>
<td>( \geq 40 )</td>
</tr>
</tbody>
</table>
Classifications of Obesity

Degrees of Obesity

NORMAL
BMI 18.5 — 24.9

OVERWEIGHT
BMI 25 — 29.9

OBESE
BMI 30 — 34.9

SEVERE OBESE
BMI 35 — 39.9

MORBIDLY OBESE
BMI ≥ 40
Minorities and Obesity

• Increase has been steep for minorities
• Overweight increase has also followed trend but to a lesser degree
• Highest increase has been in the non Hispanic blacks

Prevalence of obesity among US nonpregnant women ages 20-39 from 2003-4

Flegal KM JAMA 2010
## Obesity – Pregnancy Effects

<table>
<thead>
<tr>
<th>Maternal</th>
<th>Fetal</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Spontaneous miscarriage</td>
<td>○ Congenital anomalies</td>
</tr>
<tr>
<td>○ Multifetal pregnancy</td>
<td>○ Difficulty in performing US screening and procedures</td>
</tr>
<tr>
<td>○ Hypertensive disorders</td>
<td>○ Stillbirth</td>
</tr>
<tr>
<td>○ Gestational Diabetes</td>
<td>○ Fetal macrosomia</td>
</tr>
<tr>
<td>○ Cesarean section</td>
<td>○ Prematurity</td>
</tr>
<tr>
<td>○ Anesthesia complications</td>
<td>○ Altered metabolic programming: development of childhood diabetes, HTN, and premature CAD</td>
</tr>
<tr>
<td>○ Obstructive sleep apnea</td>
<td></td>
</tr>
<tr>
<td>○ Wound infections</td>
<td></td>
</tr>
<tr>
<td>○ Deep venous thrombosis</td>
<td></td>
</tr>
<tr>
<td>○ Postpartum hemorrhage</td>
<td></td>
</tr>
<tr>
<td>○ Decreased breastfeeding</td>
<td></td>
</tr>
</tbody>
</table>
Obesity- population studies

  - 16,102 pregnancies in US
- Sebire NJ Int J Obes Relat Metab Disord 2001
  - 287,213 pregnancies in London
- Cnattingius S NEJM1998
  - 167,750 pregnancies in Sweden
- Robinson HE Obstet Gynecol 2005
  - 142,404 pregnancies in Nova Scotia
- Athukorala C. BMC Pregnancy and Childbirth 2010
  - 1,661 pregnancies in Australia
- Owens LA. Diabetes care. 2010
  - 2,329 pregnancies with normal glucola in Ireland
- Ovesen P. Obstet Gynecol 2011
  - 369,347 pregnancies in Denmark
Obesity- Spontaneous miscarriage

- **SAB**
  - Early Miscarriage: OR 1.2 (CI 1.01-1.46, p=0.04)
  - Recurrent Miscarriage: OR 3.5 (CI 1.03-12.01, p=0.04)

- **Meta-analysis**
  - OR 1.89 (1.14-3.13)

- Possibly related to PCOS or insulin resistance

- **Key to care**
  - Screen for diabetes

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Metwally M, Fertil Steril 2008;90:714
Obesity- Multifetal Pregnancy

  - Increased dizygotic twinning
    - Obese gravidas (1.1%) vs. control (0.5%)
- Possible elevated FSH seen in obese women

- Key to care
  - Early dating ultrasound and evaluation for multiple gestation

## Obesity- Hypertensive disorders

- **Obesity BMI 30-34.9**
  - Gestational HTN
    - Weiss OR 2.5 (CI 2.1-3.0)
    - Preeclampsia
      - Sibai OR 2.21 (CI 1.3-3.75)
      - Athukorala OR 2.99 (CI 1.88-4.73)
      - Weiss OR 1.6 (CI 1.1-2.25)

- **Obesity BMI>35**
  - Gestational HTN
    - Weiss OR 3.2 (CI 2.6-4.0)
  - Preeclampsia
    - Sibai OR 3.2 (CI 1.79-5.81)
    - Weiss OR 3.3 (CI 2.4-4.5)

- **Obesity BMI 30-40 (92%)**
  - Gestational HTN OR 2.38 (CI 2.24-2.52)

- **Obesity BMI>40 (8%)**
  - Gestational HTN OR 3.00 (CI 2.49-3.62)

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Weiss JL. AJOG. 2004. 190 1091-7
Robinson HE. Obstet Gynecol 2005. 106(6) 1357-64
Obesity- Hypertensive disorders

- **Key to care**
  - Baseline labs
  - 24 hour urine
  - Prepregnancy weight loss
    - Risk doubles with every 5-7 kg/m² increase in BMI
  - Correct cuff size
Obesity - Gestational Diabetes

- Obesity BMI 30-34.9
  - Weiss OR 2.6 (CI 2.1-3.4)
  - Athukorala OR 2.1 (CI 1.17-3.79)
- Obesity BMI >35
  - Weiss OR 4.0 (CI 3.1-5.2)
- Meta-analysis all studies between 1980 and 2006 and calculated odds ratio for developing GDM
  - Overweight- OR 2.14 (CI 1.82-2.53)
  - Obese- OR 3.56 (CI 3.05-4.21)
  - Severely obese- OR 8.56 (CI 5.07-16.04)

- Concerning as almost 50% of these women will develop diabetes 5-10 years after delivering

Weiss JL Am J Obstet Gynecol 2004
Athukorala C. BMC Pregnancy and Childbirth 2010
Chu S Diabetes Care 2007;30(8):2070-5
Obesity- Gestational Diabetes

- **Key to care**
  - Screen in the 1\textsuperscript{st} trimester
  - Maternal education
Morbid obesity -
Trial of Labor vs. Repeat cesarean

- 14,142 trial of labor and 14,304 elective c/s
  - Morbidly obese
    - 1,638 TOL and 2,315 elective c/s
    - 2 fold increased in composite morbidity
    - Failed TOL 39.3%
    - Risk uterine rupture/dehiscence 2.1%
    - NICU admission
      - Failed TOL 21.5% vs. Successful 8.8%
    - Overall risk of morbidity with TOL in morbid obesity is 7.2%

- Key to care
  - Careful patient selection
Obesity- Cesarean complications

- **Increased emergent c/s**
  - 9.4 vs 2.6%
  - 1.64 (1.55-1.73) in overweight and 2.23 (2.07-2.42) in obese

- **Longer operating time**
  - 48.8 vs 9.3%
  - Vricella
    - <25 BMI 53±20 min
    - 25-35 BMI 62±23 min
    - >35 BMI 79±39 min

- **Longer incision to delivery**
  - 9.4 +/- 0.8 minutes vs. 9.9 +/- 1.1 minutes, respectively (P<0.05)

Vricella LK. AJOG 2010;276.e1-276.e5.
Obesity- Cesarean complications

- Key to care
  - Bariatric lifts and inflatable mattresses, additional personnel
  - Combined spinal-epidural anesthesia
Cesarean Incisions

Large panniculus elevated/retracted upward with tape

Area of incision to be made in lower abdomen

Umbilicus

Panniculus

Abdominal cavity
Self-retaining retractor
Obesity- Anesthesia complications

- Epidural placement
  - >1 attempt 16.1 vs 6.3 vs 1.1
  - >3 attempts 5.6 vs 2.8 vs 0
  - No complications in normal, overweight or obese
  - 8.4% in morbidly obese

- Obscured landmarks, deeper epidural space

- Difficult airway

- Sleep apnea postpartum

Vricella LK. AJOG 2010 Sept. 276.e1-e5.
Obesity- Anesthesia complications

- **Key to care**
  - Anesthesia consult
  - Early epidural
  - Equipment check
  - Consider central line
  - Difficult airway kit
  - Decrease aspiration risk
    - Clears or NPO, Bicitra, H2 blocker
Obesity- Obstructive sleep apnea

- 57 women with OSA and 114 controls
  - Preeclampsia 19.3% vs 7.0% P = .02
- Decreased fetal growth
- Possible etiology for stillbirth
- Concern for postoperative sedation
  - Very sensitive to opioids

- Key to care
  - Sleep study
  - CPAP
  - Maternal echocardiogram

Obesity- Risk of infections

- **Wall**
  - 239 pts BMI >35
    - Wound- risk 12.1%
    - Increased risk with vertical

- **Robinson**
  - Obesity BMI 30-40 (92%)
    - Wound Infection OR 1.67 (CI 1.38-2.00)
  - Obesity BMI>40 (8%)
    - Wound Infection OR 4.79 (CI 3.30-6.95)

- **Perlow**
  - Endometritis 32.6 vs 4.9%

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Myles, TD. Obstet Gynecol 2002; 100:959
Obesity- Risk of infections

- Key to care
  - Thorough skin preparation
  - Adequate antimicrobial prophylaxis
  - Avoidance of subpannincular incision
  - Meticulous surgical technique
  - Subcutaneous closure
Obesity- Venous thromboembolism

- Obesity BMI 30-40 (92%)
  - Antepartum VTE OR 2.17 (CI 1.30-3.63)

- Obesity BMI>40 (8%)
  - Antepartum VTE OR 4.13 (CI 1.26-13.54)

- Larsen TB, Danish cohort 71,729 pregnancies
  - Pregnancy and puerperium OR 5.3 (CI 2.1- 13.5)

- Key to care
  - Early ambulation
  - Intermittent compression stocking
  - Anticoagulation

Robinson HE. Obstet Gynecol 2005. 106(6) 1357-64
Obesity- Postpartum hemorrhage

- Conflicting data
- Perlow EBL >1,000 ml
  - 34.9 vs 9.3%
- Largest study by Sebire
  - OR
    - Overweight 1.16 (1.12-1.21)
    - Obese 1.39 (1.32-1.46)
- May be due to macrosomia or reduced bioavailability of uterotonics

- Key to care
  - Blood typed and screen
  - Ligate large subcutaneous vessels
  - Meticulous surgical technique
Obesity- Breast Feeding

- Less likely to start breastfeed
  - Liu 2009: (OR: 0.63)
- D/C breast-feeding within first 6 months
  - (HR: 1.89)
- Etiology
  - Physiologic: ↓ prolactin response to suckling in the 1st wk postpartum
  - Behavioral
  - Practical: Large breasts => difficulties with latching
- Breastfeeding: lower risk of overweight kids
  - 1-3 mo’s (OR=0.81); 4-6 mo’s (OR=0.76); >7 mo’s (OR=0.67)

- Key to care
  - Early support

Obesity – Congenital abnormalities

<table>
<thead>
<tr>
<th>Abnormality</th>
<th>Waller</th>
<th>Stothard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neural tube defect</td>
<td>2.09(1.63-2.7)</td>
<td>1.87(1.62-2.15)</td>
</tr>
<tr>
<td>Spina bifida</td>
<td></td>
<td>2.24(1.86-2.69)</td>
</tr>
<tr>
<td>Congenital heart defect</td>
<td>1.26(1.11-1.43)</td>
<td>1.3(1.12-1.51)</td>
</tr>
<tr>
<td>Cleft lip/palate</td>
<td></td>
<td>1.20(1.03-1.40)</td>
</tr>
</tbody>
</table>

- Increased risks for other anomalies including anorectal atresia, limb reduction defects
- These NTD’s may to be independent of folate intake

### Obesity - Congenital abnormalities

<table>
<thead>
<tr>
<th>BMI</th>
<th>NTD</th>
<th>CHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 – 29.9</td>
<td>1.22 (0.99-1.49)</td>
<td>1.16 (1.05-1.29)</td>
</tr>
<tr>
<td>30-34.9</td>
<td>1.70 (1.34-2.15)</td>
<td>1.15 (1.00-1.32)</td>
</tr>
<tr>
<td>35-39.9</td>
<td>3.11 (1.75-5.46)</td>
<td>1.31 (1.11-1.56)</td>
</tr>
</tbody>
</table>

- **Keys**
  - Folic acid supplementation
  - Serum screening
  - Detailed ultrasound

Gilboa S AJOG 2010;S1e1-e10.
Obesity and anomaly detection

Dashe JS, McIntire DD, Twickler DM. Obstetrics & Gynecology May 2009; 113(5).
Obesity and risk of stillbirth

- Meta-analysis reviewed the relationship between maternal overweight and obesity and risk of stillbirth
- Reviewed studies from 1980-2005
- Pooled estimates of the effect of prepregnancy weight on odds of stillbirth
  - Overweight vs. normal OR 1.47 (CI 1.08-1.94)
  - Obese vs. normal OR 2.07 (CI 1.59-2.74)

- Key to care
  - Antepartum monitoring

Chu S AJOG 2007;223-228
Chen A. Epidemiology 2009;20:74–81
Obesity- fetal size

- Macrosomia (>4000g)
  - Weiss Study
    - 8.3% of non-obese
    - 13.3% of obese
    - 14.6% of morbid obese
  - Athukorala
    - 4.54(2.10-10.24) macrosomic
- >90th percentile
  - Seibre
    - Overweight 1.57 (1.50--1.64)
    - Obese 2.36 (2.23--2.50)

- Key to care
  - growth ultrasound
  - Careful with assisted delivery


Fig. 2. Term singleton birth weight in grams from 37 to 41 weeks from 1975 to 2003 at MetroHealth Medical Center, P<.001.
Prevalence of obesity (>95%ile) for school age children

Fig. 2. Term singleton birth weight in grams from 37 to 41 weeks from 1975 to 2003 at MetroHealth Medical Center, P<.001.
Obesity- childhood effects

- **Longterm Risks**
  - High birth weight correlates with adult obesity in Nurses Health Study
  - Whitaker Study
    - 8400 children of obese mothers (BMI >30) at 1st Tri
    - Children were 2.4 to 2.7 times more likely to exceed 95%ile for weight

- **Boney CM. Pediatrics 2005, LGA =84, AGA = 95**
  - Looking for metabolic syndrome- 2 or more
    - LGA/GDM 50%
    - AGA/GDM 21%
    - LGA/control 29%
    - AGA/control 18%
  - Maternal obesity increased risk by 1.8 (CI 1.03-3.19)
Patients say doctors don’t tell them

- Survey of 2237 women via questionnaire
  - 27% receive no advice at all
  - 26% receive advice above or below the IOM guidelines
  - Advised weight and actual weight gain were strongly correlated
    - Cogswell 1999

- Survey of 1460 women via questionnaire
  - 33% receive no advice at all
  - 24% Overweight women advised to gain more than IOM
  - 4% Normal weight women advised to gain more than IOM
    - Stotland 2005
However!

- **Doctors say they do...**
  - 900 responses to ACOG survey
    - 82% report using BMI to screen for obesity
    - 85% counseled pts on pregnancy weight gain
    - 64% used pre-pregnancy BMI to modify weight gain
  - Power Obstet Gynecol 2006
Prepregnancy counseling

- **Goal:** Conceive at Normal BMI (18.5 – 24.9)
  - Dietary counseling
  - Exercise
  - Behavioral

- Provide contraception until at goal

- **Education**
  - Improves understanding of pregnancy risks and results in behavioral modification (Elsinga 2008)

- Gestational weight gain recommendations

- Bariatric surgery
## Weight Loss Options

### Non-Surgical
- **Lifestyle modification: Diet, exercise**
  - Lack of long term success
  - Exercise health benefits even without weight loss
- **Pharmacotherapy**

### Pharmacotherapeutic options for weight loss

<table>
<thead>
<tr>
<th>Medication</th>
<th>Mechanism for weight loss</th>
<th>Mean weight reduction</th>
<th>Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phentermine</td>
<td>Sympathomimetic amine, appetite suppressant</td>
<td>-3.6 kg in 2-24 weeks</td>
<td>Palpitations, tachycardia, GI effects</td>
</tr>
<tr>
<td>Orlistat</td>
<td>Gastric and pancreatic lipase inhibitor</td>
<td>-2.75 kg at 52 weeks</td>
<td>Diarrhea, flatulence</td>
</tr>
<tr>
<td>Sibutramine</td>
<td>Norepinephrine-serotonin reuptake inhibitor</td>
<td>-4.45 kg at 52 weeks</td>
<td>Tachycardia, insomnia, constipation</td>
</tr>
<tr>
<td>Bupropion</td>
<td>Norepinephrine/dopamine uptake inhibitor</td>
<td>-2.77 kg at 24-52 weeks</td>
<td>Dry mouth, insomnia, constipation</td>
</tr>
<tr>
<td>Topiramate</td>
<td>unknown</td>
<td>-6.5% at 24 weeks</td>
<td>Paresthesias</td>
</tr>
<tr>
<td>Classification</td>
<td>BMI</td>
<td>Total Weight Gain</td>
<td>Rate of Wt Gain 2\textsuperscript{nd} &amp; 3\textsuperscript{rd} tri (lbs/wk)</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------</td>
<td>-------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Underweight</td>
<td>≤ 18.5</td>
<td>12.5-18.0 (28-40lbs)</td>
<td>0.44-0.58 kg \hspace{1cm} 1 – 1.3 lbs</td>
</tr>
<tr>
<td>Normal weight</td>
<td>18.5 – 24.9</td>
<td>11.5-16.0 (25.0-35.0lbs)</td>
<td>0.35-0.50 kg \hspace{1cm} 0.8 – 1 lbs</td>
</tr>
<tr>
<td>Overweight</td>
<td>25 – 29.9</td>
<td>7.0-11.5 (15.0-25.0lbs)</td>
<td>0.23-0.33 kg \hspace{1cm} 0.5 – 0.7 lbs</td>
</tr>
<tr>
<td>Obese</td>
<td>≥ 30</td>
<td>5.0-9.0 (11.0-20.0lbs)</td>
<td>0.17-0.27 kg \hspace{1cm} 0.4-0.6 lbs</td>
</tr>
</tbody>
</table>

2009 IOM/NRC guidelines
Daily intake
The components of gestational weight gain

Pitkin Clin ObGyn 1976
Are we sticking with the guidelines?

PRAMS, 2002-2003
I’m Pregnant, Now What

• “Let’s set a weight gain goal together”
  ○ Review the IOM goals individualized to your patient
  ○ Chart and review weight gain EACH visit
  ○ Give them a Chart for their Pregnancy Binder
Congratulations on your pregnancy!

Your health is more important than ever as you continue to nourish your growing fetus. Eating healthy foods and staying active are important in pregnancy. It's also a great time to develop healthy eating habits. Eating for two isn't just about the calories - healthy eating in pregnancy can improve healthy eating habits for the whole family, and decrease risk of health problems for both you and your future child. The extra caloric need in pregnancy is only, at most, an additional 300 calories or less per day. That's one healthy snack like a handful of almonds and an apple or a peanut butter sandwich on wheat bread.

Today your BMI was @BMI@. Talk to your doctor about a reasonable weight gain goal for you during your pregnancy. Staying within the guidelines will help you to lose weight postpartum and stay a healthy weight after delivery and long term.

BMI
Recommended Weight Gain (lbs)
Where does the weight go?
Baby 8 lbs
Placenta 2-3 lbs
Amniotic Fluid 2-3 lbs
Breast Tissue 2-3 lbs
Blood Supply 4 lbs
Fat stores for delivery & breast feeding 5-9 lbs
Uterus increase 2-5 lbs
TOTAL 25-35 lbs
The time you will gain the most weight in the second and third trimesters (average 1 pound per week).

If your BMI was greater than 30 today your pregnancy is at higher risk for complications including diabetes and high blood pressure.
If you are interested in meeting with a nutritionist please ask your provider for a referral.
In pregnancy....

- Provide information on diet and exercise in pregnancy
  - 30 minutes or more of moderate exercise per day
    - ACOG Committee Opinion-267 2002

- Early, pertinent referral for Dietary Counseling
  - Recommended by both IOM and ACOG 2005
  - Refer to individualized dietary guidance online
  - Kramer & Kakuma 2003
    - Counseling decrease energy/protein intake in overweight women led to reduced weekly weight gain
Obesity- Postpartum weight loss

- **Villamor E**
  - 200,000 women
  - Compared sequential pregnancies within 10 years
  - Control BMI change -1.0 to +0.9 vs ≥3.0 increase
    - Linear increase in preeclampsia, gestational hypertension, GDM, cesarean delivery, LGA, and stillbirth
Indications for Bariatric Surgery

- Class III obesity (BMI > 40)

- Class II obesity (BMI 35-40) with comorbidities
  - cardiopulmonary problems or obesity related problems that interfere with lifestyle
Categories of Bariatric Surgery

- Roux-en-Y: most popular in US
- Adjustable gastric banding: popular in Europe

Belachew M, Obesity Surgery 2002 25:564-8
Complications from Bariatric Surgery

- Anastomotic leaks
- Bowel obstructions
- Internal hernias
- Ventral hernias
- Band erosion
- Band migration
- Dumping syndrome
## Nutrition Issues during Pregnancy

### Nutritional Complications Following Bariatric Surgery

<table>
<thead>
<tr>
<th>Procedure Type</th>
<th>Iron</th>
<th>Folate</th>
<th>Vitamin B12</th>
<th>Vitamin D</th>
<th>Hemoglobin</th>
<th>Calcium</th>
<th>Albumin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restrictive</td>
<td>↓</td>
<td>↓</td>
<td>--</td>
<td>--</td>
<td>↓</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Malabsorptive</td>
<td>↓↓</td>
<td>↓↓</td>
<td>↓↓</td>
<td>↓↓</td>
<td>↓↓</td>
<td>↓↓</td>
<td>↓</td>
</tr>
</tbody>
</table>
Overall rate of maternal and fetal complications in pregnancy appears to be reduced among women post bariatric surgery, compared to obese controls

<table>
<thead>
<tr>
<th>Pregnancy Outcomes Among Women pre and post-Bariatric Surgery</th>
<th>GDM</th>
<th>Macrosomia</th>
<th>Severe Preeclampsia</th>
<th>Preeclampsia</th>
<th>Miscarriage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Bariatric Surgery</td>
<td>6-11%</td>
<td>3-7%</td>
<td>1%</td>
<td>5-11%</td>
<td>26%</td>
</tr>
<tr>
<td>Obese Cohort Pre-surgery</td>
<td>15-17%</td>
<td>8-35%</td>
<td>4%</td>
<td>23-28%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Timing of pregnancy

- Consensus is that pregnancy should be delayed for 12-24 months
  - Achieve goal weight loss
  - Avoid possible nutrient deficiencies

- Sheiner E AJOG 2010
  - 104 in 1st year vs 385 after 1st year
    - HTN 15.4 vs 11.2% p=0.392
    - DM 10.5 vs 7.3% p=0.159
    - IUGR 3.8 vs 2.3% p=0.396
    - Bariatric complications 6.7 vs 7.0% p=0.920
Obesity- Setting Maternity care standards

- **Prepregnancy**
  - Optimize weight
  - BMI >30 discuss risks
  - Folic acid supplementation
  - Consider echocardiogram
  - Screen sleep apnea
  - Consult as needed

- **Pregnancy**
  - 1st Trimester
    - Baseline labs, 24 hour urine
    - Screen for GDM
    - Ultrasound
    - Discuss wt gain
    - Risk of SAB
  - 2nd Trimester
    - Screen for congenital abnormalities
    - Fetal echocardiogram
  - 3rd Trimester
    - Monitor for complications
    - Antepartum testing
    - EFW
    - Evaluate facilities
    - Equipment
    - Anesthesia consult

- **Labor and delivery**
  - Notify anesthesia
  - Venous access
  - Active management of 3rd stage
  - C/S prophylactic antibiotics

- **Postpartum**
  - Early ambulation
  - Thromboprophylaxis
  - BF support
  - Weight reduction education
  - 6 week gtt for those with GDM

Questions?