# Obesity and Maternal Outcomes – what can we do to make things better?

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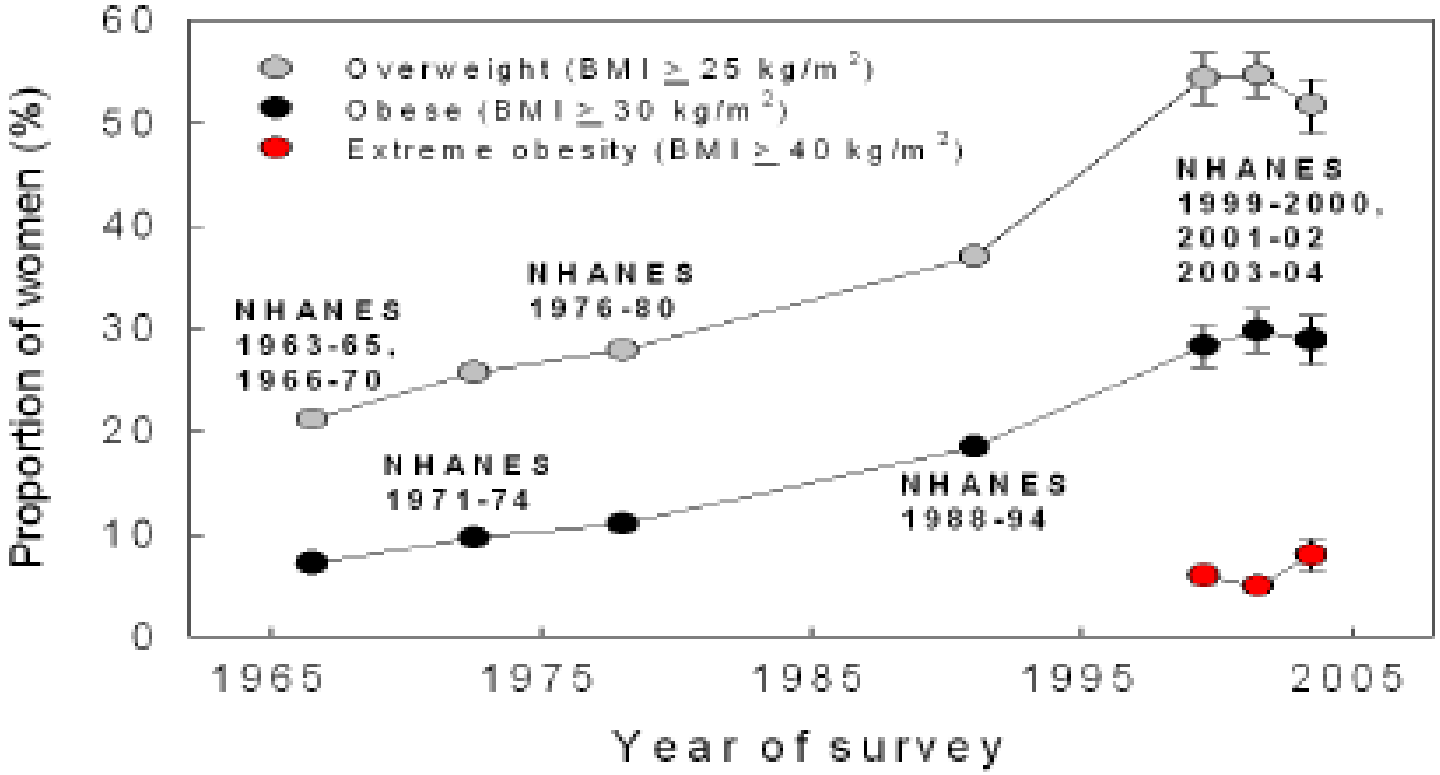
- No Conflict of Interest to Declare



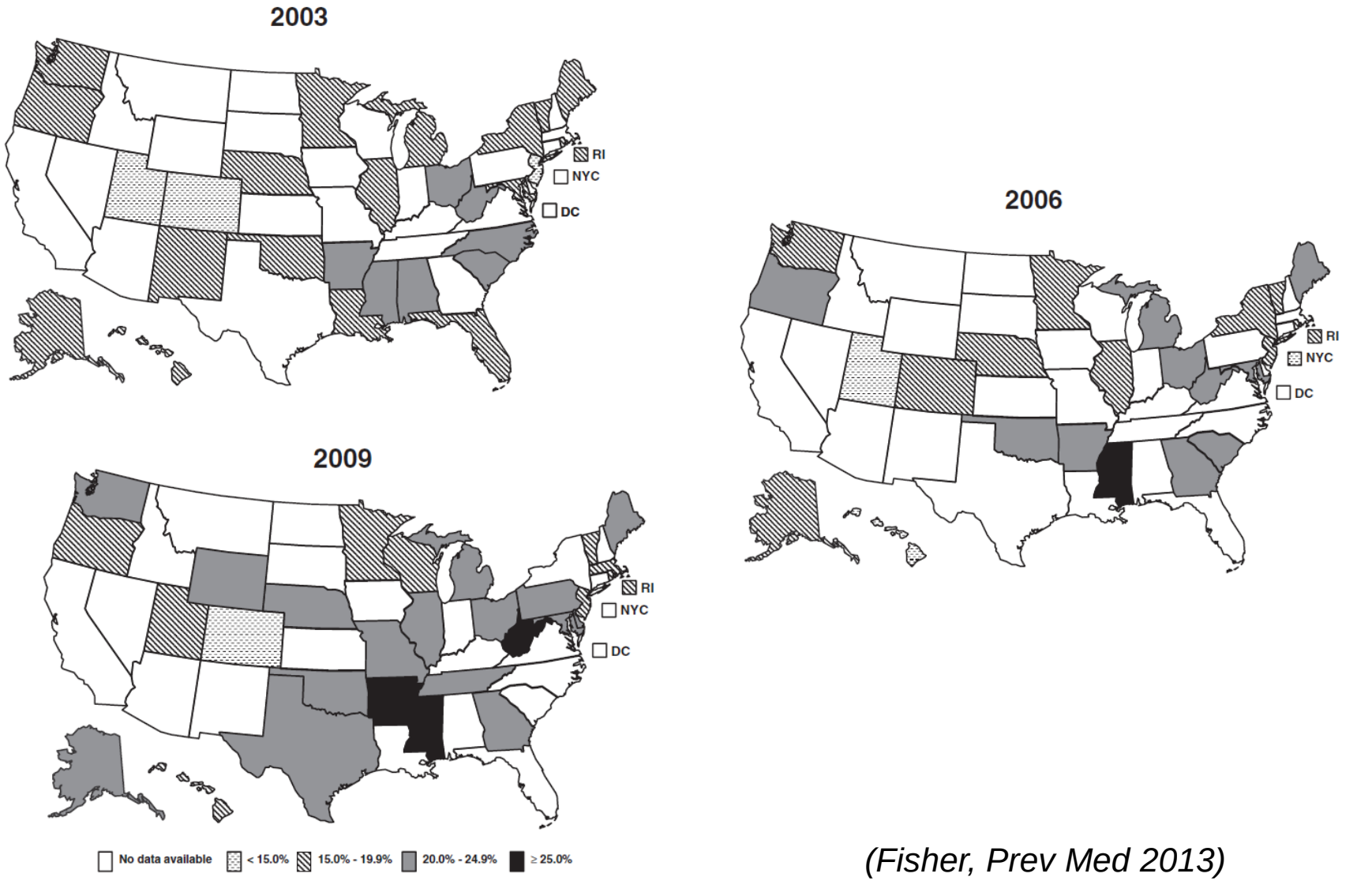



Fig. 2. Prepregnancy obesity prevalence by US state, 2003, 2006, and 2009 (obesity ≥ 30 kg/m$^2$).

*(Fisher, Prev Med 2013)*

# Definition of metabolic syndrome

- Spectrum of metabolic abnormalities associated with insulin resistance
  - Dyslipidemia
  - Abdominal obesity/waist circumference
  - High serum glucose
  - High blood pressure
  - Activation of coagulation
  - Increase inflammatory markers

# Objectives

- Describe the impact of obesity and gestational weight gain on maternal outcomes
- Identify interventions that may reduce obstetrical risks for the obese woman
- Recognize patient and provider characteristics that impact on care obese women receive

## Maternal and fetal risks in women with a BMI >30 kg/m$^2$ compared to women with a healthy BMI adapted from CMACE/RCOG Joint Guideline: management of women with obesity in pregnancy

| Risk | Odds ratio [95% confidence interval]* |
|---|---|
| Gestational diabetes | 2.4 [2.2–2.7] to 3.6 [3.3–4.0] |
| Hypertensive disorders | 2.1 [1.9–2.5] to 3.3 [2.7–3.9] |
| Venous thromboembolism | 9.7 [3.1–30.8] |
| Slower labour progress 4–10 cm | 7 vs. 5.4 hours $p < 0.001$ |
| Caesarean | 2.1 [1.9–2.3] |
| Emergency caesarean | 1.8 [1.7–1.9] to 2.0 [1.2–3.5] |
| Postpartum haemorrhage | 1.4 [1.2–1.6] to 2.3 [2.1–2.6] |
| Wound infection | 2.24 [1.91–2.64] |
| Birth defects | 1.6 [1.0–2.5] |
| Macrosomia | 2.4 [2.2–2.5] to 3.1 [3.0–3.3] |
| Shoulder dystocia | 2.9 [1.4–5.8] to 3.14 [1.86–5.31] |
| Admission to NNU | 1.3 [1.3–1.4] to 1.5 [1.1–2.3] |
| Stillbirth | 2.1 [1.5–2.7] |
| Neonatal death | 2.6 [1.2–5.8] |

Kither, Obstet Gynaec Reprod Med 2012

# Gestational weight gain

- Overweight and obese women are more likely to gain more than IOM recommendations
- GWG associated with poor obstetrical outcomes
- GWG associated with long term weight retention
- GWG associated with increased risk of child adiposity at 3 years (?important motivator)
  - *Oken, Am J Obstet Gynecol 2007*

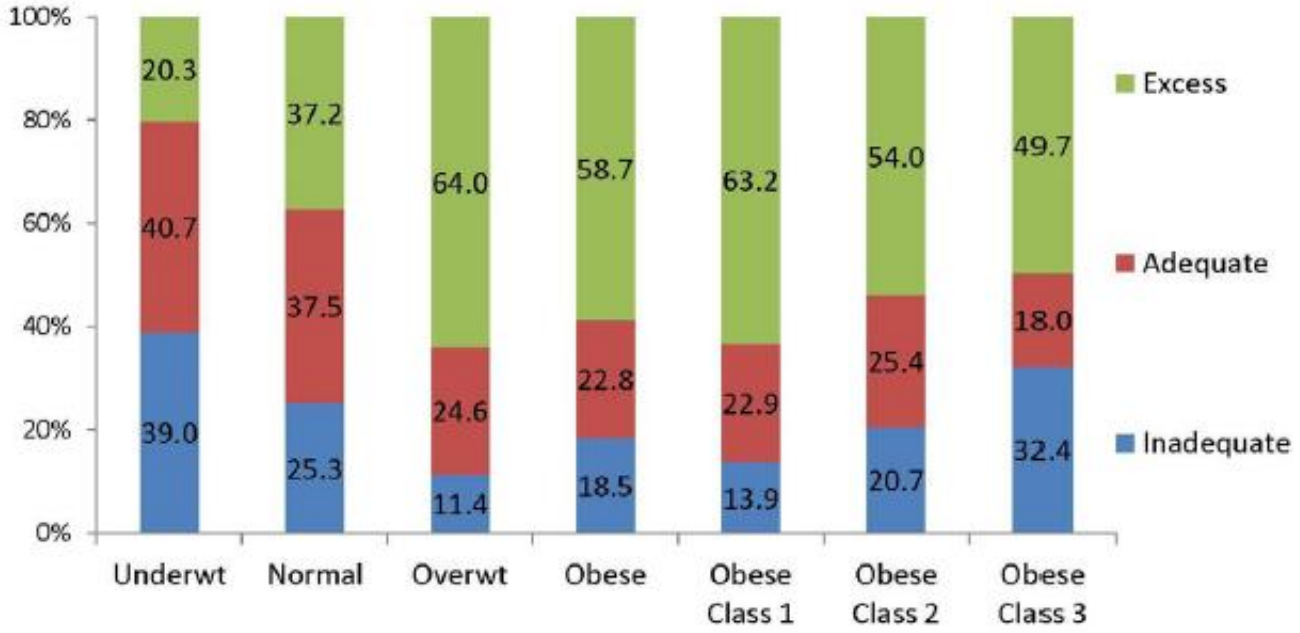



**FIGURE 3-1** Proportion of women meeting gestational weight gain recommendations, full-term, singleton births in 2010, PRAMS preliminary data.
NOTE: Pregnancy Risk Assessment Monitoring System (PRAMS), 28 states and New York City included.
SOURCE: Sharma, 2013.

**Table 3—*The impact of gestational weight gain on maternal and fetal outcomes in 481 obese glucose-tolerant women: multivariate analysis***

| | Gestational weight gain (kg) | OR vs. baseline | 95% CI | *P* for trend |
|---|---|---|---|---|
| Hypertension* | | | | 0.001 |
| | 5.0–9.9 | 2.1 | 0.8–5.7 | |
| | 10.0–14.9 | 3.6 | 1.3–9.8 | |
| | ≥15.0 | 4.8 | 1.7–13.1 | |
| Cesarean section | | | | 0.002 |
| | 5.0–9.9 | 2.4 | 1.1–5.3 | |
| | 10.0–14.9 | 3.0 | 1.4–6.4 | |
| | ≥15.0 | 3.6 | 1.6–7.8 | |
| Induction of labor | | | | 0.002 |
| | 5.0–9.9 | 2.7 | 1.3–5.7 | |
| | 10.0–14.9 | 2.8 | 1.3–5.9 | |
| | ≥15.0 | 3.7 | 1.7–8.0 | |
| Birth weight ≥4,000 g | | | | 0.001 |
| | 5.0–9.9 | 1.8 | 0.8–3.8 | |
| | 10.0–14.9 | 2.2 | 1.0–4.7 | |
| | ≥15.0 | 4.0 | 1.8–9.0 | |
| LGA infant† | | | | 0.001 |
| | 5.0–9.9 | 2.4 | 1.1–5.3 | |
| | 10.0–14.9 | 2.1 | 1.1–4.8 | |
| | ≥15.0 | 4.7 | 2.0–11.0 | |

Baseline: women with weight gain <5.0 kg. For some of the variables, the total number is <481 due to missing values. Trends across the gestational weight-gain groups were evaluated by logistic regression. *Hypertension with and without proteinuria in women without hypertension before pregnancy. †Birth weight ≥90th percentile for a Danish reference population.

*Jensen, Diabetes Care 2005*

# So how can we improve outcomes?

- Preconception
  - Weight reduction
  - Reduce risks of congenital anomalies
  - Optimize associated medical conditions
- During Pregnancy
  - Limit GWG
  - Screening/monitoring for hyperglycemia, hypertension
  - Prevention of GDM, VTE, pre-eclampsia
  - Safest possible delivery
- Postpartum
  - Breastfeeding
  - Weight retention

# Preconception counselling for the obese woman

- Optimization of complications and associated condition
- weight loss if possible
- Avoidance of disruption of effective glycemic and blood pressure control
- Elicit beliefs and knowledge gaps
- Reinforce realistic expectations
- Reduce anxiety through reassurance

# Prepregnancy counselling

- Women who are least likely to plan
  - Smokers
  - Single
  - Lower socioeconomic
  - Poor relationship with HCP
  - Perceive HCP as discouraging

For every 1 increase in BMI (kg/m2),the risk of a neural tube defect increases 7%

*Watkins, Pediatrics 2003*

# Will more folate help obese women?

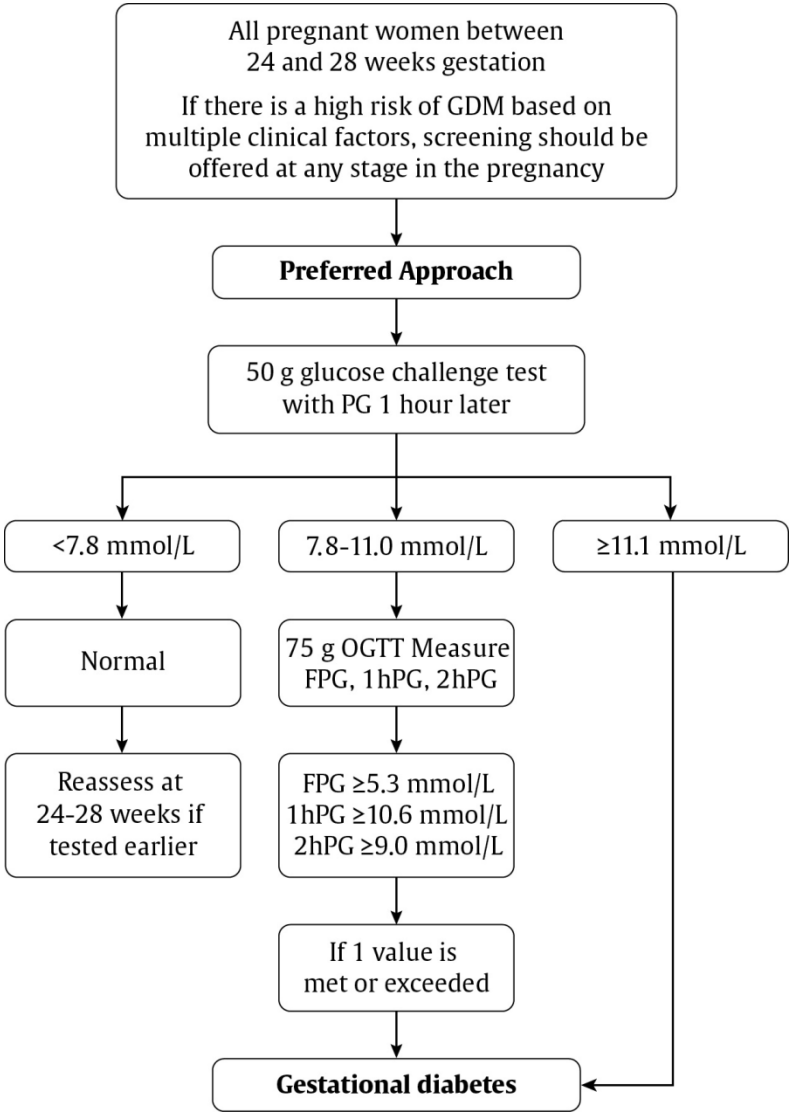
- Folate levels have decreased 16% since fortification of cereal (NHANES data)
  - *MMWR weekly Jan 5, 2007*
- NTD increased 1.2 fold per 10 kg maternal weight even after fortification
  - *Ray, Am J Obstet Gynecol 2005*
- Obese women less likely to eat cereals, vegetables
  - *Laraia, Public Health Nutr 2007*
- Obese women have lower serum folate levels with same intake, need to take an additional 350 ug/day
  - *Mojtabai, Eur J Epidemiol 2004*

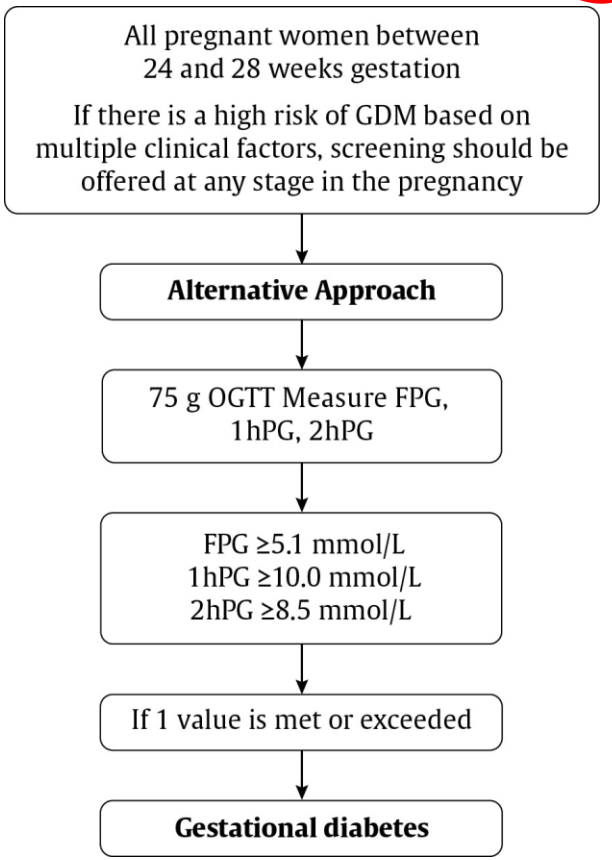
# First trimester glucose screening

- Purpose
  - To diagnose type 2 vs. gestational diabetes
  - To predict gestational diabetes
- Predictor of ….?
  - GDM
  - Poor obstetrical outcomes
- Impact of intervention
  - unknown

# 2013 GDM Diagnosis: Two Approaches

2013



# To diagnose overt diabetes in first trimester

To diagnose overt diabetes in pregnancy

| Measure of glycemia | Consensus threshold |
|---|---|
| FPG‡ | ≥7.0 mmol/l (126 mg/dl) |
| A1C‡ | ≥6.5% (DCCT/UKPDS standardized) |
| Random plasma glucose | ≥11.1 mmol/l (200 mg/dl) + confirmation§ |

IADSPG Consensus Panel, Diab Care 2010

Table 2—*AORs for associations between maternal glucose as a categorical variable and primary outcomes**

| | Fasting glucose | *n* (%) | GDM [*n* (% outcome)] | GDM [OR (95% CI)] | LGA and/or macrosomia [*n* (% outcome)] | LGA and/or macrosomia [OR (95% CI)] | Primary cesarean section [*n* (% outcome)] | Primary cesarean section [OR (95% CI)]† |
|---|---|---|---|---|---|---|---|---|
| 1 | <75 mg/dl | 1,525 (24.9) | 15 (1.0) | 1.0 | 120 (7.9) | 1.0 | 182 (12.7) | 1.0 |
| 2 | 75–79 mg/dl | 1,587 (25.9) | 31 (2.0) | 1.95 (1.05–3.62) | 134 (8.4) | 1.08 (0.84–1.40) | 222 (14.9) | 1.21 (0.98–1.5) |
| 3 | 80–84 mg/dl | 1,427 (23.3) | 34 (2.4) | 2.39 (1.30–4.42) | 168 (11.8) | 1.56 (1.22–2.00) | 195 (14.8) | 1.22 (0.98–1.52) |
| 4 | 85–89 mg/dl | 893 (14.6) | 27 (3.0) | 3.04 (1.60–5.75) | 100 (11.2) | 1.48 (1.12–1.95) | 141 (17.0) | 1.43 (1.12–1.82) |
| 5 | 90–94 mg/dl | 415 (6.8) | 39 (9.4) | 9.32 (5.07–17.14) | 61 (14.7) | 2.02 (1.45–2.80) | 58 (15.9) | 1.45 (1.04–2.00) |
| 6 | 95–99 mg/dl | 179 (2.9) | 15 (8.4) | 8.63 (4.13–18.04) | 31 (17.3) | 2.45 (1.60–3.77) | 28 (17.3) | 1.56 (1.00–2.42) |
| 7 | 100–105 mg/dl | 103 (1.7) | 12 (11.7) | 11.92 (5.39–26.37) | 20 (19.4) | 2.82 (1.67–4.76) | 17 (20.0) | 1.94 (1.11–3.41) |

*Associations were adjusted for parity and maternal age. †Data for women who had a previous cesarean section were excluded.

*Riskin-Mashiah, Diab Care 2009*

## *Does intervention make a difference?*

# Prevention of pre-eclampsia

- ?ASA
- ?Calcium supplementation

# Risk of VTE in obese women

Table 4 Adjusted odds ratios (OR) of venous thromboembolism by type of thrombotic event

| Risk factor | DVT | | PE | |
|---|---|---|---|---|
| | Cases/ controls[a] | Adjusted OR[b] (95% CI) | Cases/ controls[a] | Adjusted OR[b] (95% CI) |
| Non-smoker (reference) | 38/151 | 1.0 | 7/151 | 1.0 |
| Current smoker | 39/59 | 2.5 (1.3, 4.6) | 7/59 | 5.3 (1.2, 23.6) |
| BMI | | | | |
| <25 (reference) | 52/164 | 1.0 | 5/164 | 1.0 |
| 25-30 | 14/36 | 1.3 (0.6, 2.8) | 3/36 | 1.7 (0.3, 10.0) |
| >30 | 11/10 | 4.4 (1.6, 11.9) | 6/10 | 14.9 (3.0, 74.8) |

DVT: deep venous thrombosis, PE: pulmonary embolism.
[a] Only cases and controls with available data on all variables were included.
[b] Adjusted for age of mother, parity, clomiphene citrate stimulation, and diabetes mellitus.

Larsen, Thrombosis Res, 2007

# Prevention of VTE

- No clear consensus on thromboprophylaxis

# Pregnancy as a teachable moment

- Naturally occurring life transitions or health events that motivate individuals
  - Increase perceptions of personal risk
  - Elicit strong emotional responses
  - Redefine self-concept or social roles
- Provider advice about weight gain is strongly associated with actual weight gain

(Phelan, AJOG 2010)

# Do lifestyle interventions work to improve pregnancy outcomes?

- Meta-analysis *(Thangaratinam et al, BMJ 2013)*
  - *44 RCT's – diet, physical activity or both*
  - *Activity interventions associated with reduced birth weight, not seen in dietary intervention*
  - *Any intervention*
    - *1.42 kg reduction in weight gain*
      - *Most benefit in dietary intervention (3.84 kg, 2.45-5.22)*

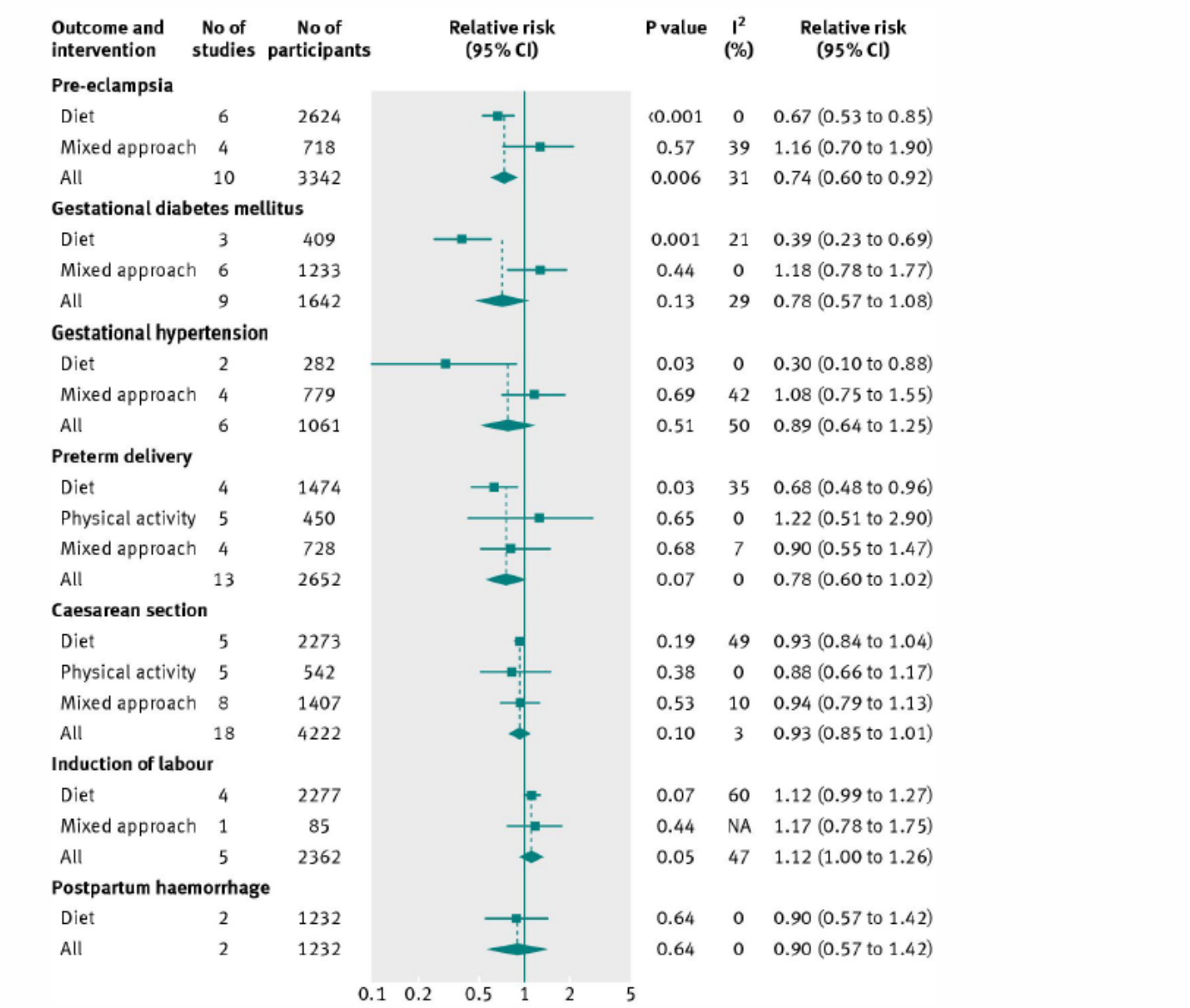



**Fig 6** Relative risk of effects of weight management interventions in pregnancy on maternal outcomes

Thangaratinam, BMJ 2013

# Do women know their BMI and how much weight they should gain?

- 74% of women underestimated their BMI category
- 64% of obese women and 40% of overweight women overestimated their recommended GWG
- Poor knowledge of risks of obesity
  - 28% identified BP problems
  - 51% identified GDM
  - 14% identified pp weight retention
  - 71% back pain
  - <5% c-section, preterm delivery,pregnancy complications

*Shub, BMC Res Notes 2013*

# Bias toward Obese Pregnant Women

- 11% agreed to making insensitive comments to obese pregnant women
- 31% ***agreed to making derogatory comments*** about obese pregnant women ***to colleagues***
  - Obstetricians (46%)
  - Family Physicians (39%)
  - Midwives (36%)
  - Nurses (14%)
  - Dietitians (0%)
  - (*p*=0.02)
- 66% believe ***more derogatory comments are made*** about obese pregnant women vs non –obese pregnant women
  - Obstetricians (81%)
  - Family Physicians (69%)
  - Midwives (92%)
  - Nurses (52%)
  - Dietitians (14%)
  - (*p*=0.002)

Table 2 Health-care providers' attitudes to communicating gestational weight gain recommendations (represented in percentages)

| | SA | A | D | SD | N/A |
|---|---|---|---|---|---|
| Important | 84 | 16 | 0 | 0 | 0 |
| Beneficial to rapport | 15 | 68 | 10 | 3 | 4 |
| Best practice | 64 | 35 | 0 | 1 | 0 |
| Pleasant (for me) | 3 | 26 | 6 | 1 | 9 |
| Comfortable (for me) | 8 | 44 | 44 | 1 | 2 |
| Convenient (for me) | 15 | 39 | 41 | 2 | 3 |
| Rewarding (for me) | 14 | 45 | 32 | 1 | 8 |

SA, strongly agree; A, agree; D, disagree; SD, strongly disagree; N/A, not applicable

*Grohman, Obstet Med 2012*

# What is best way to improve counseling rates/impact?

# Breastfeeding

- Rates are reduced in obese woman
  - Difficulties with infant latching
  - Delayed arrival of milk
  - Increased obstetrical complications including operative delivery
  - Body image discomfort

# Exclusive Breastfeeding on d/c

| | BMI < 25 | BMI > 25 | BMI>30 |
|---|---|---|---|
| 2007-2008 | 65% (94%) | 53% (91%) | 45% (89%) |
| 2008-2009 | 64% (92%) | 53% (90%) | 45% (89%) |

Source: BORN Ontario (Niday Perinatal Database)

# Breastfeeding associated with better maternal and offspring outcomes

- May reduce offspring obesity and risk of type 2 diabetes

- Lactation may attenuate unfavourable metabolic risk factors, promote pp weight loss
  - *Gunderson Obstet Gynecol 2007*

Need to target this group for breastfeeding support

# Weight reduction after childbirth

- Strongest predictor of 1 year postpartum weight retention is GWG

- Optimal setting, delivery, length of intervention, recruitment approach not known

# So how can we improve outcomes?

- Preconception
  - Weight reduction
  - Reduce risks of congenital anomalies
  - Optimize associated medical conditions
- During Pregnancy
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Carefully chosing the words we use and the situations we use them in