

“Weight & See”

**Impacts of maternal overweight and obesity
on neonatal and childhood outcomes**

RCP “Weight Times in Perinatal Health”

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Fat kids will die younger

**Obesity
rubs off,
study finds**

The Cincinnati Post 10/15/03



CHILDHOOD Heavy facts

At age 4
15%
overweight

5%
obese

At age 10
20%
overweight

6%
obese

Disadvantaged children

- Most likely to be overweight or obese
- The most disadvantaged children are nearly four times more likely to be obese throughout childhood than the most affluent

Confidence is Beautiful

NO MATTER YOUR

SIZE

NO MATTER YOUR

WEIGHT

Be confident in who you
are and you'll be

BEAUTIFUL

Weight Loss Problems #1457

trying not to slap the person who
says you can eat whatever you
want as long as you burn it
off at the gym

**It is easier to
change a man's
religion than to
change his diet.**

-Margaret Mead

MyWeightLossDream.co.uk

Objectives

- ▶ Review current controversies in determining the impact of maternal weight on the outcomes of off spring
- ▶ Examine maternal/perinatal outcomes associated with maternal weight
- ▶ Neonatal outcomes related to maternal weight
- ▶ Childhood outcomes related to maternal weight
- ▶ Delineate research questions/ areas for further investigation

Controversies

Controversy 1 – nature vs. nurture

- ▶ Complex interplay of factors
- ▶ Genetic predisposition vs. lifestyle and choices
 - Animal models support both as factors
 - Epidemiologic studies support both
 - Human studies also support both
- ▶ How can we intervene for nature
 - How to pick which factors may be modifiable?
 - What time frames may be most vulnerable?

Controversy 2– Which phase is most import?

- ▶ Antenatal vs. pregnancy vs. postnatal
- ▶ Impact of pre-pregnant weight/BMI and health (DM, hypertension)
- ▶ Impact of the intrauterine environment (the epigenetic time bomb) and gestational weight gain
- ▶ The impact of postnatal feeding/ activity

Controversy 3– It's all about overweight and obesity

- ▶ Programming of childhood and adult weight and health outcomes is associated with *alterations* in intrauterine environment
- ▶ Impact of growth restriction
 - Similar long term outcomes of overweight and cardiovascular adverse effects (Barker's hypothesis)
 - Epidemiologic studies post famine

Maternal /Perinatal Outcomes

Maternal/Perinatal Outcomes of maternal overweight/obesity

- ▶ Many studies of the risks for pre-pregnant overweight/obesity and for excessive GWG
- ▶ Conflicting data about which is most important factor
- ▶ Strongest association with adverse outcomes when both pre-pregnant overweight/ obesity and excessive GWG

Maternal/Perinatal Outcomes of maternal overweight/obesity

Cochrane review 2012

- ▶ Pre-pregnant overweight/obesity associated with:
 - Increased risk of PIH/ GDM (2–3 X)
 - Increased risk of induction (50–75% more likely)
 - Increased risk of c-section (40–60% more likely)
 - Increased risk of LGA infant (2–4X)
 - Increased risk of still birth and neonatal death
 - Increased risk of NICU admission
- ▶ Excessive GWG
 - Increased risk of “keeping weight on” (2–3 X more likely than if normal weight gain)

Maternal/Perinatal Outcomes of maternal overweight/obesity

- ▶ Anesthesia
 - In past increased risk of general (less in more recent cohorts)
 - Increased risk of epidural failure
- ▶ Post-partum complications
 - Increased wound infection
 - Increased post-partum hemorrhage

Neonatal Outcomes

Neonatal Outcomes Associated with Maternal overweight/obesity

- ▶ Timing of delivery
 - Increased risk of both preterm and post-term delivery
 - Preterm associated with other maternal co-morbidities such as PIH
- ▶ So what?
 - Adds to the cohort the complications associated with preterm delivery
 - May explain some of the excess in respiratory outcomes (both preterm and MAS) and the birth depression
 - May explain some of the excess need for resuscitation

Neonatal Outcomes Associated with Maternal overweight/obesity

- ▶ Mode of delivery
 - More likely to be induced (studies vary as to whether inductions are more likely to be unsuccessful)
 - More likely to undergo c-section
- ▶ So what?
 - Impact of c-section on transition and respiratory outcomes
 - Emerging evidence about the effect of planned c-section on micro biome and subsequent inflammatory status

Neonatal Outcomes Associated with Maternal overweight/obesity

- ▶ Birth weight
 - More likely to be LGA (compounded if excessive GWG)
 - May also be SGA related to maternal co-morbidities
- ▶ So what?
 - Known complications of increased size– birth trauma, need for operative delivery, need for resuscitation
 - Impact of LGA and SGA on hypoglycemia risk– need for intervention, separation from mother

Neonatal Outcomes Associated with Maternal overweight/obesity

- ▶ Increased risk of low Apgar
 - Remained even after adjustment for the other factors (up to 31% excess risk in one study)
- ▶ So what?
 - Increased risk of resuscitation requirement
 - Increased admission to NICU
 - Association with short and long term effects

Neonatal Outcomes Associated with Maternal overweight/obesity

- ▶ Increased admission to NICU
 - Almost 40 % higher for obese women if spontaneous or induced labours
 - No difference if c-section
- ▶ So what?
 - Maternal separation
 - Effects on breastfeeding
 - NICU is not where you want to be if possible!

Neonatal Outcomes Associated with Maternal overweight/obesity

- ▶ Decreased breastfeeding
 - Decreased initiation
 - Choice/ mechanical issues/ separation
 - Later onset of milk production
 - Endocrine factors/ secondary to increased complications of pregnancy
 - Decreased duration
- ▶ So what?
 - Lack of breastfeeding related to many of the outcomes to be studied including childhood weight, metabolic derangement, asthma.....

Neonatal Outcomes Associated with Maternal overweight/obesity

- ▶ Increased risk of perinatal mortality
 - Mixed results in various studies of the statistical significance (all in the same direction but CI inclusive of 1)
- ▶ So what?
 - Clinical significance goes without saying

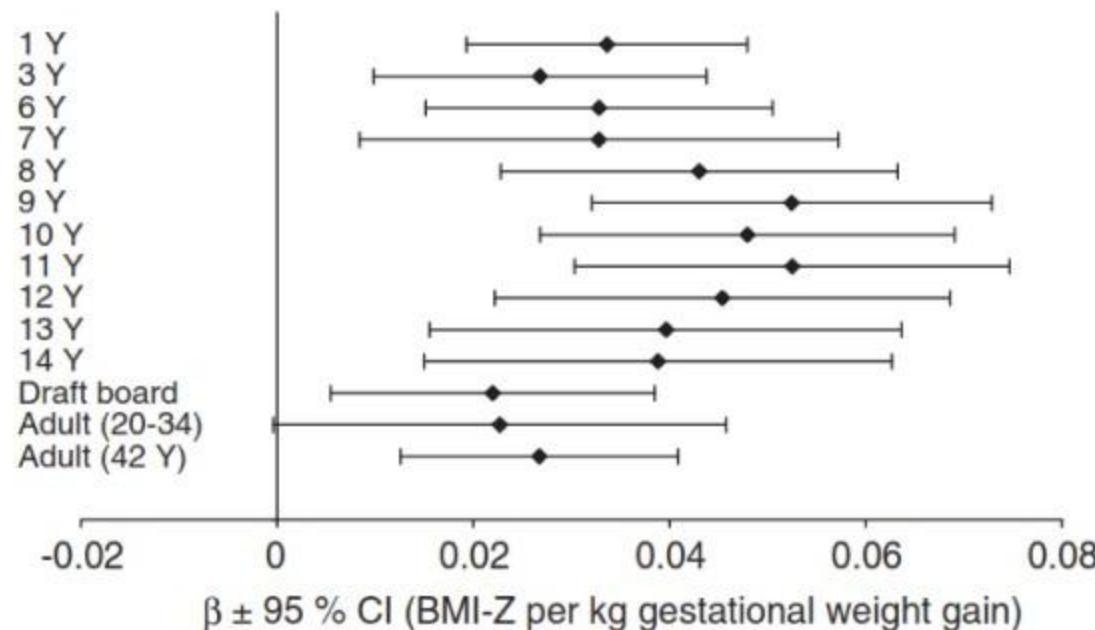
Childhood Outcomes

Childhood outcomes related to maternal overweight/obesity

- ▶ Increased childhood obesity
 - Up to double the rate of obesity at 18 -24 months
 - Greater fat mass at 4 and 6 years
 - Maternal BMI greatest predictor of overweight and fat mass at 8 years
 - Children who are obese at age two more likely to be obese at age 12
- ▶ So what?
 - Obesity associated with adverse health outcomes
 - ? Effect of earlier attainment of obesity

Childhood outcomes related to maternal overweight/obesity

- ▶ Increased childhood obesity with excessive GWG



Regression analyses with gestational weight gain as dependent variable and offspring body mass index (BMI) z-scores at different ages as independent variables. Adjusted for sex, maternal age, maternal pre-pregnancy BMI, parental social status at birth, breadwinner's education, single-mother status, prematurity, edema and smoking during pregnancy. Reprinted from [40] by permission from Macmillan Publishers Ltd.: copyright (2010).

Childhood outcomes related to maternal overweight/obesity

- ▶ Altered self image
- ▶ Altered social relationships
 - “thin is in”
 - “fat=lazy, stupid, poor unattractive.....”
 - Hundreds of slogans, jokes and cartoons.....

Childhood outcomes related to maternal overweight/obesity

- ▶ Adverse health outcomes
 - Increased risk of asthma (8–30% higher)
 - Increased risk of hypertension
 - Increased triglycerides, HDL-cholesterol
 - Increased insulin resistance
 - Increased type 2 DM
- ▶ So what?
 - Clinically self-evident



**Fat kids
will die
younger**

Where to from here?– Future research directions

What do we need to do?

- ▶ Identify vulnerable time frames
 - Weight gain, which trimester
 - Neonatal period
 - ? Programmed or individual
- ▶ Identify potential modifiable factors
 - Exercise, diet, sleep patterns, stress
- ▶ Deal with social determinants of health
 - Poverty, isolation, abuse

What information do we need?

- ▶ Linked data which is population-based and includes more than just “health”
- ▶ Broad-based, cross-sectorial, inclusive studies
- ▶ Long time lines

Sometimes the questions
are complicated and the
answers are simple. Dr. Seuss