



UC Leuven
Limburg

MOVING MINDS

The inter-pregnancy period, an opportunity for intervention

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29-10-2015, Hot topic London

Prevalence **Maternal Obesity**

- **European cohorts** → **8% - 20%**

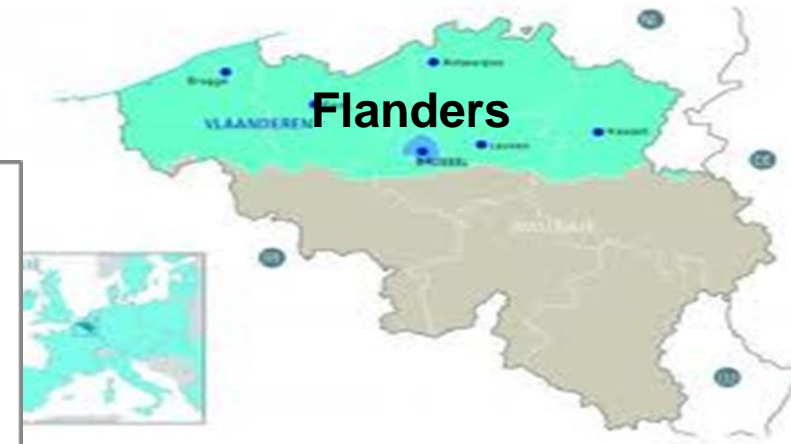
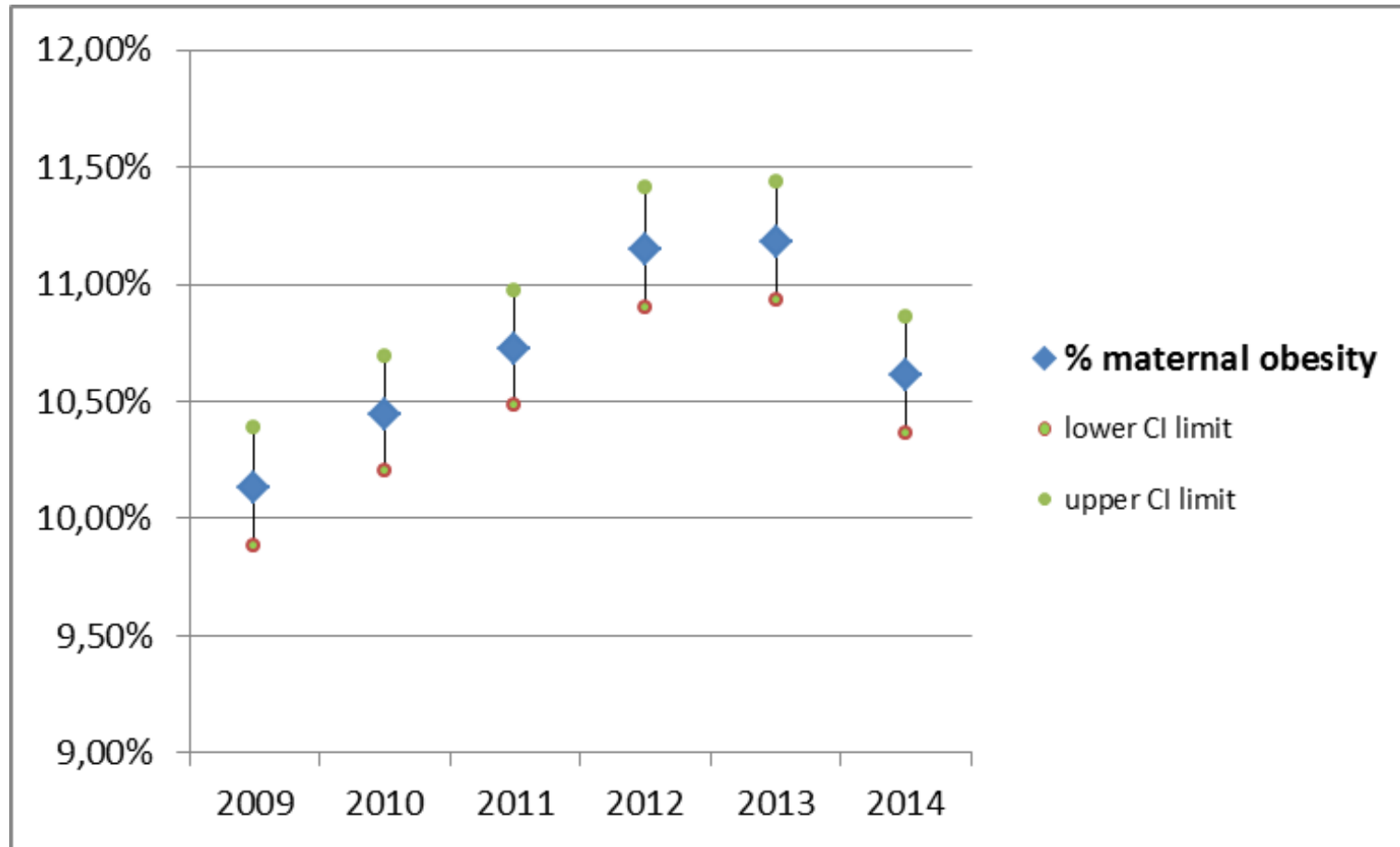
(Guelinckx et al. , 2008; Briesse, et al. 2010; Bogaerts A. et al. 2012; Heslehurst, N. et al. 2010)

- **American cohorts** → **18% - 38%**

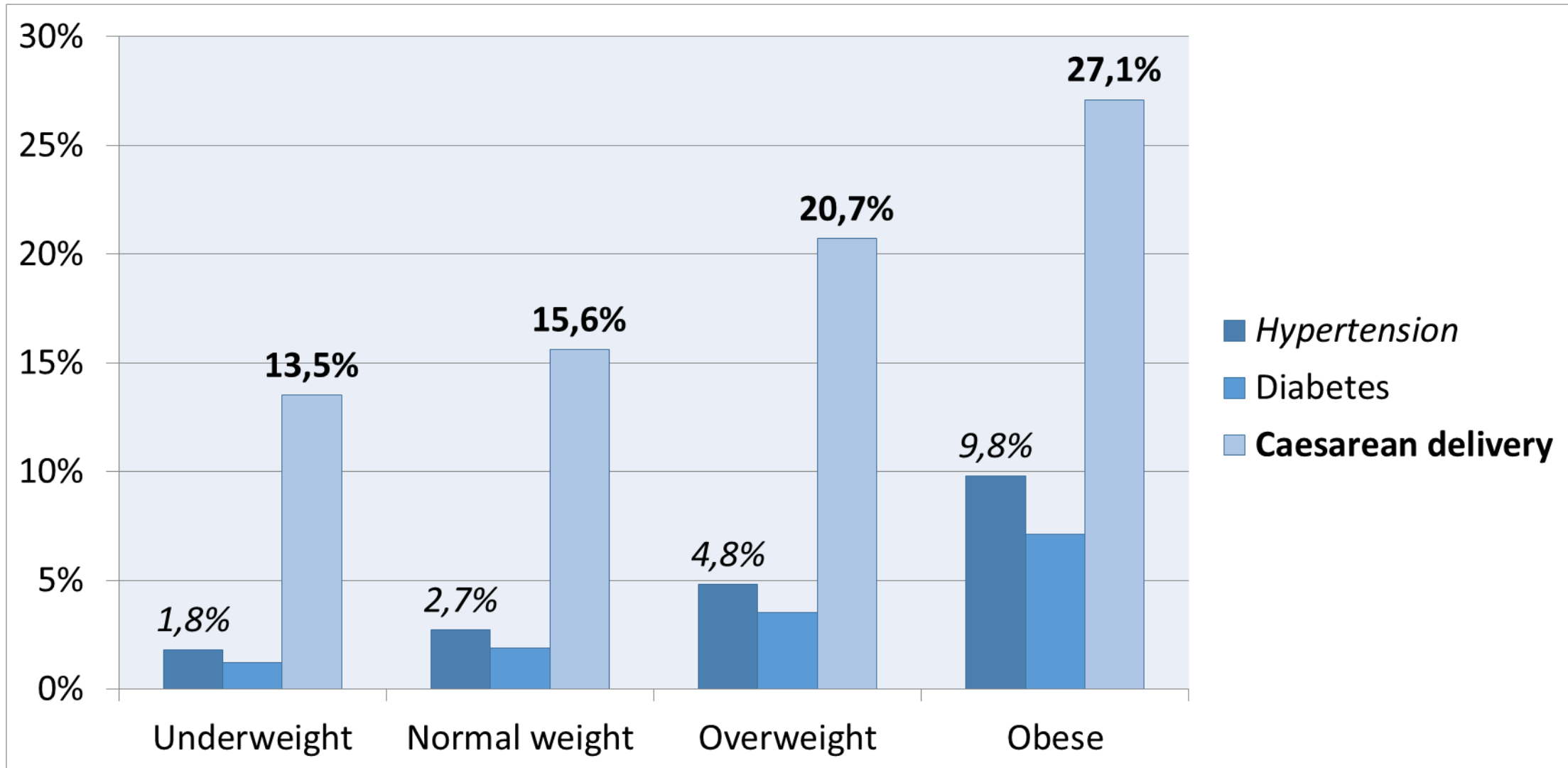
(Galtier-Dereure; F. et al., 2000; IOM, 2009; Flegal et al. 2012)

Evolution of **Maternal Obesity** (≥ 30 kg/m²) , 2009-2014

(Northern part of Belgium, N = 350 923)

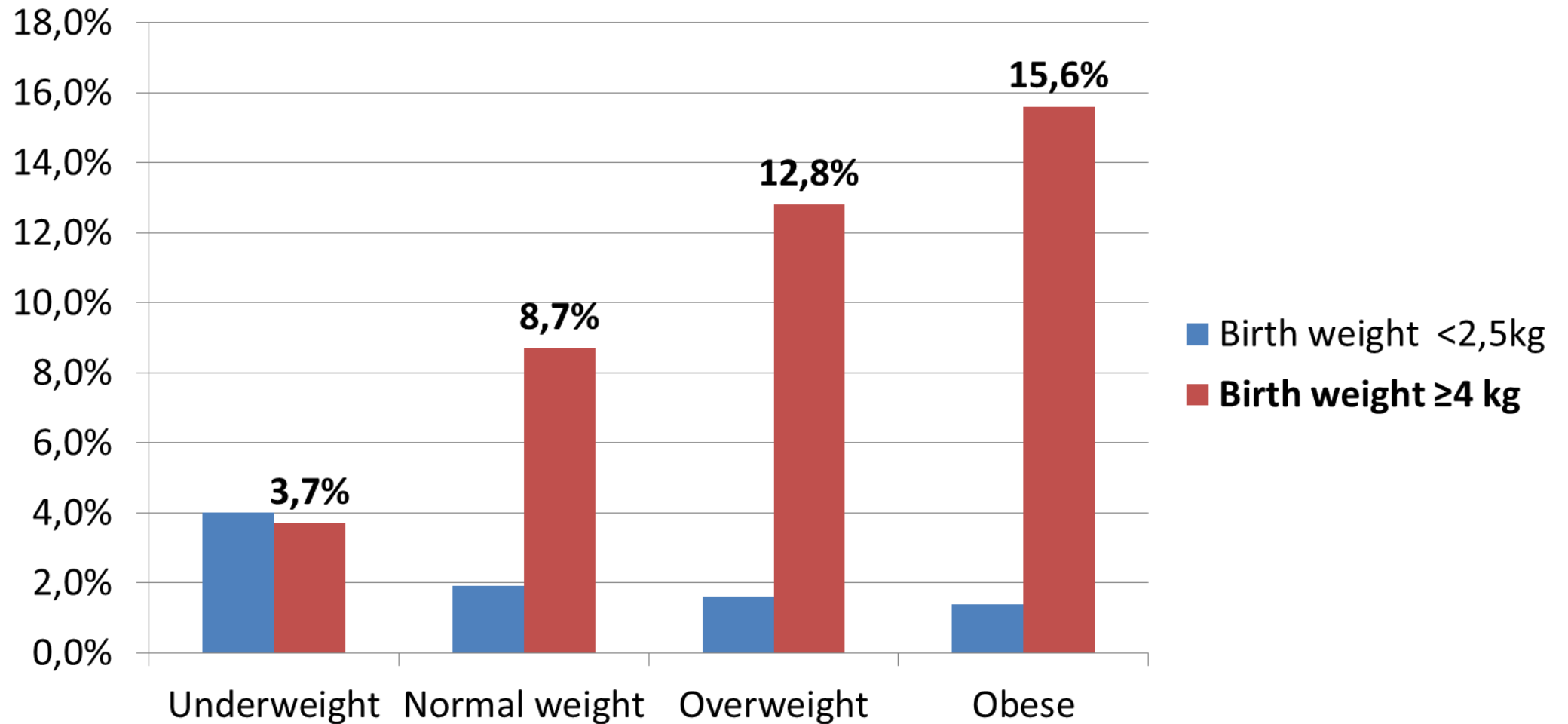


Perinatal outcomes by prepregnancy BMI category (2012)



N=59 904, Flemish cohort 2012

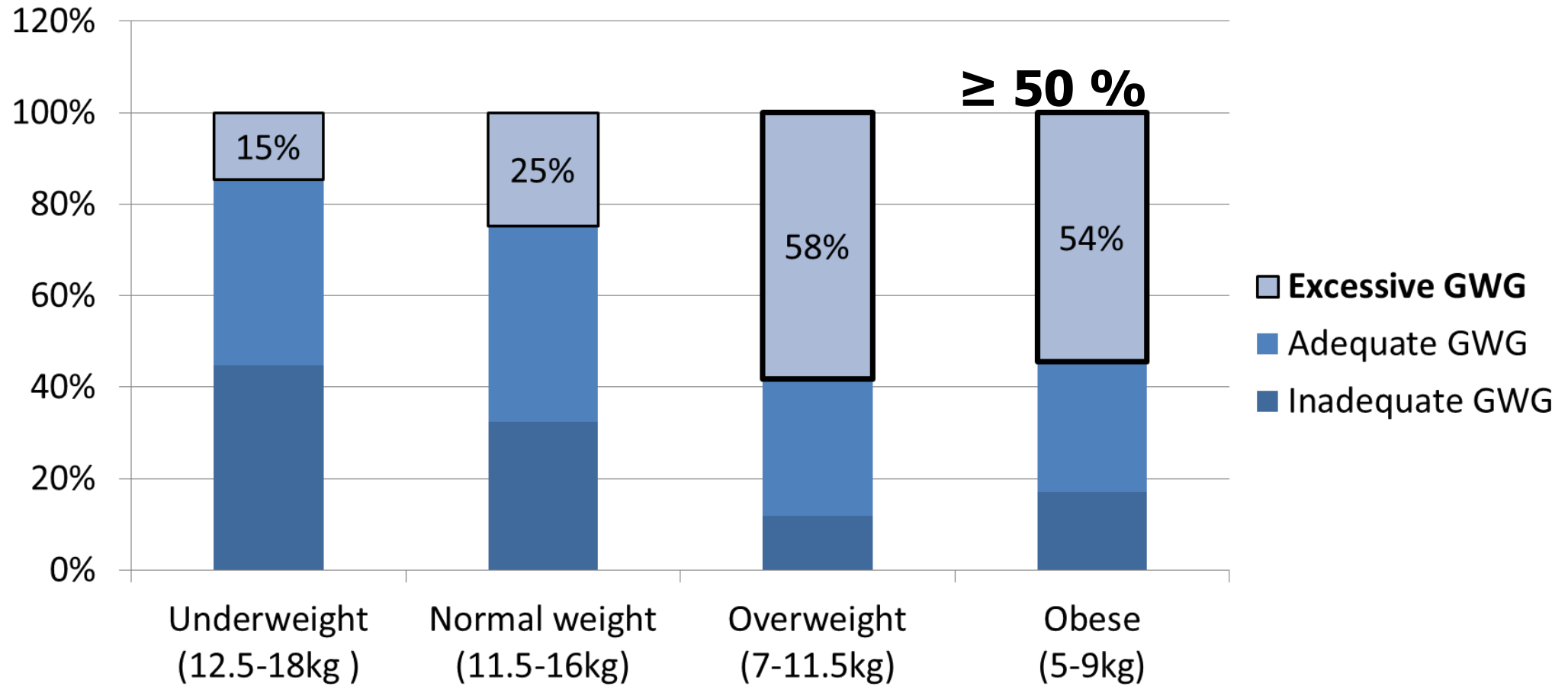
Perinatal outcomes by prepregnancy BMI category (2012)



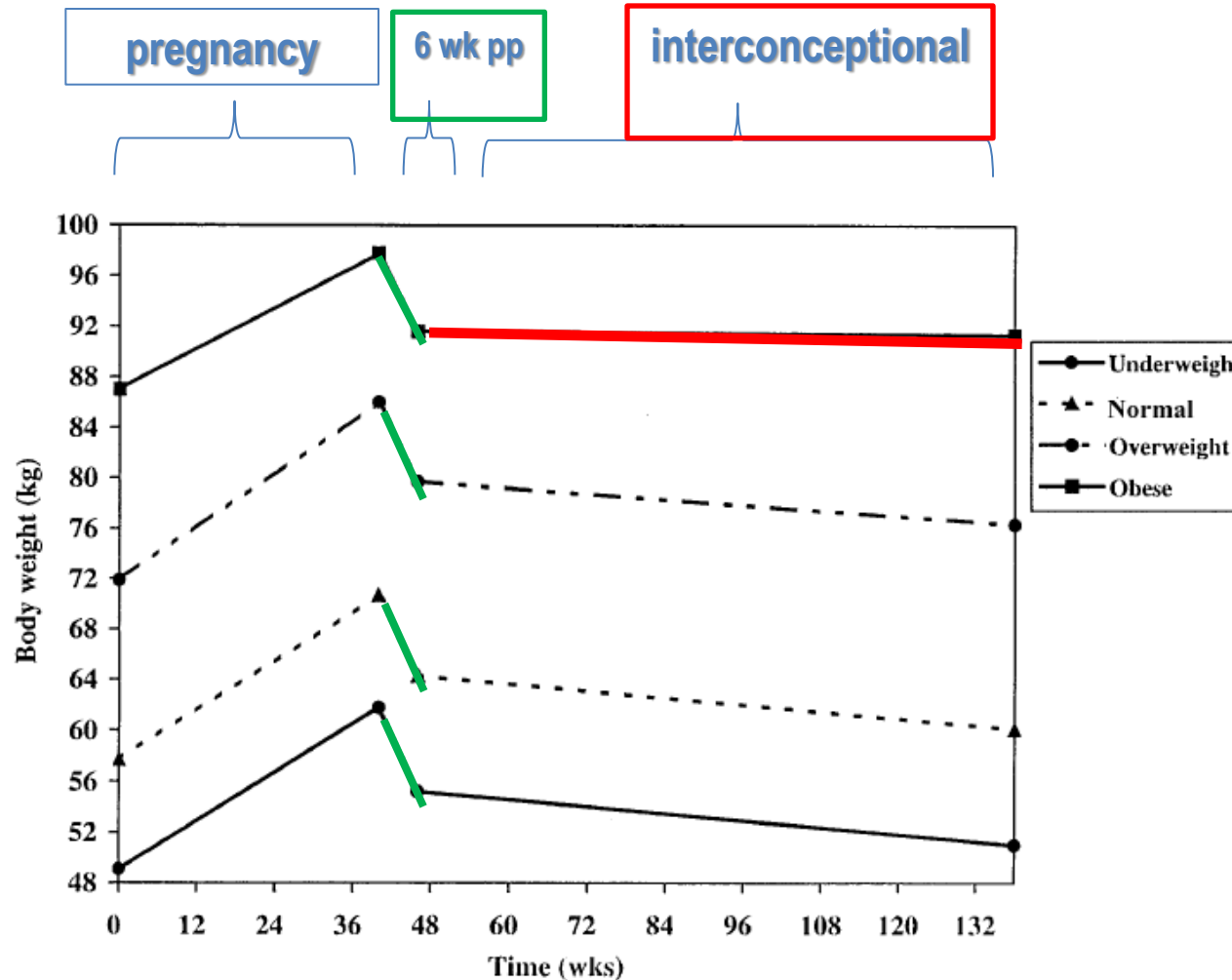
N=59 904, Flemish cohort 2012

Gestational Weight Gain (Flanders 2009)

N= 54 022



Postnatal weight change



- N= 985 women with 2 consecutive pregnancies in San Francisco;
- Same decrease of weight change between the 4 BMI groups **during the first 2 months**;
- Slower decrease in weight loss in obese mothers during the 2 year follow up after delivery

Figure 1 Patterns of maternal weight changes from preconception through gestation and early and late postpartum periods according to pregravid BMI group.

Postnatal weight change

- ❑ +/- 1 in 3 women are reaching their **prepregnancy weight** within **6 weeks after delivery**; **mean weight retention at 6 weeks** after delivery : between **3 and 7 kg**
- ❑ **14 – 20% women** → 4 to 5 kg postnatal weight retention **1 year** after delivery
- ❑ **23% women** gained > 5 kg , **7 years** after delivery

1 in 4



excessive weight retention

(Kirkegaard et al. 2015; Walker et al. 2005, 2007; Gunderson et al. 2001, Bogaerts et al. 2008)

Interpregnancy Weight Change and Risk for Adverse Perinatal Outcome

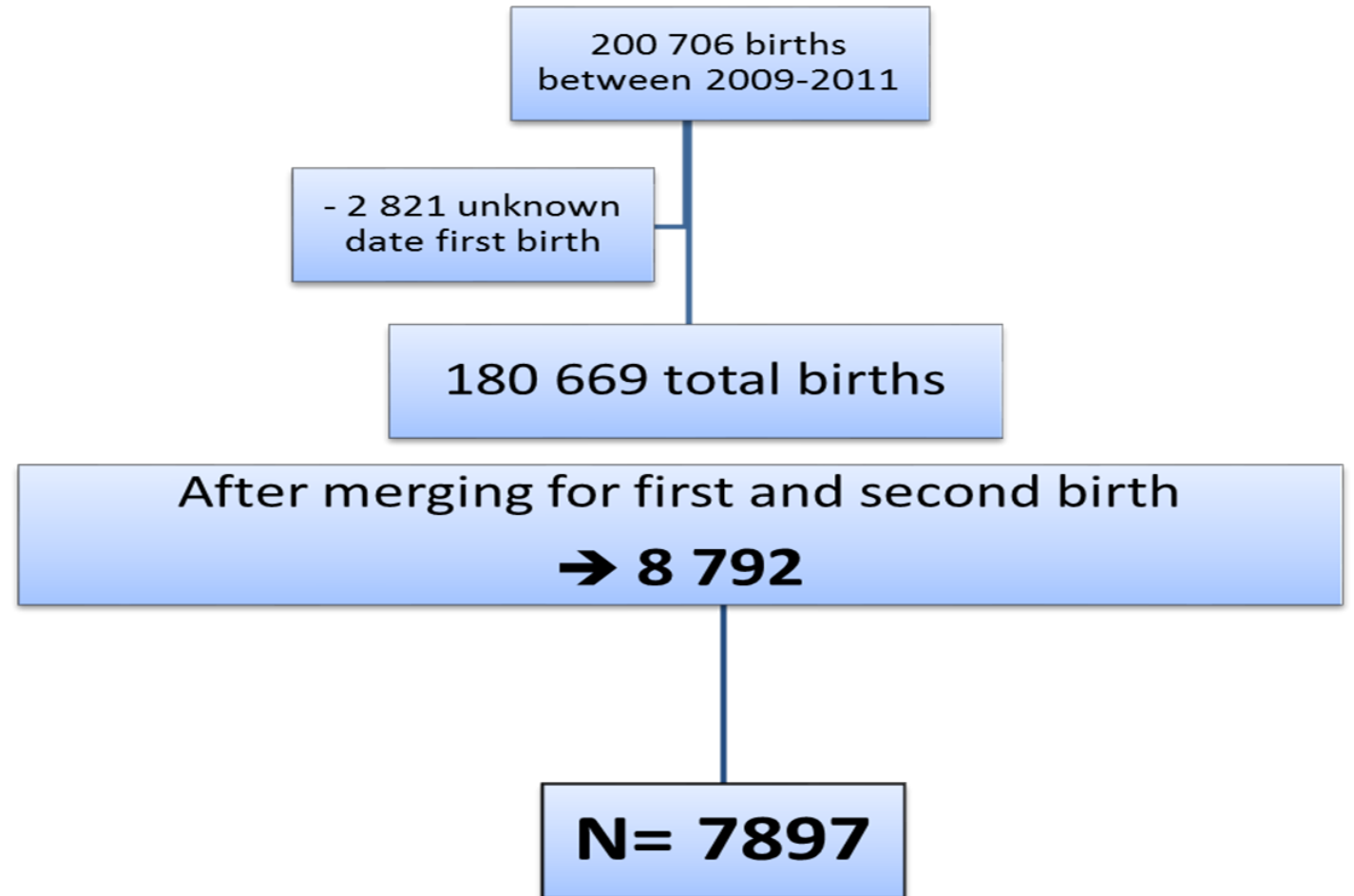
Annick Bogaerts, PhD, Bea R. H. Van den Bergh, PhD, Lieveke Ameye, PhD, Ingrid Witters, PhD, Evelyne Martens, MSc, Dirk Timmerman, PhD, and Roland Devlieger, PhD

Obstetrics & Gynecology, 2013; 122, (5), 999-1009.

AIM: To describe **associations** between **maternal weight evolution** between the **first and the second pregnancy** and risk for **adverse perinatal outcomes** during the second pregnancy

Inclusion

- Flanders, the Northern part of Belgium → SPE database
- All liveborn singleton births with a first and second pregnancy between 2009 – 2011



OUTCOME measures:

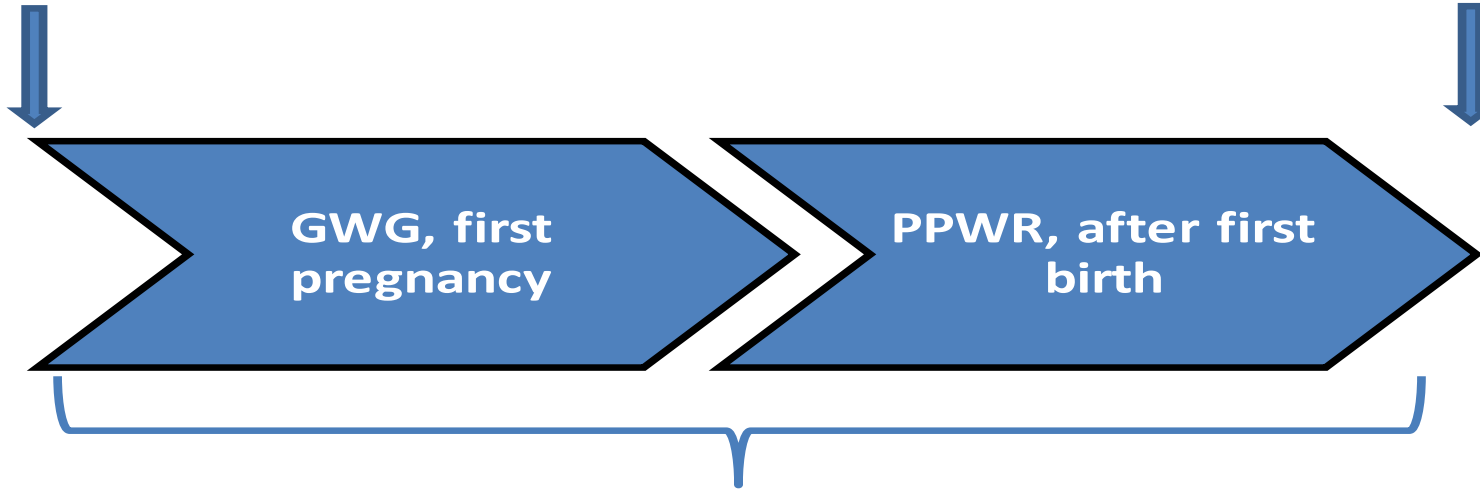
1. Pregnancy-induced hypertension (PIH)
2. Gestational diabetes mellitus (GDM)
3. Caesarean delivery (CS)
4. Birth weight $\geq 4000\text{g}$ (BW)
5. Low birth weight $< 2500\text{g}$

Interpregnancy weight (IPW) retention



Pre-pregnancy BMI,
first pregnancy

Pre-pregnancy BMI,
second pregnancy



IPW retention = GWG + PPWR

Changes in BMI categories (units of BMI) :

Lost 1 or more than 1 unit BMI

From -1 and +1 (ref)

From +1 to +2

From +2 to 3

3 or more

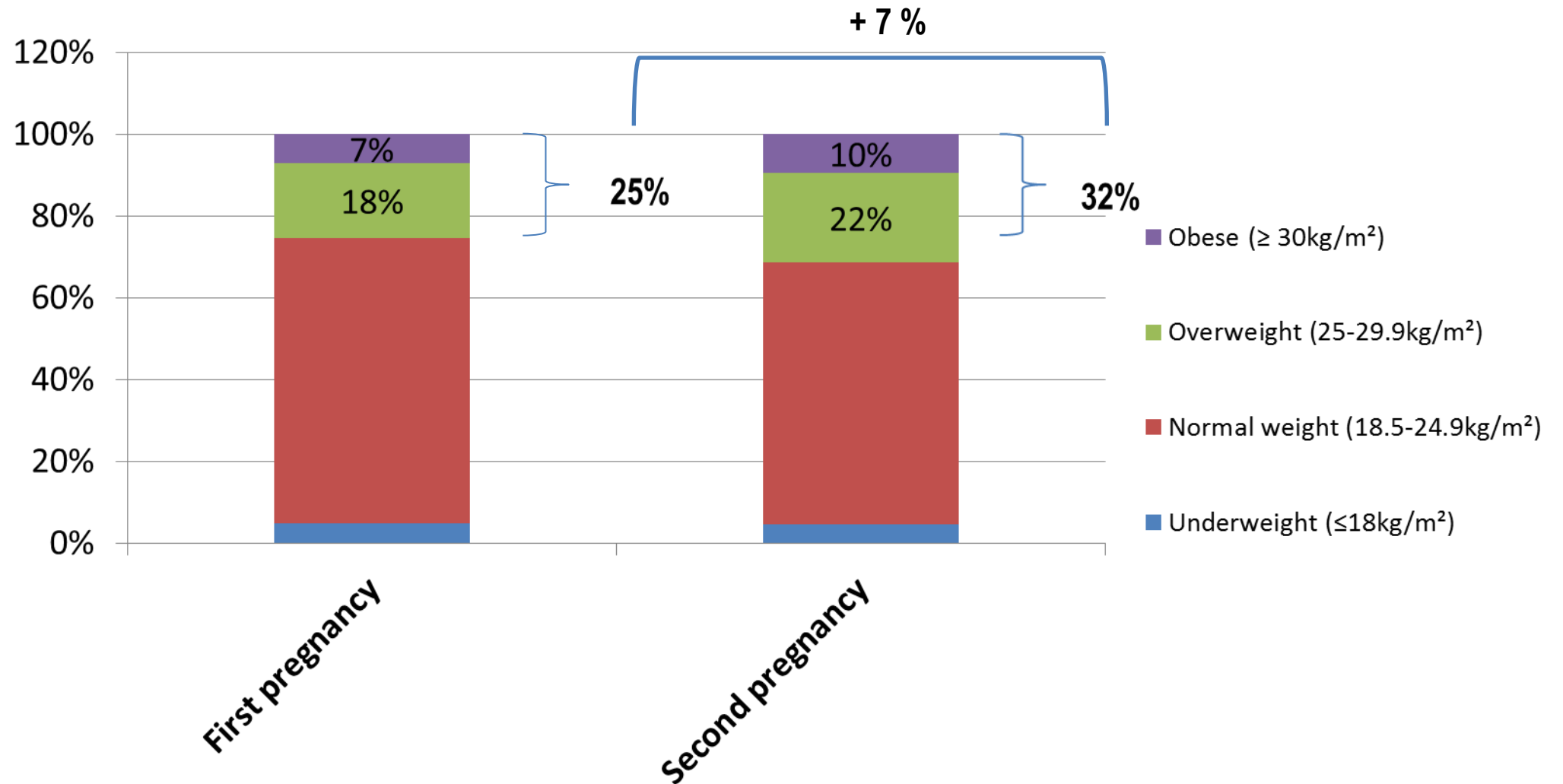
GWG=gestational weight gain

PPWR=postpartum weight retention

1 unit BMI = +/- 2.5 – 3 kg

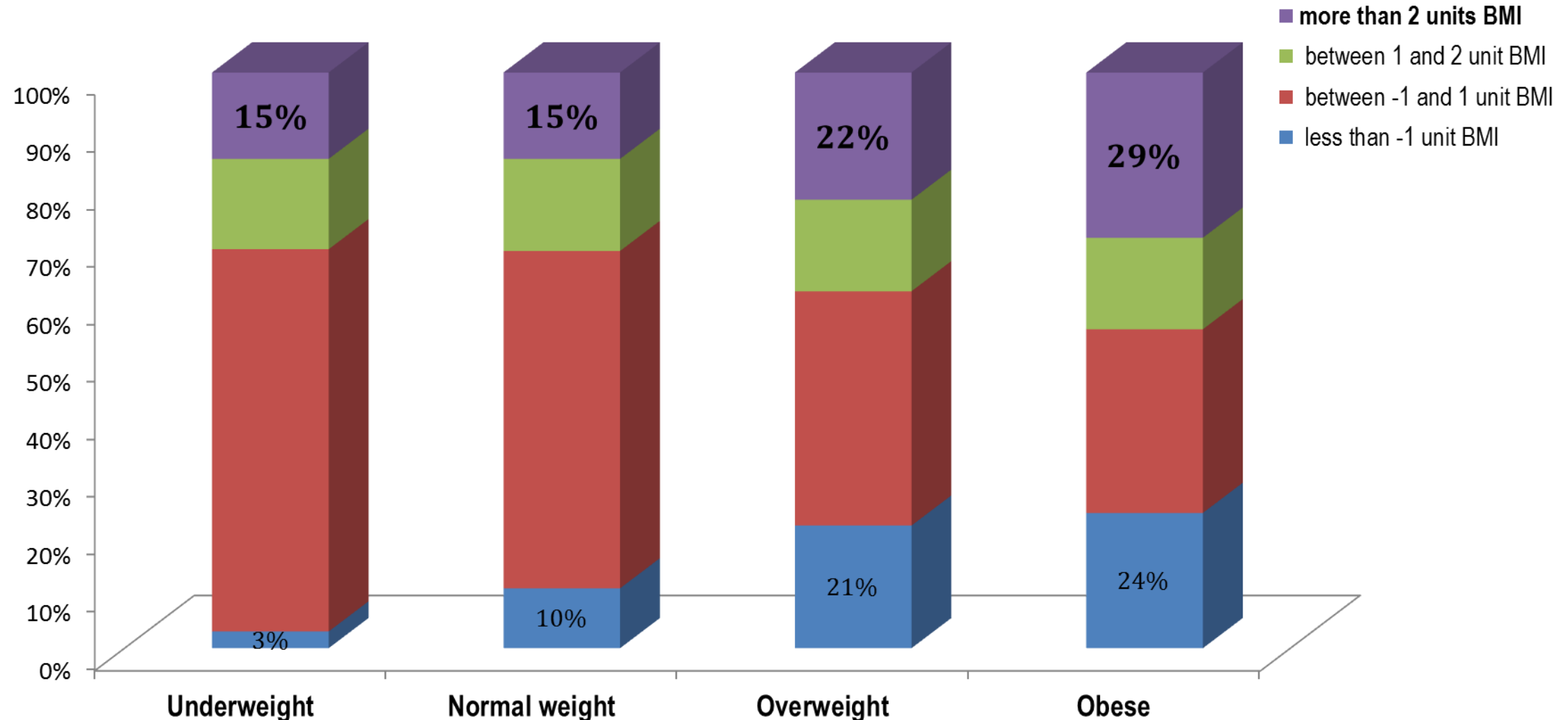
Results: descriptives

Increase in prevalence of overweight/obese women from the FIRST to the SECOND pregnancy



INTER-pregnancy weight change

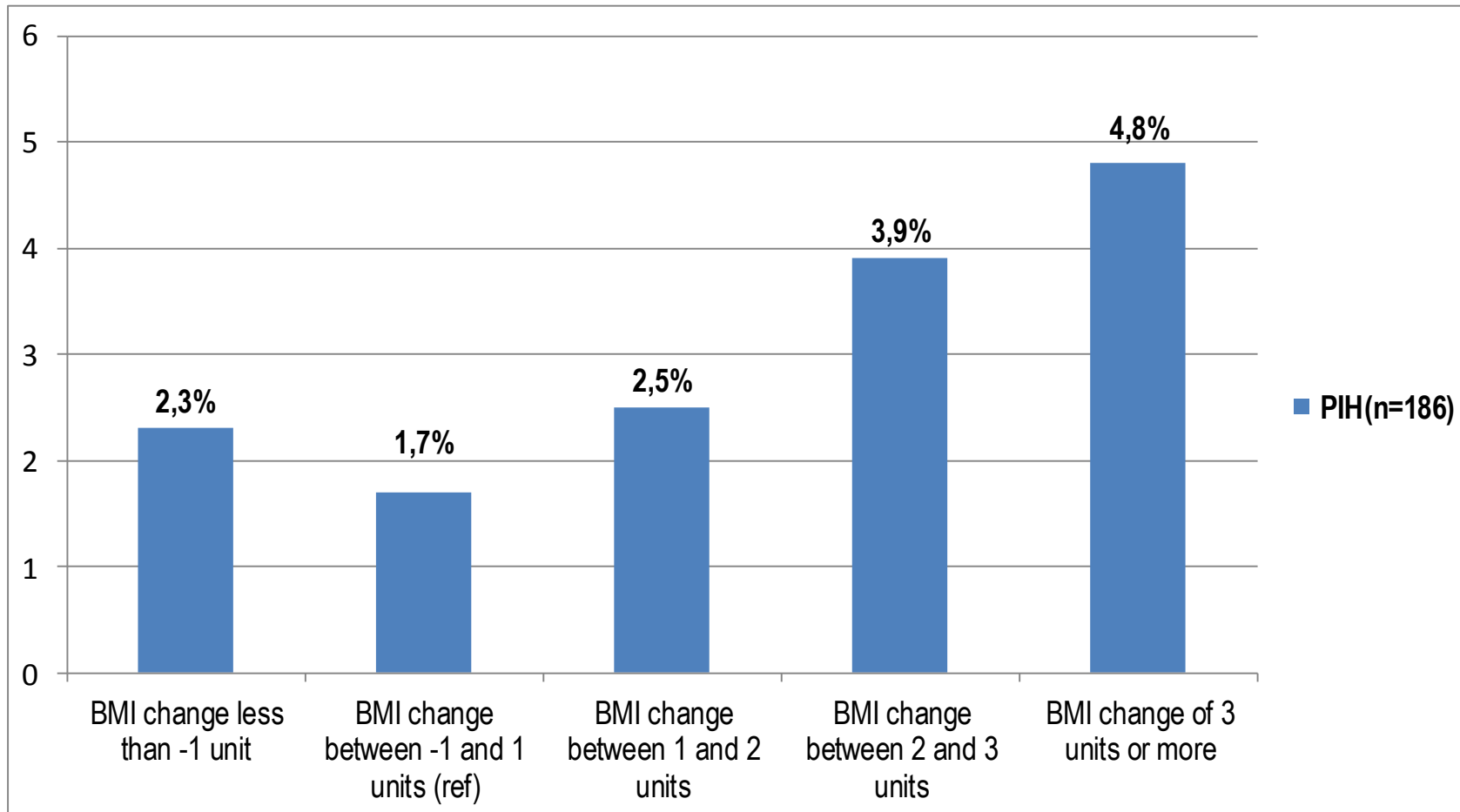
(1 unit BMI = +/- 2,5-3 kg)



N= 7897 with 2 consecutive pregnancies between 2009-2011 in Flanders (Bogaerts et al., 2013, Obstet &Gyn.)

Univariate analysis:

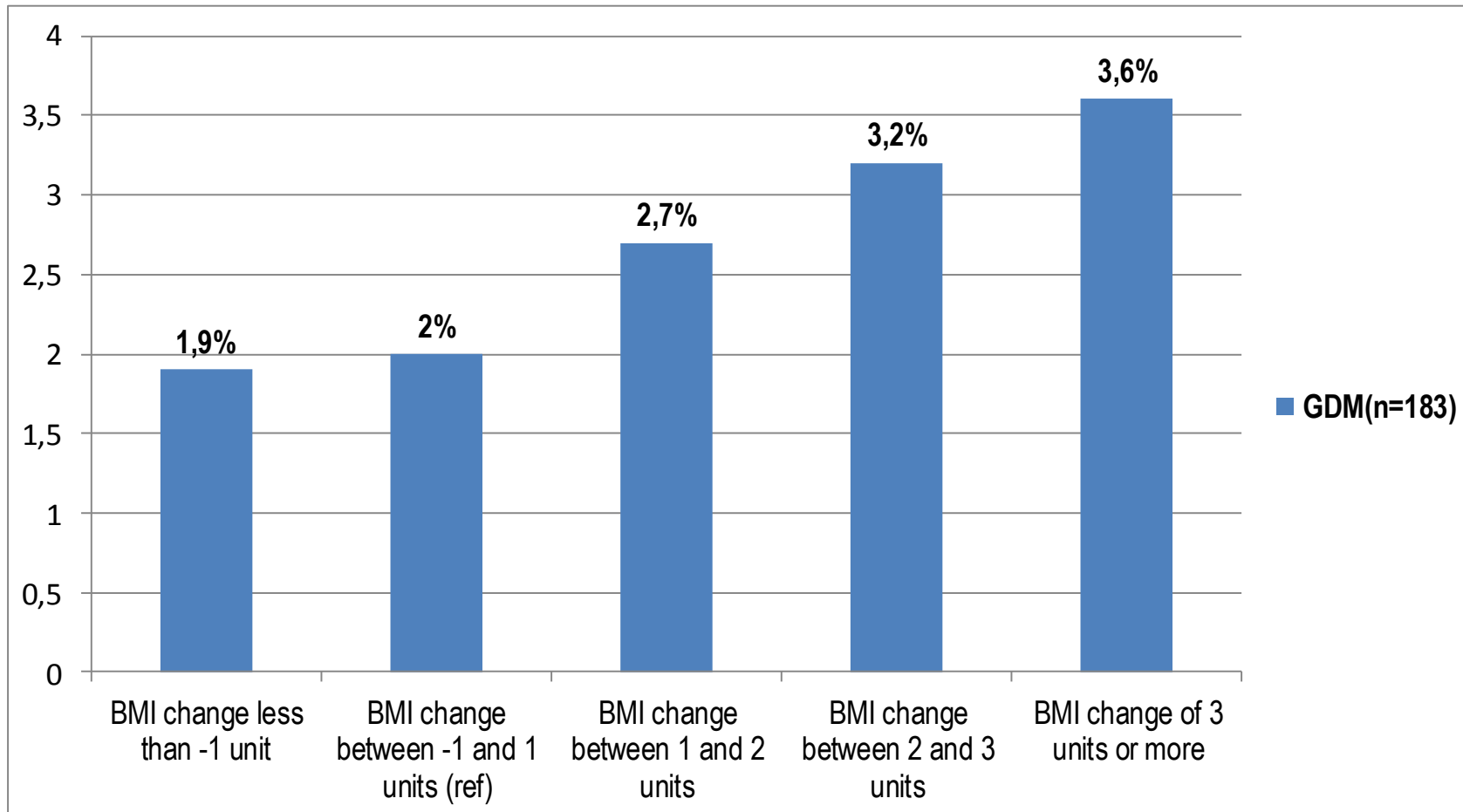
Hypertension (PIH) in second pregnancy



N = 7897; PIH p < 0,001

Univariate analysis:

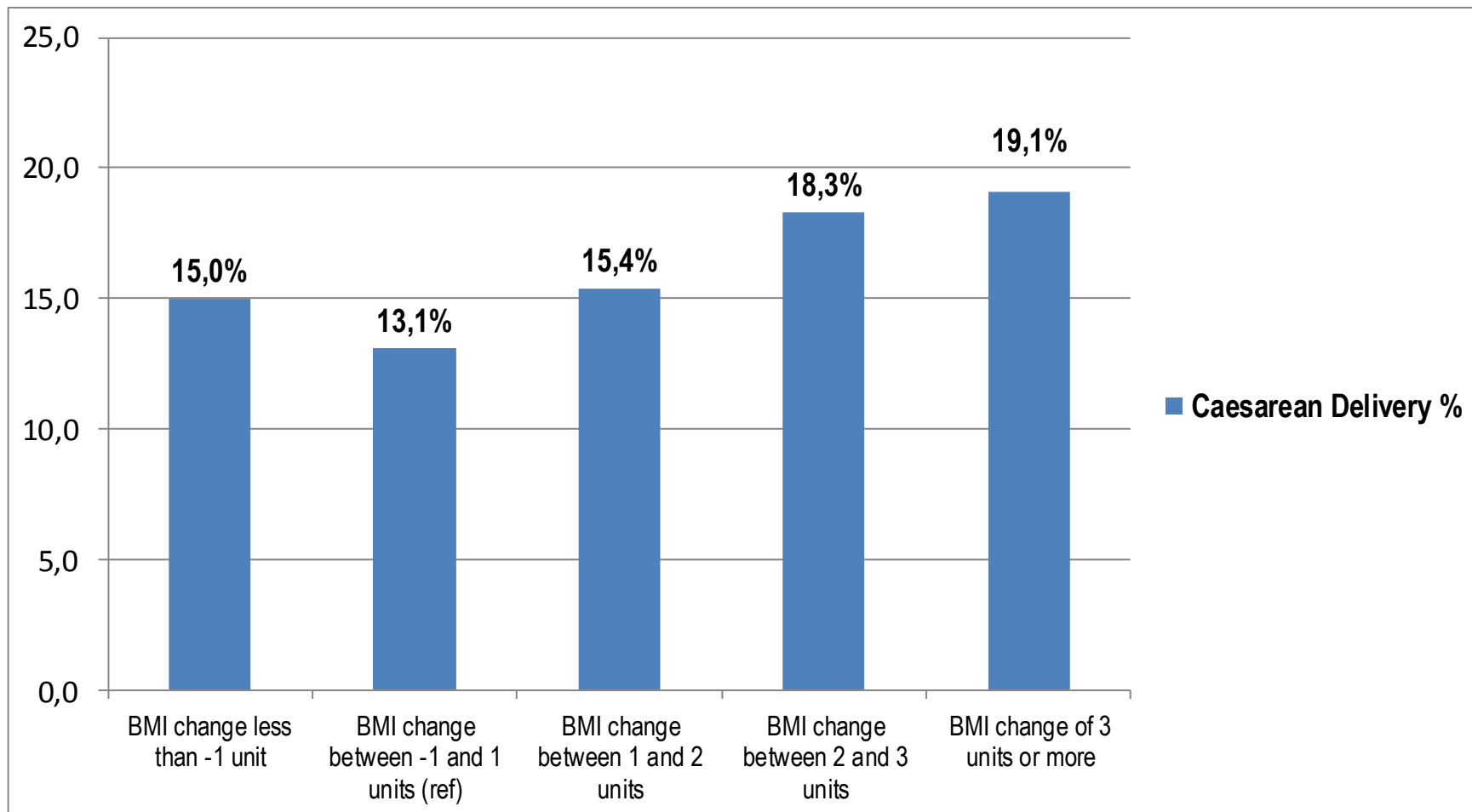
Gestational Diabetes (GDM) in second pregnancy



N = 7897; GDM p = 0.001

Univariate analysis:

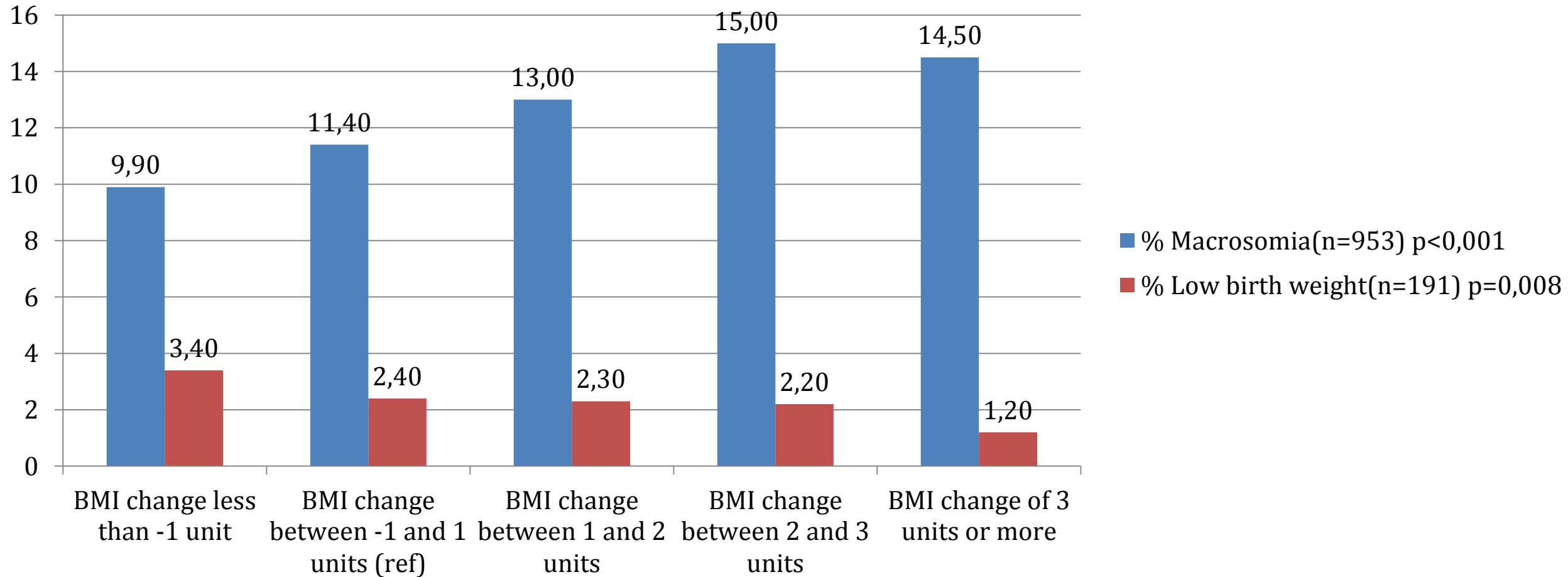
Caesarean delivery in second pregnancy



N= 7897; p < 0,001

Univariate analysis:

Macrosomia – Low birth weight in second pregnancy



N= 7897; Macrosomia p<0.001; Low birth weight p=0.008

Adjusted Odds ratios (aOR's, 95% BI) of **perinatal outcomes** in **second pregnancy** and **IPW changes**

Initial BMI < 25 kg/m² : NORMAL WEIGHT

[Ref = Δ BMI – 1 and +1 BMI unit]

BMI \leq 25 kg/m ²	PIH	GDM	Macrosomia	Low Birth Weight
Δ BMI < -1 BMI unit			0.50 (0.35-0.71)*	2.22 (1.41-3.51)*
Δ BMI 1-2 BMI unit		1.82 (1.08-3.08)		
Δ BMI \geq 2 BMI unit		2.25 (1.33-3.78)*		
Δ BMI \geq 3 BMI unit	3.76 (2.16-6.57)*			

Initial BMI \geq 25 kg/m²: OVERWEIGHT/OBESE

BMI \geq 25 kg/m ²	Caesarean delivery
Δ BMI \geq 2 BMI unit	2.04 (1.41-2.95)*

Adjusted and corrected for: pre-pregnancy BMI, IP time interval, gestational and maternal age, GWG (Bonferroni correction)*

Adjusted Odds ratios (aOR's, 95% BI) of **perinatal outcomes** in **overweight/obese women**

- **No effect of IPW change on PIH and GDM in overweight/obese women, but predicting variables here were:**

	PIH	GDM
<i>Excessive GWG in first pregnancy</i>		aOR 2.84 (95% CI 1.52-5.33)
<i>BMI in first pregnancy</i>	aOR 1.08 (95% CI 1.03-1.14)	aOR 1.10 (95% CI 1.03-1.16)
Complication in first pregnancy	aOR 10.74 (95% CI 6.76-17.07)	aOR 46.40 (95% CI 24.82-86.73)

(Bonferroni correction for multiplicity problem; $p < 0.005$)

Practical implications

Suppose :

Before pregnancy 1: $L = 1.65 \text{ m}$ and $W = 63 \text{ kg} \rightarrow \text{BMI} = 63 / 1.65^2 = \underline{23.2 \text{ kg/m}^2}$

Before pregnancy 2 : BMI is 25.2, which means a $\Delta W = 2.72 \text{ kg} \times 2 \approx 5 \text{ kg}$

Risk for GDM :	aOR 2.25 (1.33-3.78)
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Before pregnancy 2 : BMI of 26.2, which means a $\Delta W = 8.16 \text{ kg} \approx 8 \text{ kg}$

Risk for PIH :	aOR 3.76 (2.16-6.57)
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Practical Implications

Suppose :

Before pregnancy 1: L = 1.65 m and W = 81 kg → **BMI** = $81 / 1.65^2 = \underline{30} \text{ kg/m}^2$

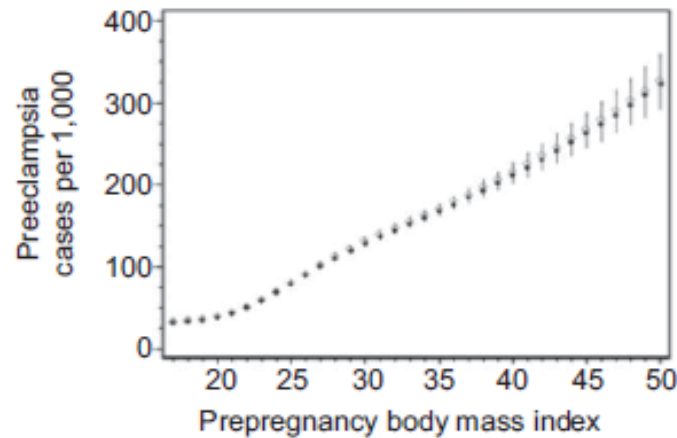
Before pregnancy 2 : BMI of 32, which means a $\Delta G = 5.4 \text{ kg} \approx 5 \text{ kg}$

Risk for caesarean delivery :	aOR 2.04 (1.41-2.95)
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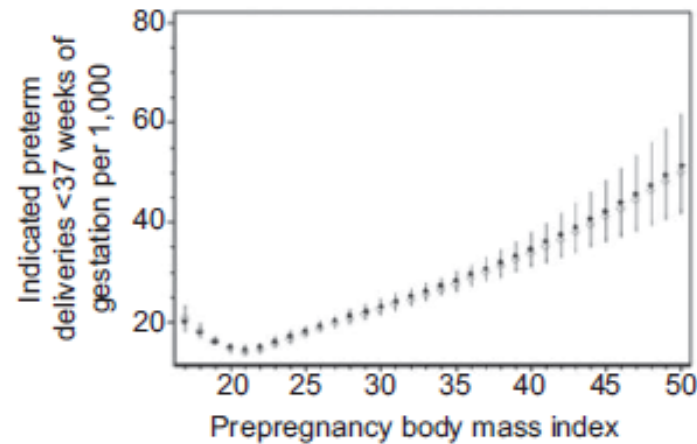
Questions?

1. What is the **optimal time frame** for the prevention of maternal obesity ?

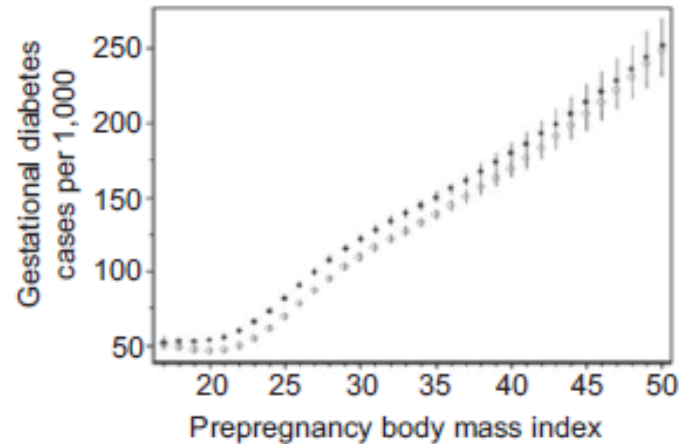
Pre-conceptional weight loss and perinatal outcomes



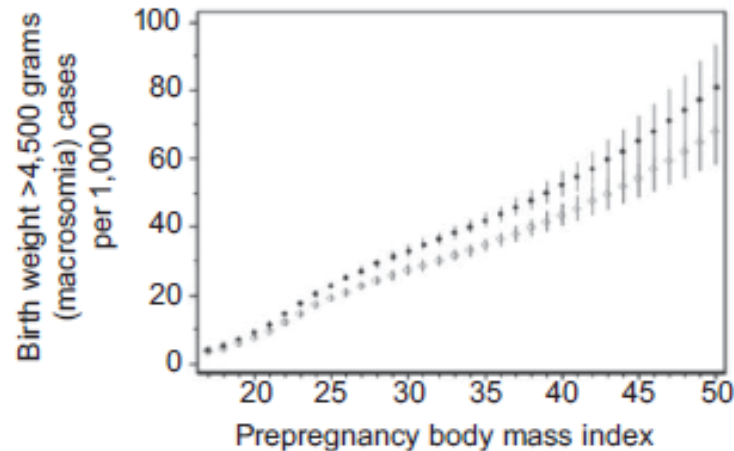
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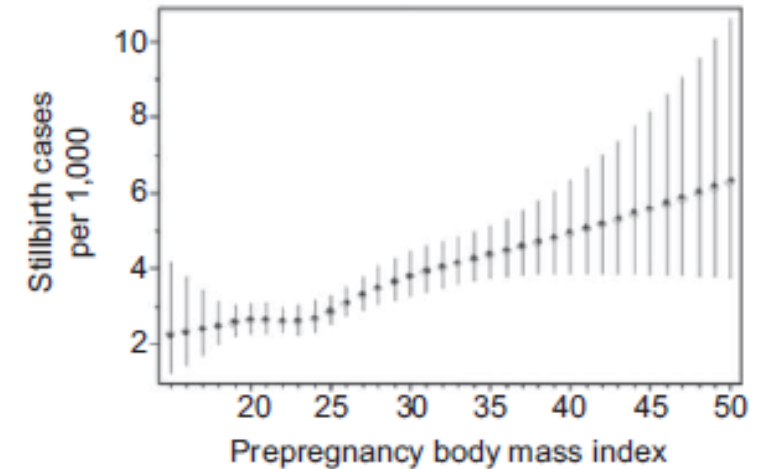
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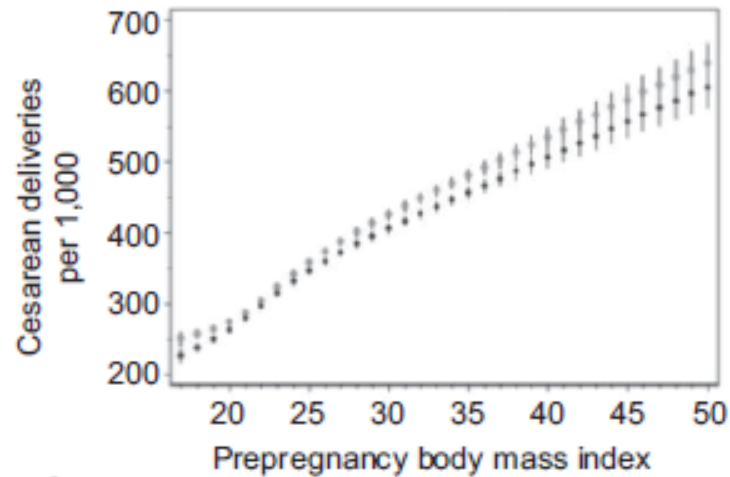
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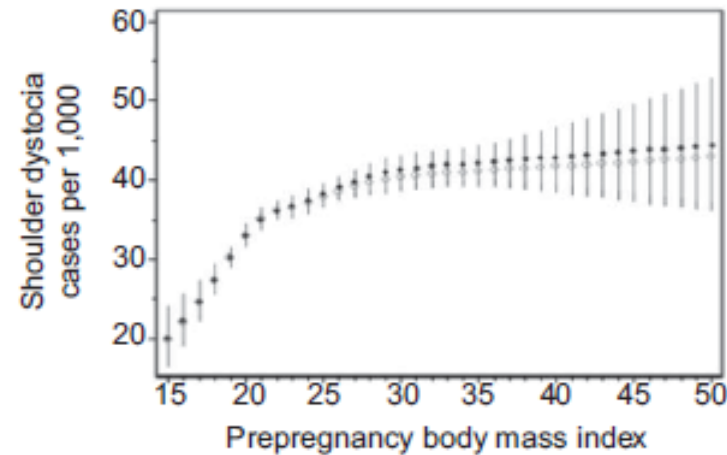
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10% reduction in preconceptional BMI → at least 10% lower risk of PET, GDM, med induction, macrosomia and fetal death

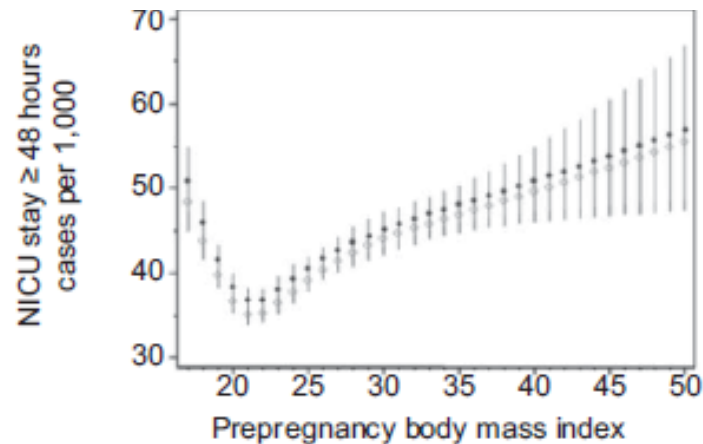
Pre-conceptional weight loss and perinatal outcomes



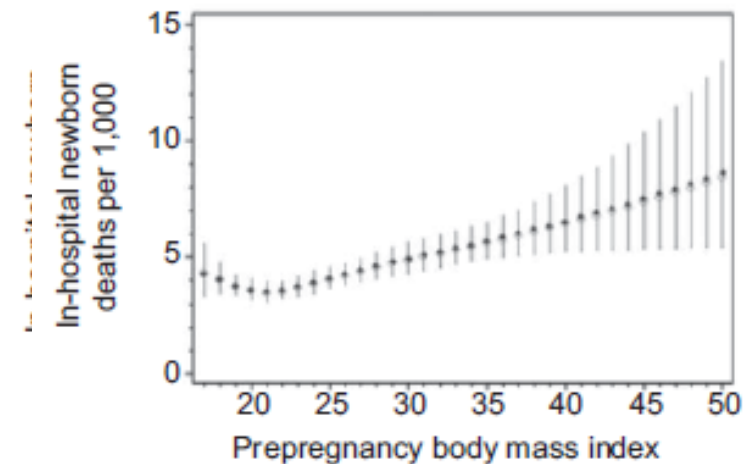
G



F



K



L

**At least 20-30 %
reduction in
preconceptional BMI →
lower risk for CS,
shoulder dystocia, NICU
≥ 48h, neonatal death in
hospital**

Questions?

2. **Which BMI groups** do we have to reach ?

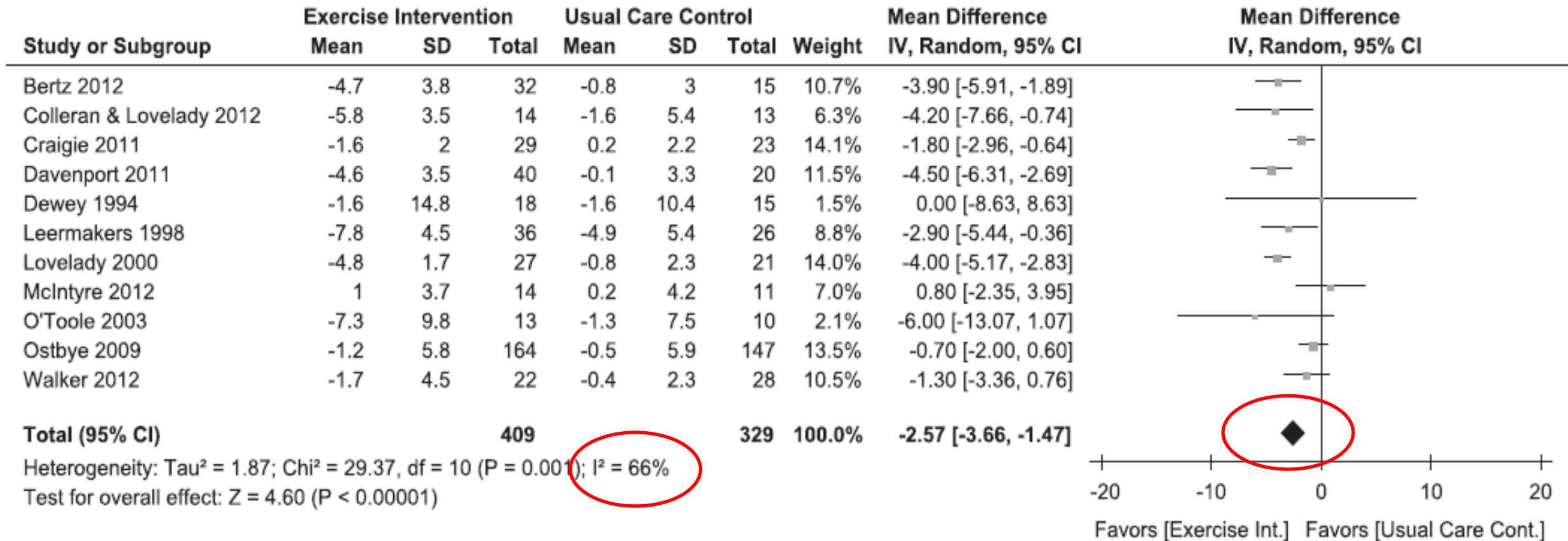
Questions?



3. What is an **optimal setting and strategy** to help women (at least) **return to their pre-pregnancy weight**?

Cochrane review : O'Pray et al. 2015: "Directed preconception health programs & interventions for improving pregn outcomes for overweight & obese women" → no RCT's comparing health programs & interventions with routine care in women of reproductive age and BMI ≥ 25 found

Effect of physical exercise strategies on weight loss in postpartum women, a SR and MA



Future directions for postpartum interventions

- ❑ Optimal timing, duration, level of supervision in interventions
- ❑ Long term effects of interventions on mother and child ?
- ❑ Cost-effectiveness of interventions ?
- ❑ Feasibility in terms of incorporation into clinical settings ?
- ❑ Developing strategies to improve adherence and compliance of lifestyle interventions !



Take home message



Weight retention between the first and second pregnancy

- **increased risk for pregnancy & birth outcomes in the next pregnancy**
- **even in initially normal weight women**

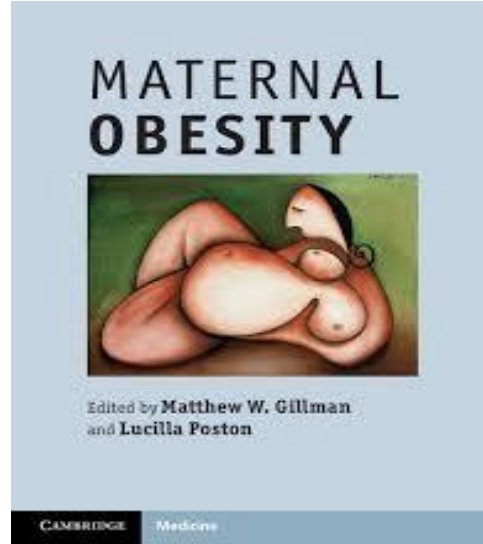
The inter-pregnancy period (postpartum), which is the pre-conceptional period for the next pregnancy, should be an important window of opportunity for weight management and follow-up, even in normal weight women.

Interesting literature

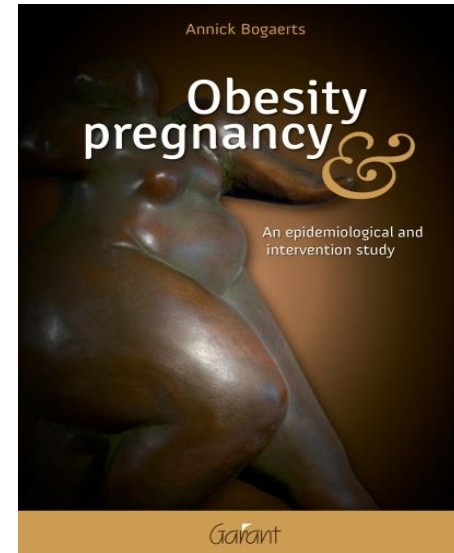
Denmark



UK



Belgium



IOM



Thanks to ...

Roland Devlieger

Guy Martens

Evelien Martens

Lieveke Ameye

Midwives, doctors, all related caregivers, mothers and babies

Contact: annick.bogaerts@ucll.be

