

# Weight loss after pregnancy – a challenging but opportune time to intervene

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Background – maternal obesity

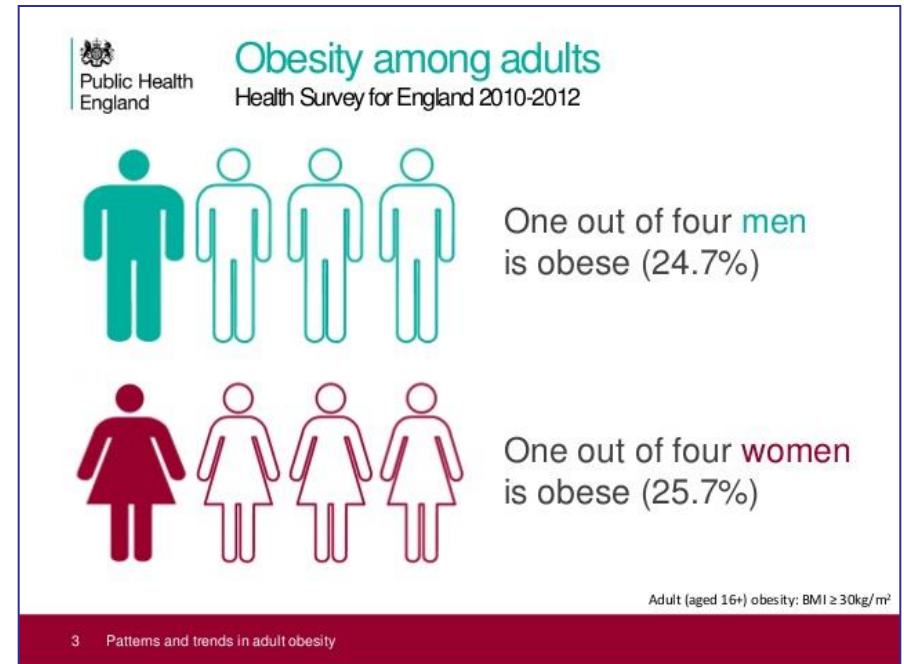
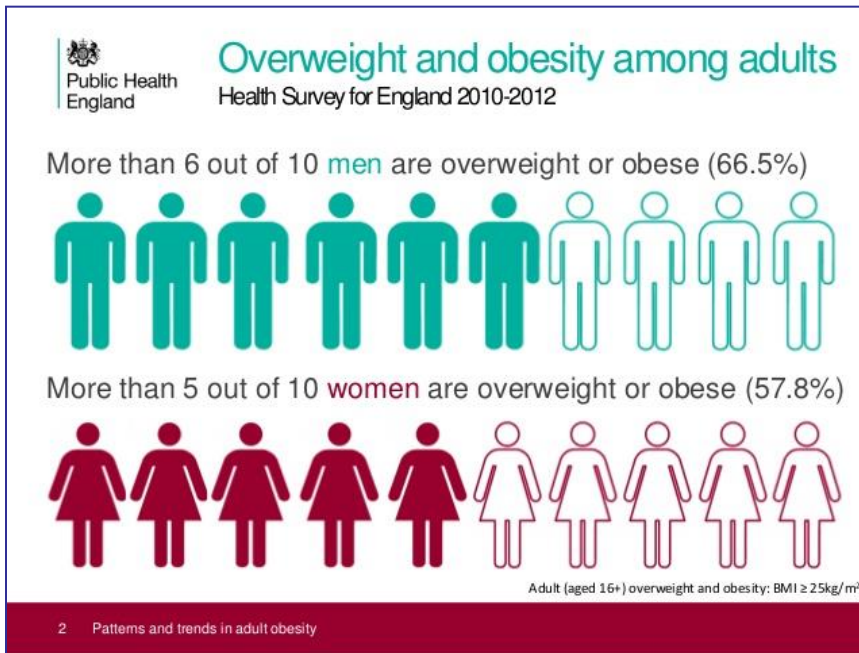
Postpartum weight loss trajectories

Postpartum (PP) period – a challenging time

Weight loss interventions in PP women

New study starting in NI

# Background – Obesity



Source: PHE Slide set Patterns and Trend in adult obesity

# Background – Maternal obesity

Prevalence maternal overweight & obesity (1<sup>st</sup> trimester):

- England -16% obese  
(Heslehurst et al. Int J Obes 2010; 34: 420–428)
- Northern Ireland – 27.8% overweight; 16.8% obese
  - obese class I (11.0%)
  - obese class II (3.9%)
  - obese class III (1.9%)

(Scott-Pillai et al. BJOG. 2013;120:932-9).



# Background – Maternal obesity

- Increased risks for the mother & baby - short & long term

Mother	Baby
Gestational hypertension	Inter-uterine growth restriction
GDM	Neural tube defects
Pre-eclampsia	Congenital anomalies
C-section	Small for gestational age
Miscarriage, Preterm delivery	Large for gestational age
Infections	Reduced likelihood & shorter period of exclusive breastfeeding
Postpartum haemorrhage	Overweight/Obesity
Postpartum depression	



# Background – Maternal obesity

## Demands on health-care services:

- Modification of obstetrics care pathway to cope with high-risk pregnancies
- More frequent & more specialized check-ups
- Additional appointments with multi-disciplinary team
- Practical issues around care of obese women (equipment, level of staffing)
- Longer stay in hospital etc.



Centre for Maternal and Child Enquiries  
Improving the health of mothers, babies and children

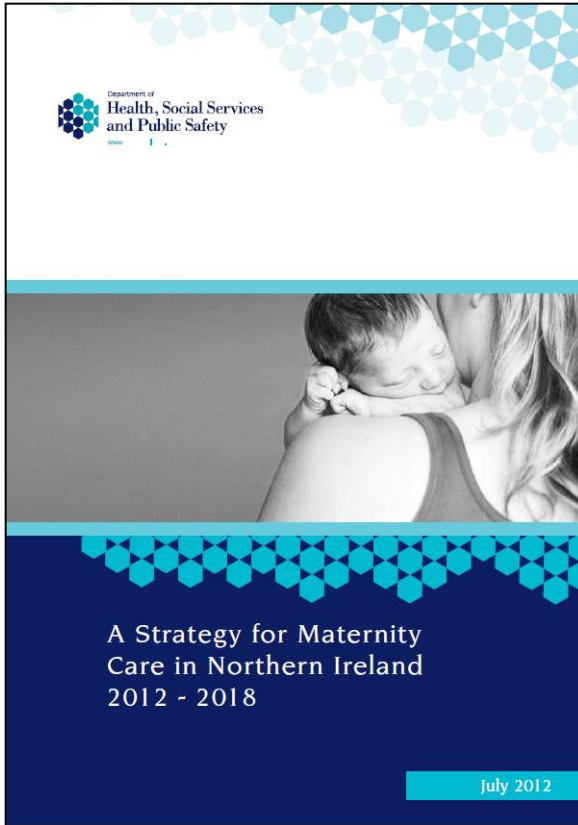


## Maternal obesity in the UK: findings from a national project

2010  
United Kingdom



Department of  
Health, Social Services  
and Public Safety



A Strategy for Maternity  
Care in Northern Ireland  
2012 - 2018

July 2012

**NHS**  
National Institute for  
Health and Clinical Excellence

Issue Date: July 2010

## Dietary interventions and physical activity interventions for weight management before, during and after pregnancy

NICE public health guidance 27





# Postpartum weight loss trajectories

International Journal of Obesity (2001) 25, 853–862  
© 2001 Nature Publishing Group All rights reserved 0307-0565/01 \$15.00  
www.nature.com/ijo



## PAPER

### Does the pattern of postpartum weight change differ according to pregravid body size?

EP Gunderson<sup>1\*</sup>, B Abrams<sup>2</sup> and S Selvin<sup>2,3</sup>

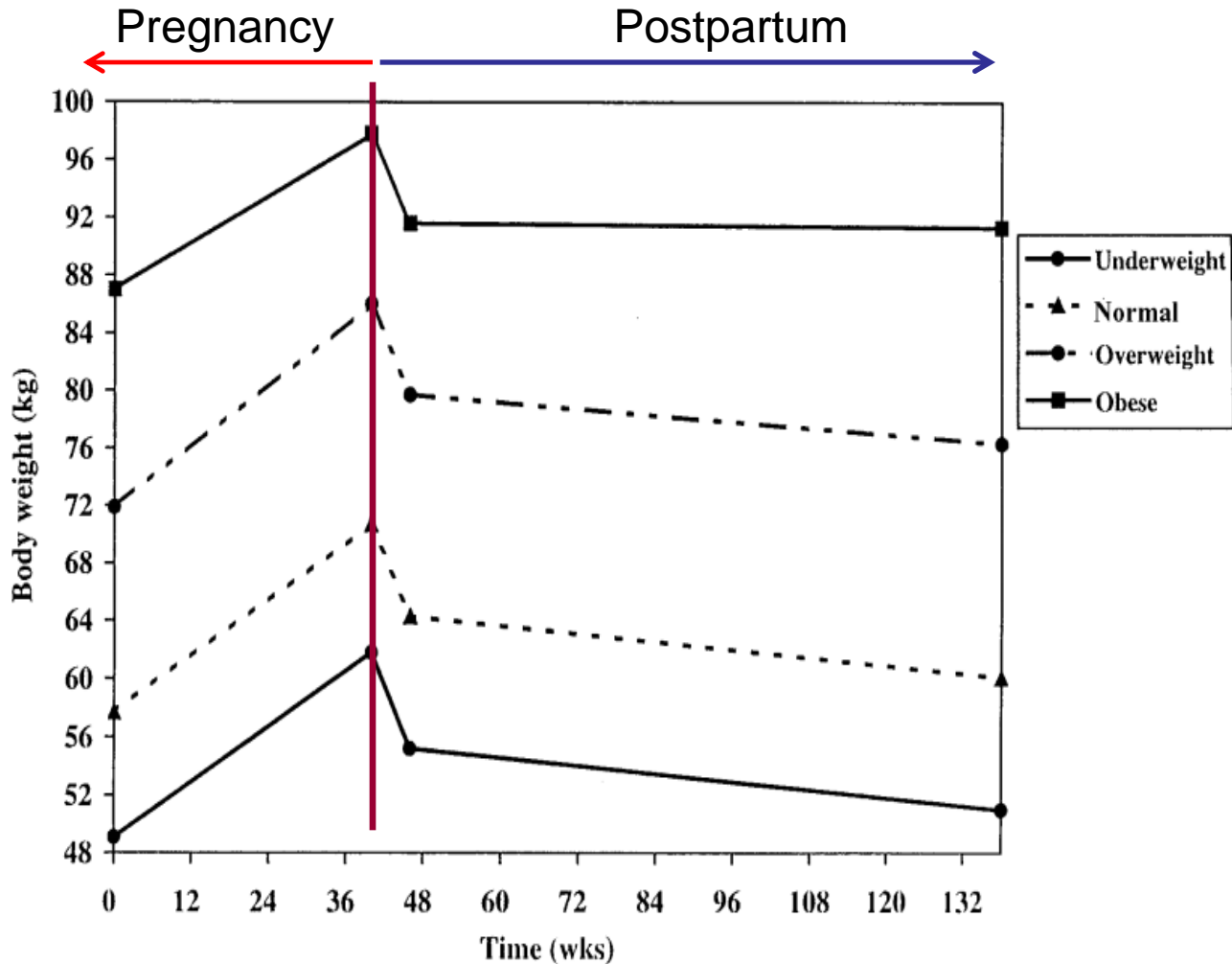
<sup>1</sup>Kaiser Permanente Division of Research, Oakland, California, USA; <sup>2</sup>Division of Public Health Biology and Epidemiology, School of Public Health, University of California, Berkeley, California, USA; and <sup>3</sup>Division of Biostatistics, School of Public Health, University of California, Berkeley, California, USA

**OBJECTIVES:** To examine differences in the pattern of weight changes during and after pregnancy among four pregravid body mass index (BMI) groups.





# Postpartum weight loss trajectories according to BMI



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

# Postpartum weight loss trajectories according to BMI

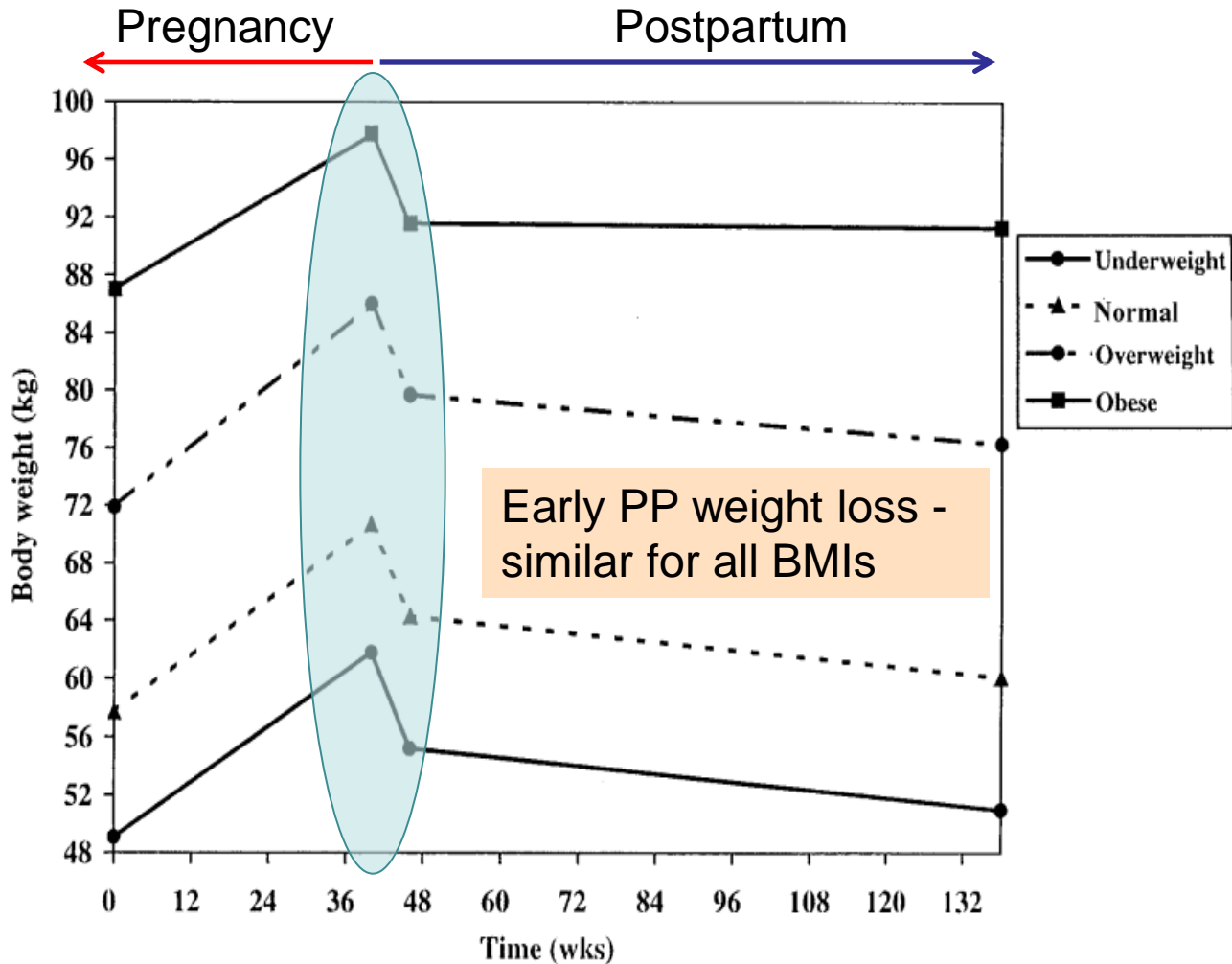


Figure 1 Patterns of maternal weight changes from preconception through gestation and early and late postpartum periods according to pregravid BMI group.

# Postpartum weight loss trajectories according to BMI

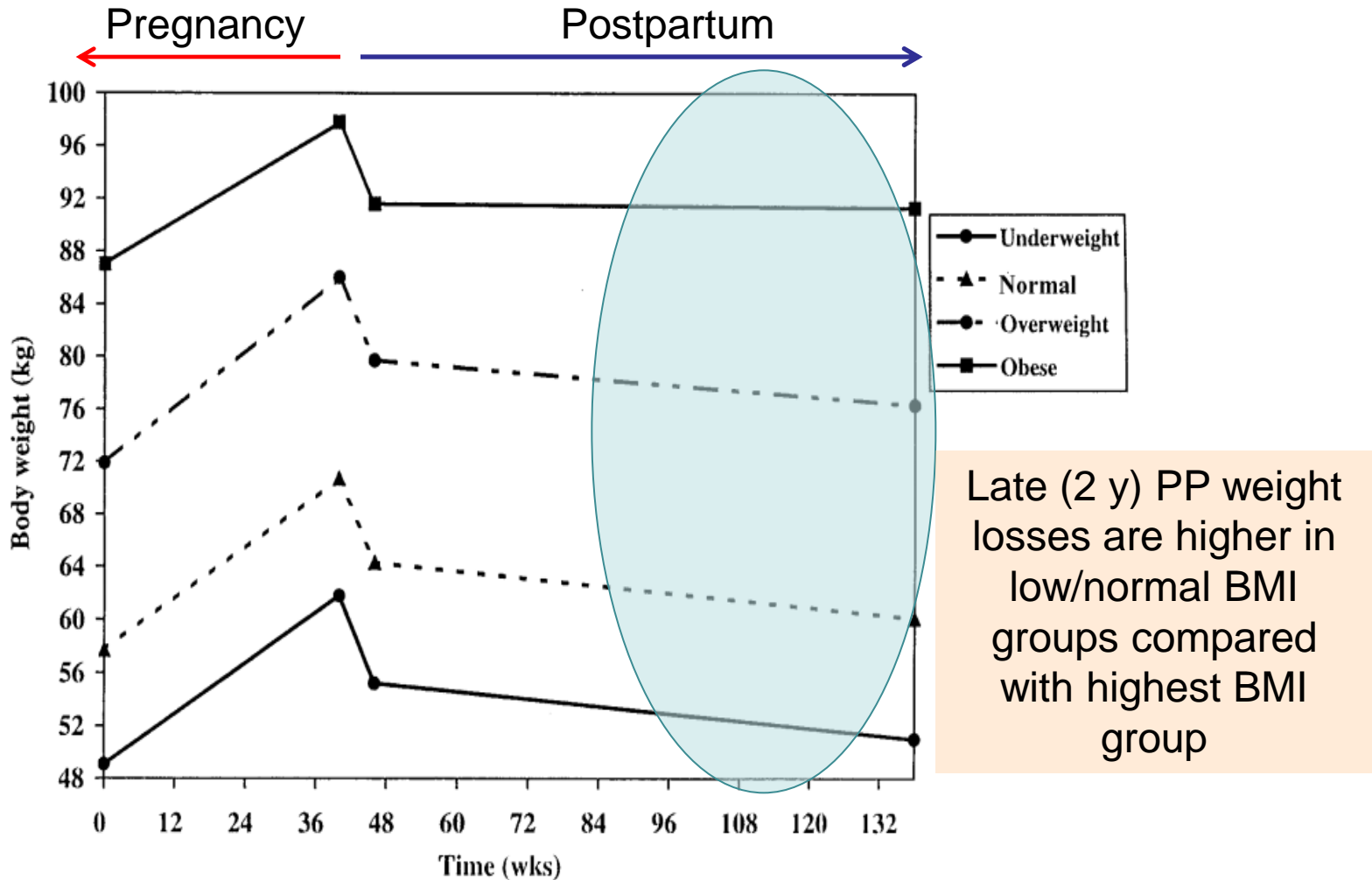


Figure 1 Patterns of maternal weight changes from preconception through gestation and early and late postpartum periods according to pregravid BMI group.

# Postpartum weight loss trajectories – retention of gestational weight

- **1 in 3** women reach pre-pregnancy weight within **6 weeks after delivery**
- Mean weight retention 6 weeks after delivery: 3-7kg
- Approx. **1 in 4** women substantial PP weight retention at **1 year** - 4-5kg (~9-11 pounds)
- Beyond 1 year postpartum..... weight change during late postpartum period?

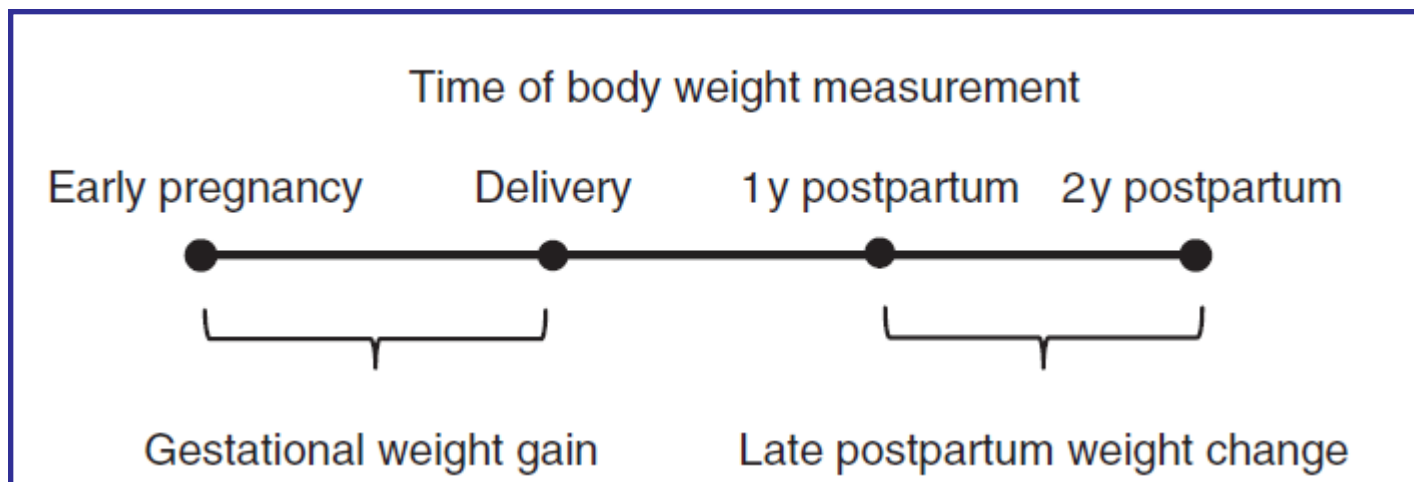


# Postpartum weight loss trajectories – the late postpartum period

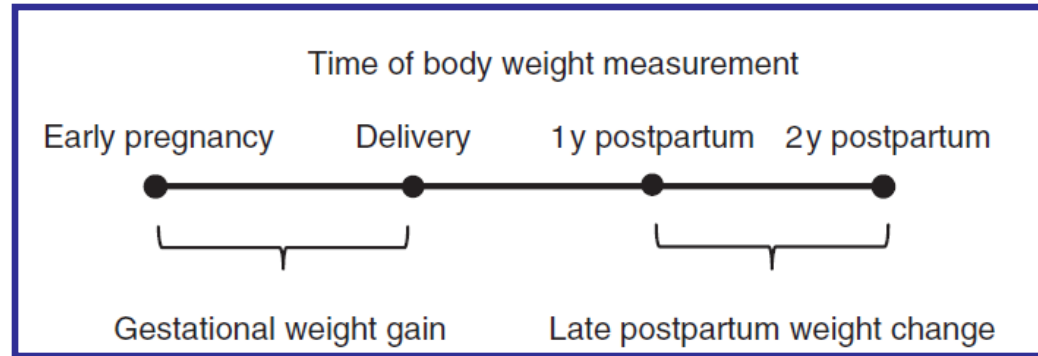
## Maternal Weight Change Between 1 and 2 Years Postpartum: The Importance of 1 Year Weight Retention

Leah M. Lipsky<sup>1</sup>, Myla S. Strawderman<sup>2</sup> and Christine M. Olson<sup>2</sup>

(Lipsky et al. Obesity 2012;20:1496-1502)



# Postpartum weight loss trajectories – the late postpartum period



26% women gained >2.25 kg between 1 and 2y postpartum

98 women (24% of total sample) had major PPWR (>4.55kg) at 2 years

61 women had major PPWR at both 1 and 2 years

So – 37 women with major PPWR at 2 years had moved into that category between 1 and 2 years PP

(Lipsky et al. Obesity 2012;20:1496-1502)



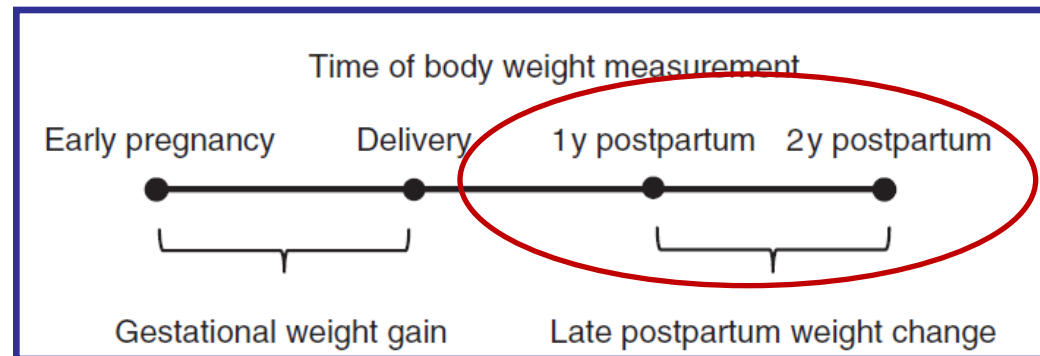
# Importance of PP weight retention

Original Research

## 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*

*(Obstet Gynecol 2013;122:999–1009)*



**Inter-pregnancy period**





# Importance of PP weight retention

Original Research

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- Belgium - Flemish Study Center for Perinatal Epidemiology routinely registers perinatal data from all deliveries in Flanders
- Database of n=200,796 births between 2009-2011
- Singleton births at first and second pregnancy n=7897



# Importance of PP weight retention

- 1<sup>st</sup> pregnancy –  
18% OW; 7% OB
- 2<sup>nd</sup> pregnancy –  
22% OW; 10% OB

**Table 1. Change of Body Mass Index Group From the First to the Second Pregnancy (N=7,897)**

	n	%
Underweight to underweight	239	3.03
Underweight to normal weight	134	1.70
Underweight to overweight	2	0.03
Normal weight to underweight	123	1.56
Normal weight to normal weight	4,681	59.28
Normal weight to overweight	683	8.65
Normal weight to obese	30	0.38
Overweight to normal weight	229	2.90
Overweight to overweight	986	12.40
Overweight to obese	229	2.90
Obese to underweight	1	0.01
Obese to normal weight	7	0.09
Obese to overweight	60	0.76
Obese	493	6.24



# Importance of PP weight retention

## Change in pre-pregnancy BMI category between first and 2<sup>nd</sup> pregnancy

BMI ↓ by ≥ 1 unit

BMI within ± 1 (ref)

BMI ↑ 1-2 units

BMI ↑ 2-3 units

BMI ≥ units

For under-weight and normal weight women:

BMI ↑ 2 or more units between pregnancies:

↑ risk **gestational diabetes** –

OR 2.25 (95% CI 1.33–3.78; P=0.002)

BMI ↑ 3 or more units between pregnancies:

↑ risk **pregnancy induced hypertension** –

OR 3.76 (95% CI 2.16–6.57; P=0.001)

In overweight and obese women:

BMI ↑ 2 or more units between pregnancies:

↑ risk **caesarean delivery** –

OR 2.04 (95% CI 1.41–2.95; P=0.001)



# Opportune time

The postpartum period =  
inter-pregnancy period or 'pre-conception  
period' for subsequent pregnancies

New motivations around health

Potential to influence mother's health  
AND also the wider family's health



# Supporting PP weight loss: some challenges



# The challenges of postpartum weight loss

- Women struggle to balance the demands of postpartum life with weight management
  - Time issues
  - Motivation issues
  - Support (partner, family, health professionals, friends, other mums) – both +ve and -ve
  - Complicating factors – postnatal depression, sleep (or lack of it)



Montgomery et al; Matern Child Health J 2011; 15:1176-84

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# The challenges of postpartum weight loss

Montgomery et al; Matern Child Health J 2011; 15:1176-84

It's hard to juggle everything you need to do when you work, take care of the house, take care of everyone else's needs. As a mother, I think it is typical to say that a mother's needs always come last because you put everybody else before you. So that could be another factor in taking care of yourself physically, eating, and exercising. It's hard to find the time to, because everything else is so demanding.





# The challenges of postpartum weight loss

- Mum from Belfast, 2 months postpartum

But you know, your kind of like you haven't got the routine I suppose you had before ...I'm hoping as time goes on I'll get more regular pattern like at the start you know myself and Graham, you know she has this thing where she knows you're having your dinner. So I'm hoping that once that actually has settled we are able to eat together but at the start we were sort of like literally relay eating.



# The challenges of postpartum weight loss

- Mum from Dublin, 9 months postpartum

Healthy eating, at the start it was hard. I wasn't cooking proper dinners and stuff because you are tired and a baby needs constant attention and stuff like that. But I have to say, over the last maybe two, three months there it's gotten a lot easier. She's more in a routine and she's sleeping more during the day and I can get dinners on and get proper stuff to eat. But before you just were grabbing whatever was in the press, if it's a chocolate bar or biscuits or something like that.



# The challenges of postpartum weight loss

- Mum from Belfast, 2 months postpartum

Em, I'm probably not as conscious as like healthiness - not that I'm eating rubbish but you know I'm not, I don't have that guilt thing to eat the right thing all the time you know cause it's just me now you know ....yeah I'd say I'm probably not as healthy as I was during pregnancy but again that's probably to do with the lack... you're not so guilty about it affecting her you know?



# The challenges of postpartum weight loss

Montgomery et al; Matern Child Health J 2011; 15:1176-84

While I have many obstacles now, once I get past some of these I am hoping I can work on being the person I want to be.



# Opportune time BUT Challenging time

The postpartum period =  
inter-pregnancy period or 'pre-conception  
period' for subsequent pregnancies

New motivations around health

Potential to influence mothers health AND  
also the wider family's health



What had been done to date?



## Obesity Prevention

# Systematic review of lifestyle interventions to limit postpartum weight retention: implications for future opportunities to prevent maternal overweight and obesity following childbirth

P. van der Pligt<sup>1</sup>, J. Willcox<sup>1</sup>, K. D. Hesketh<sup>1</sup>, K. Ball<sup>1</sup>, S. Wilkinson<sup>2</sup>, D. Crawford<sup>1</sup> and K. Campbell<sup>1</sup>

**obesity** reviews (2013) **14**, 792–805



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**obesity** reviews (2013) **14**, 792–805

Trials where PP weight was a main outcome  
Any combination of diet/physical activity/weight monitoring as  
intervention components

### Results:

- Interventions delivered by range of people – nurses, dietitian, trained counsellor, study assistant, fitness instructor
- No study used modern technology as an alternative to face-to-face delivery
- 7 out of the 11 included studies reported a decrease in PPWR
- 6 of these used both diet and activity components
- Limitations – small sample sizes, short duration, heterogeneity





## Conclusions

The postpartum period presents as an important life stage to influence long-term obesity risk as well as maternal weight status for subsequent pregnancies. This review has shown that interventions that include both diet and physical activity components and include individualized support are more likely to be successful in promoting healthy postpartum weight. Despite remaining uncertainties into the ideal approach to provision of support for healthy weight attainment, interventions that have utilized modern technologies have shown promise in their capacity to limit PPWR. Future high-quality intervention studies targeting PPWR are needed.



# Active mothers postpartum

## Aim

- To promote a reduction in BMI postpartum via sustainable lifestyle changes

## Participants

- 450 OW/OB women; enrolled 6-weeks postpartum

## Intervention

- 8 x healthy eating classes; 10 x physical activity classes; 6 x telephone counselling sessions; over 9 months

## Control

- Bi-weekly newsletters, general tips for postpartum mothers

Ostbye et al Am J Prev Med 2009;37:173-180

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# Active mothers postpartum


Mean weight loss; P=0.25

## Intervention

- 0.9kg  
( $\pm 5.1$ kg)

## Control

- 0.36 kg  
( $\pm 4.9$ kg)



Outcomes assessed at baseline (6-wk PP) and end (12-months PP) - dietary intake, physical activity, weight

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# Active mothers postpartum

**Engagement in the intervention components:** lower than expected – attended mean 3.8 / 8 classes; completed mean of 3.3 / 6 counselling calls

## **Women had difficulty attending the scheduled group sessions:**

Attendance was made as easy as possible by providing sessions:

- multiple times a week
- at various times during the day and evening and on weekends
- scheduling physical activity and nutrition sessions back-to-back so that with one effort, mothers could attend two classes.

*“Despite these efforts, and the women’s own motivation and interest, the realities of getting to class with a baby simply over-whelmed many participants.”*

**Conclusion:** “These results indicate that community-delivered interventions delivered outside the home are not likely to affect postpartum weight loss. More individualised programs delivered in the home via telephone, mail or Internet/e-mail may be more feasible and, potentially, more successful.”

# Home-based active video games & weight loss postpartum

34 post-partum women; BMI  $24.5 \pm 3.4 \text{ kg/m}^2$ ; 40 day intervention; Japan

## Intervention

- Active video games

## Control

- No intervention



Tripette et al. Med Sci Sports & Exercise 2014

# Home-based active video games & weight loss postpartum

34 post-partum women; BMI  $24.5 \pm 3.4 \text{ kg/m}^2$ ; 40 day intervention; Japan

## Intervention

- Active video games
- **Lost  $2.2 \pm 0.9 \text{ kg}$**

## Control

- No intervention
- **Lost  $0.5 \pm 0.7 \text{ kg}$**



Tripette et al. Med Sci Sports & Exercise 2014



*National Institute for  
Health and Clinical Excellence*

Issue Date: July 2010

**Dietary interventions and  
physical activity  
interventions for weight  
management before, during  
and after pregnancy**

NICE public health guidance 27

Gaps in knowledge about effective and appropriate weight management interventions in women during the postpartum period





# *National Institute for Health Research*

- **NIHR Call: 14/67 Weight management after pregnancy**
- **Research Question(s)**
  - What are the effective and cost-effective interventions for weight management after pregnancy?



A tailored, SMS-delivered, multi-component intervention for weight loss and maintenance of weight loss in the postpartum period: intervention adaptation and pilot RCT

Supporting MumS Study  
(SMS Study)

<http://www.nets.nihr.ac.uk/projects/phr/146720>



# How to deliver the intervention?

- *Commissioning brief: .....Consideration should be given to intervention timing, duration, **delivery format, engagement and sustainability.***
- Need for:
  - A flexible and individualised approach to WL at this life stage
  - Home-based or more adaptable anytime, anyplace approach
  - Key components – diet, physical activity, key behaviour change techniques
  - Pay attention to maintenance of weight loss



# The approach – SMS – text message

- **Simple** mode of communication - uses basic mobile technology
- Intervention can be **proactive as well as reactive** - does not necessarily rely on initiation by the participant
- **Instant**, delivered in a timely manner - anyplace, anytime
- Allow **flexible content and scheduling** – tailoring
- **Sustained contact** women over medium-long term - extended contact following WL – considered best practice for WLM
- Ability to **re-engage** with women after life events that may disrupt weight management progress (illness, stress)
- **Low-cost** – roll-out
- Has been used successfully to change various health behaviours



# txt2stop

- The txt2stop trial - led by LSHTM: provided robust evidence that smoking cessation support delivered by text messaging doubled biochemically verified quitting at six months and was highly cost-effective.

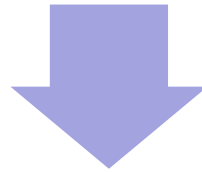
(Free et al. Lancet 2011; 378: 49–55.)

- Resulted in a new smoking cessation service delivered by text message in England.



# Two stages:

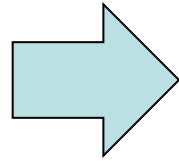
Intervention  
Adaptation  
*Months 0-12*



Pilot RCT  
*Months 13-32*

# Intervention adaptation

## Intervention Adaptation *Months 0-12*



1. Systematic review of systematic reviews
2. Message development, testing, refinement
3. Add functionality to SMS platform to allow provision of feedback

# Pilot RCT

## *Months 13-32*



# Population

*n=100; 50 per group*

## Inclusion

had a baby in previous two years; aged over 18; BMI over 25kg/m<sup>2</sup>, primiparous or multiparous

## Exclusion

no access to phone, insufficient English, pregnancy, on specialist diet, psychiatric disorders, eating disorder, previous/planned bariatric surgery, T1DM

## Recruitment strategy:

- spans wide timeframe to allow women to opt in at point of their choosing
  - awareness raising before discharge – leaflet
- verbal reminders and approaches – health visitors, 6 week postnatal check-up, childhood immunisation programmes, community groups (infant feeding, mother and baby etc)

# Intervention & Active control

## (12 month intervention period)

### Intervention

#### **Diet & activity**

#### **Cluster BCTs**

*(supported by evidence base –  
embedded within SMS)*

#### **Tailored**

*(WL, WLM, social  
circumstances, eating triggers,  
return to work, infant feeding)*

### Active control

General childcare &  
development – emotional,  
social, cognitive, physical  
development; health; safety;  
parenting



# Outcome

**To provide the basis for deciding whether to proceed to a multi-centre RCT to fully test effectiveness of the intervention.**

- Acceptability of intervention and active control
- Feasibility of recruitment
- Retention rate
- Evidence of positive indicative effects



# The team

## Queen's University Belfast

Dr Michelle McKinley (PI)  
Professor Frank Kee  
Professor Ian Young  
Prof Jayne Woodside  
Dr Valerie Holmes  
Dr Chris Cardwell

## Queen's University Belfast

Post-doctoral Research Fellow  
(Dr Ciara Rooney)  
PhD student  
(Caroline McGirr)  
Administrator  
(TBA Month 7)

## London School of Hygiene and Tropical Medicine

Dr Caroline Free

## University of Stirling

Professor Pat Hoddinnott  
Dr Stephan Dombrowski

## University of Dundee

Professor Annie Anderson

## University of Glasgow

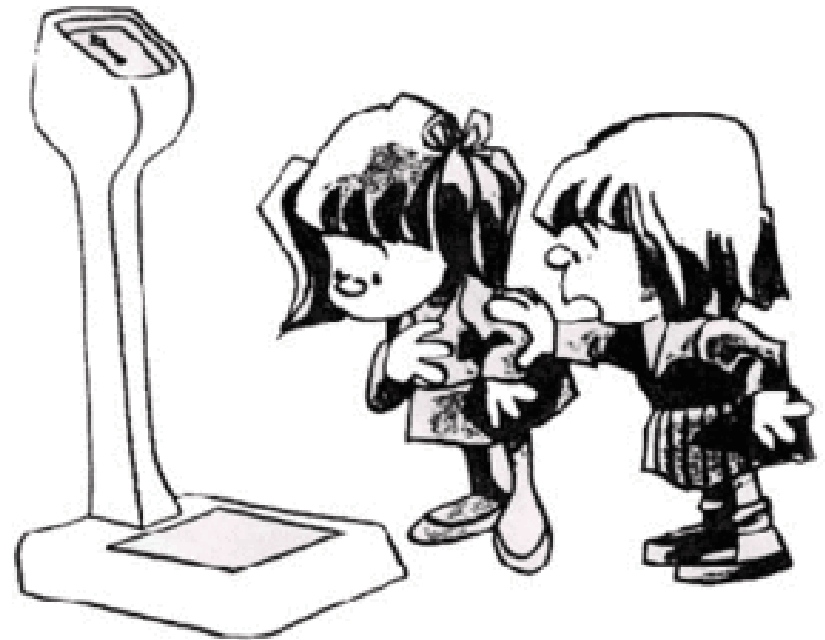
Dr Emma McIntosh  
Post-doctoral research fellow  
(TBA Jan 2017)

# Conclusion

- There is a public health need to develop weight management interventions that fit seamlessly into the busy lives of women during the postpartum period.
- These interventions must carefully consider the difficulties in reaching this population and the specific barriers to lifestyle behaviour change that come with having a new baby.
- The evidence to date supports the use of more adaptable 'anytime, anyplace' approaches with postpartum women but trials are needed and these should focus not just on weight loss but also on maintenance of weight loss.



Thanks for listening ☺



*"Don't step on it ... it makes you cry."*

