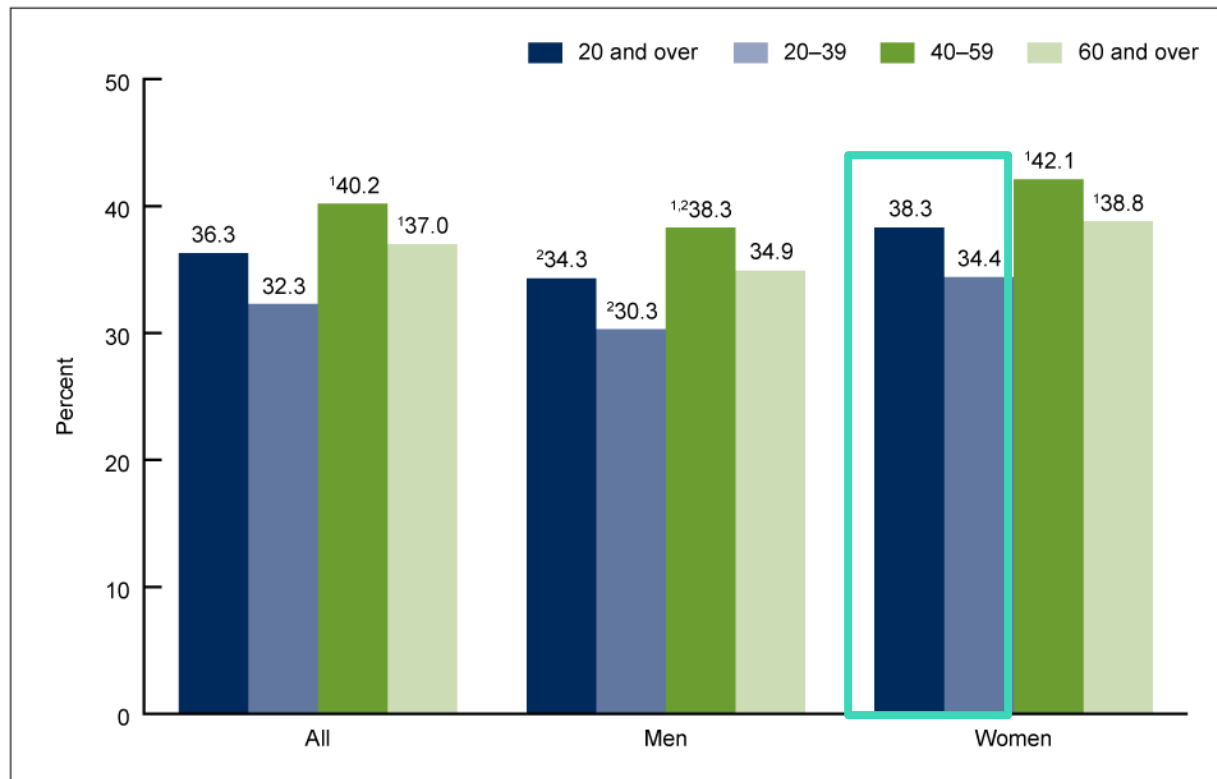


## Case Study #8

How can we efficiently help patients in pregnancy with healthy weight gain?

# Obesity is a Problem for Women of Childbearing Age

- Obesity rates among women continue to rise
- ~40% of women were obese in 2014



*Flegal KM, et al. JAMA. 2016;315(21):2284-2291; CDC/NCHS, NHANES, 2011-2014*

# Obesity During Pregnancy Increases the Risk for Adverse Outcomes

- Overweight and obesity during pregnancy presents both maternal and fetal risks.

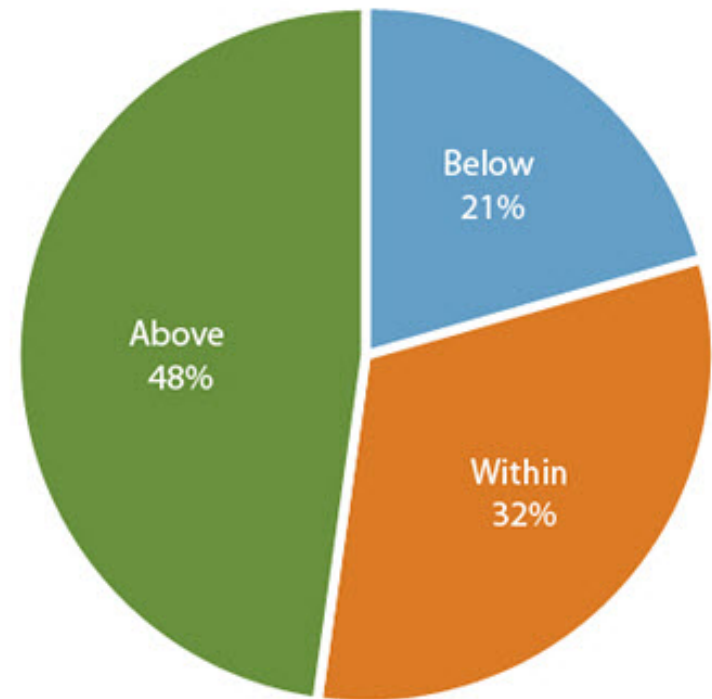
Maternal Complications	Fetal Complications
Hypertension	Fetal death
Gestational diabetes	Stillbirth
Caesarean delivery	Preterm birth
Hemorrhage	Increased birth weight
Preeclampsia	Congenital anomalies

*Arendas et al. J Obstet Gynec. 2008;30(6):477-488*

*Institute of Medicine. National Academy of Sciences. 2009*

# Excessive Weight Gain During Pregnancy

- Nearly half of women gain more than is recommended
- Overweight and obese women are at greater risk of gaining excessively
- Weight loss post-delivery is increasingly difficult with excessive weight gain

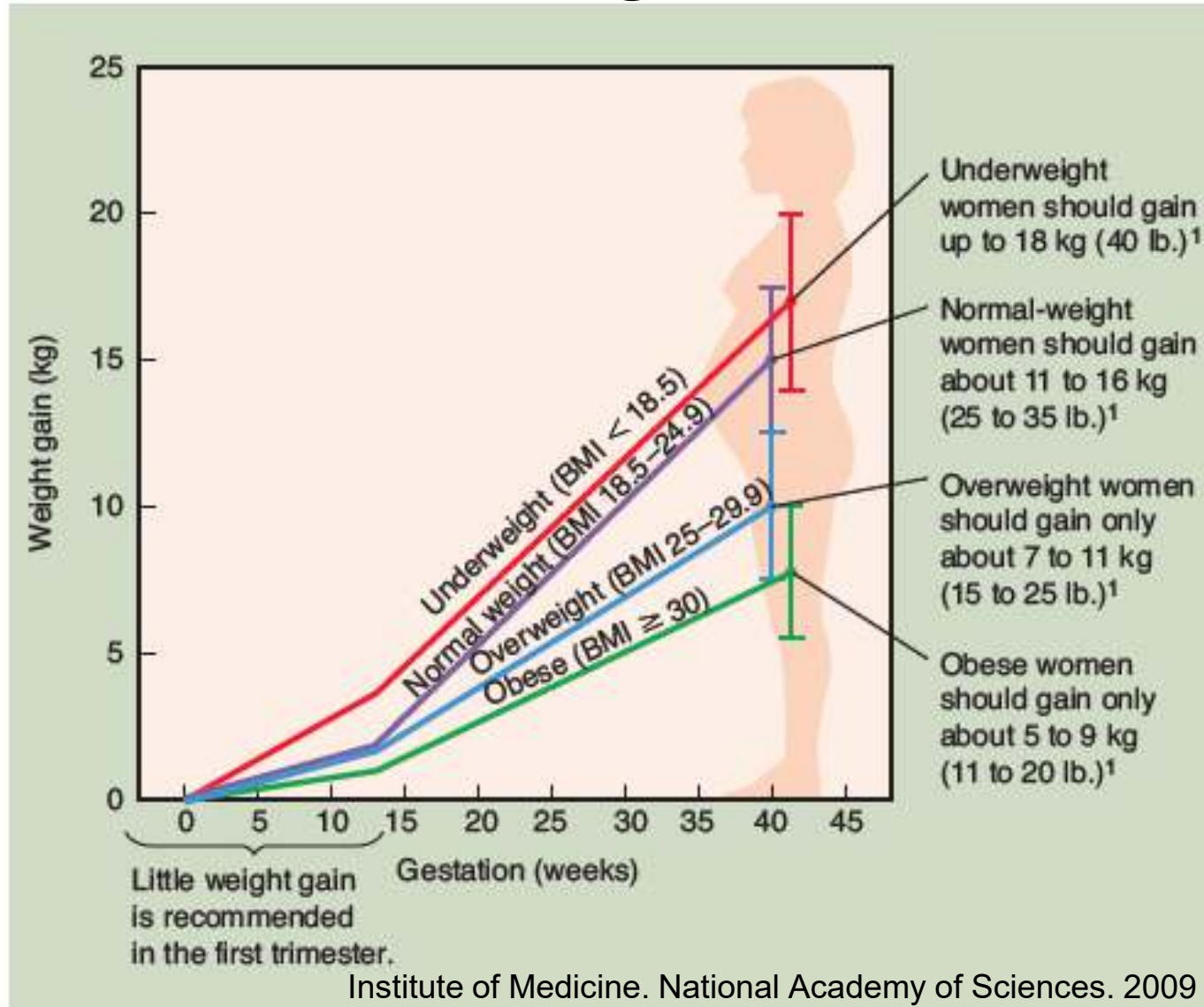


*Institute of Medicine. National Academy of Sciences. 2009*

*2015 National Vital Statistics System birth data. <http://www.cdc.gov/nchs/nvss/births.htm>*

# Pregnancy

## Rate of Weight Gain



# Pregnancy

Pre-pregnancy Weight Category	Body Mass Index	Recommended Range of Total Weight (kg)	Recommended Rates of Weight Gain† in the Second and Third Trimesters (kg/wk)	Calories Surplus for healthy weight gain
<b>Underweight</b>	< 18.5	12.5-18	0.5	350 - 500 kcal/day
<b>Normal Weight</b>	18.5–24.9	11.5-16	0.4	310 - 440 kcal/day
<b>Overweight</b>	25–29.9	7-11.5	0.3	190 - 310 kcal/day
<b>Obese (includes all classes)</b>	≥ 30	5-9	0.2	140 - 250 kcal/day

†Assumes a 0.5-2 kg weight gain in the first trimester

*Institute of Medicine. National Academy of Sciences. 2009*

# Healthy Weight Gain in Pregnancy

Dr. Corrie Whisner – School of Nutrition, Ariz. St. Univ. (ASU)

To learn more watch:

[https://www.youtube.com/watch?v=tHS-pegE\\_gQ](https://www.youtube.com/watch?v=tHS-pegE_gQ)



Clinical Group

## Global Journal of Obesity, Diabetes and Metabolic Syndrome

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**Keywords:** Pregnancy; Resting metabolic rate; Resting energy expenditure; Energy expenditure; Weight management; Energy balance; Health parameter tracking; Obesity; Overweight

<https://www.peertechz.com>

### Research Article

## Study of Resting Energy Expenditure and Weight Changes during Pregnancy

### Abstract

In the present study, we have followed 4 pregnant women during pregnancy. The participants measured their resting energy expenditure (REE), weight, and activity, and recorded caloric intake. REE was measured with a mobile indirect calorimeter, Breezing™ on a weekly basis, and used to determine total energy expenditure (TEE) and daily caloric intake needs. The measured REE profiles indicated individual patterns in metabolic rate changes across pregnancy that could not be predicted by any known REE equation. The study outcomes suggest that the use of a mobile indirect calorimeter in conjunction with weight and physical activity measures allowed for the accurate estimate of caloric needs for pregnant women. The actual caloric intake (Breezing™) was compared with the self-reported caloric intake and demonstrated to have non-significant differences in three of the four cases, and a significant difference in one of the four cases. In addition, the participants reported that knowledge gained from tracking health parameters positively affected weight gain during pregnancy and helped to gain within a healthy weight range. Furthermore, all the participants were able to fully recover their pre-pregnancy weight within the year following birth.

<https://www.peertechz.com/articles/study-of-resting-energy-expenditure-and-weight-changes-during-pregnancy.pdf>

# Maternal Measures Throughout Pregnancy



- Physical dimensions
- Weight
- Resting metabolic rate
- Activity
- Blood Glucose
- Blood pressure
- Diet



weight



metabolic rate



fitness



glucose



blood pressure



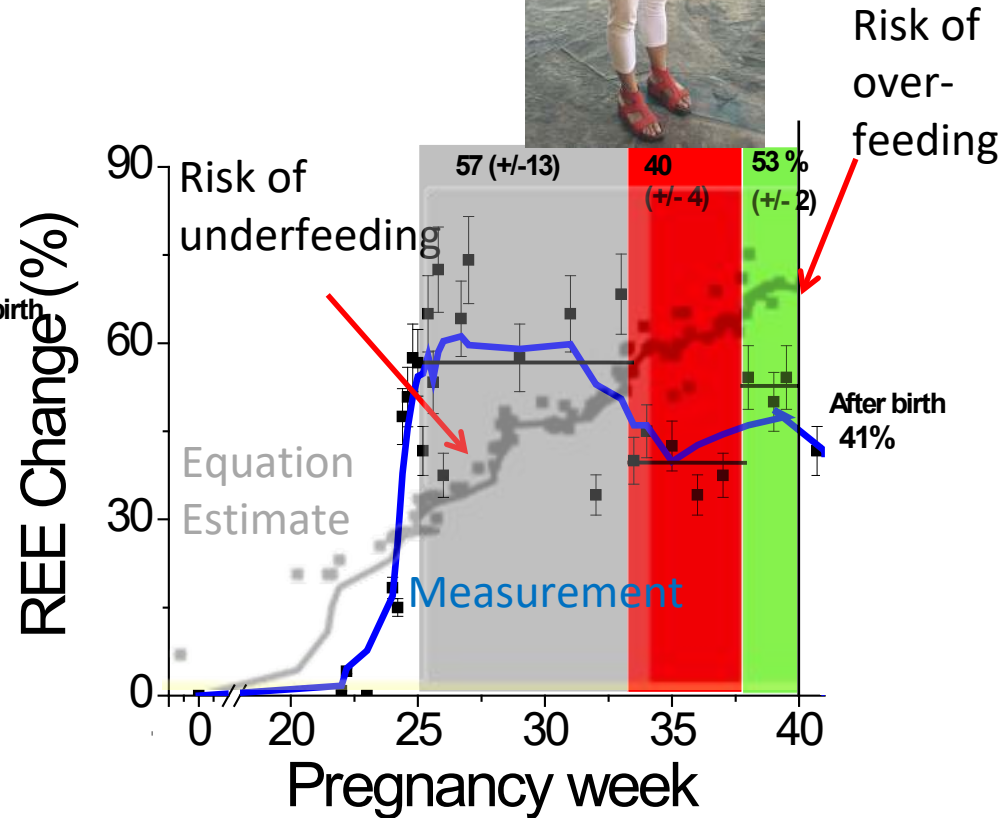
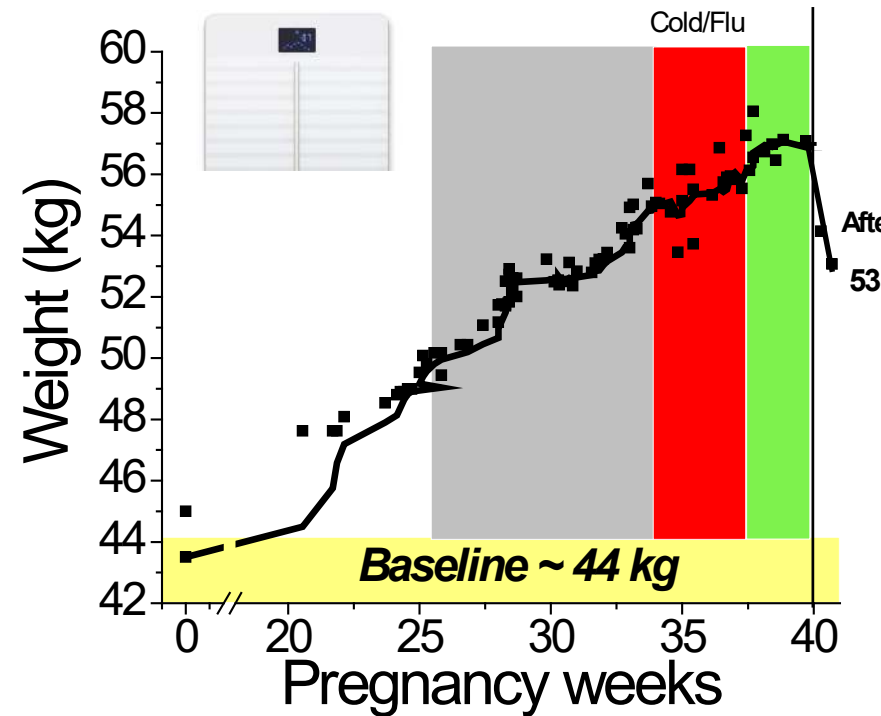
nutrition

TRIMESTER	MONTH	WEEK
1	ONE	1-4
	TWO	5-8
	THREE	9-13
2	FOUR	14-17
	FIVE	18-21
	SIX	22-26
3	SEVEN	27-30
	EIGHT	31-35
	NINE	36-40

- Measurements were taken every Saturday morning:
- Conditions of the measurements:
  - after waking up, urinating (defecating) and hydrating
  - before breakfast



# An Example of REE calculation vs. REE measurement



Mifflin - St Jeor equation:

Woman:  $REE(M-StJ) = [10 * \text{weight (kg)}] + [6.25 * \text{height (cm)}] - [5 * \text{age (y)}] - 161$

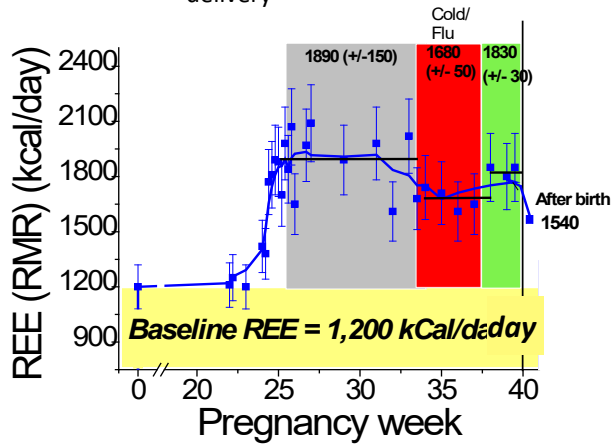
*REE does not follow the simple math of "higher mass -> higher metabolic rate" from the equation*

# Healthy Weight Gain in Pregnancy



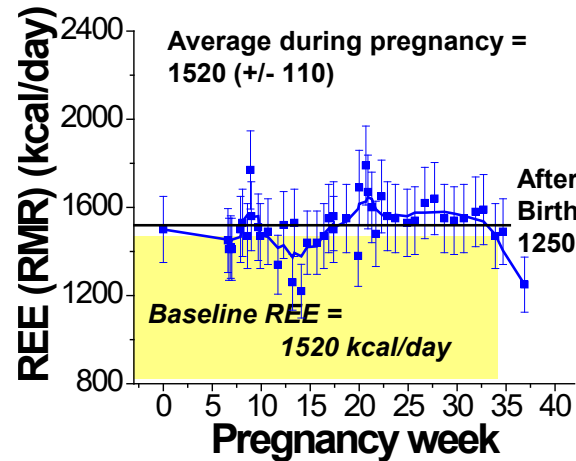
## CASE ONE:

REE increased during second trimester and remained relatively stable through delivery



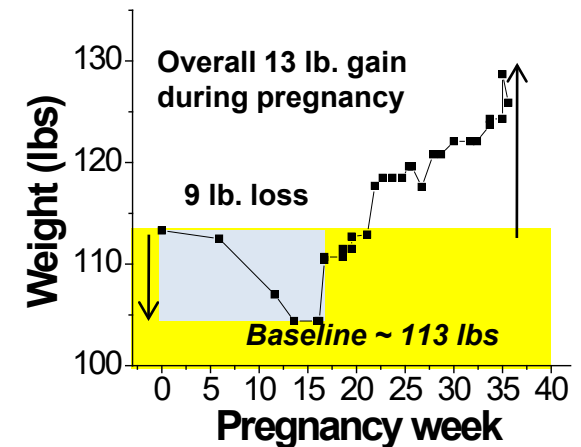
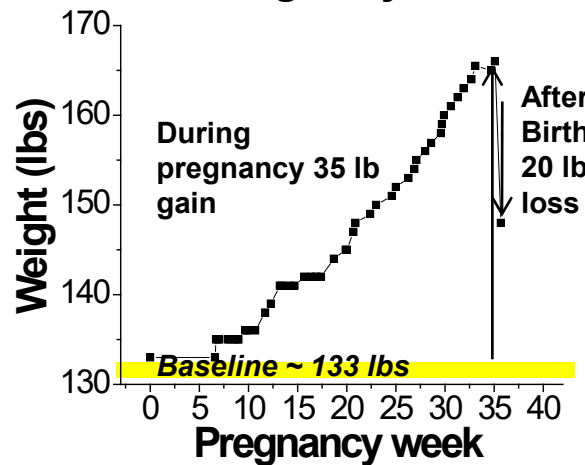
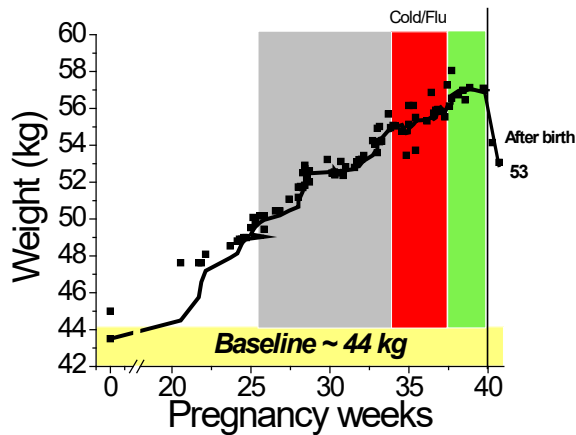
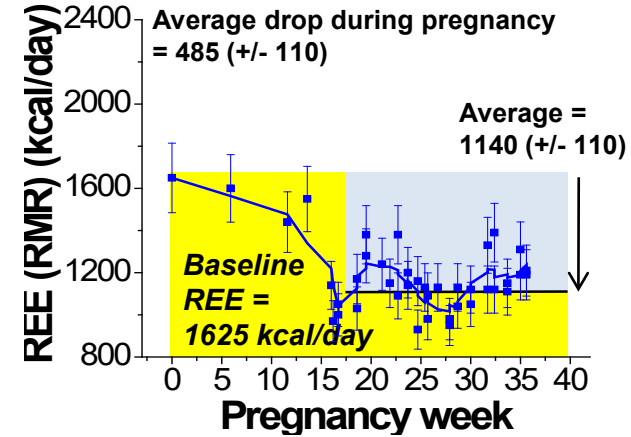
## CASE TWO:

REE stayed the same throughout pregnancy



## CASE THREE:

REE decreased with nausea and remained low later in pregnancy



\*Dr. Corrie Whisner, American Society of Nutrition's Public Information Committee

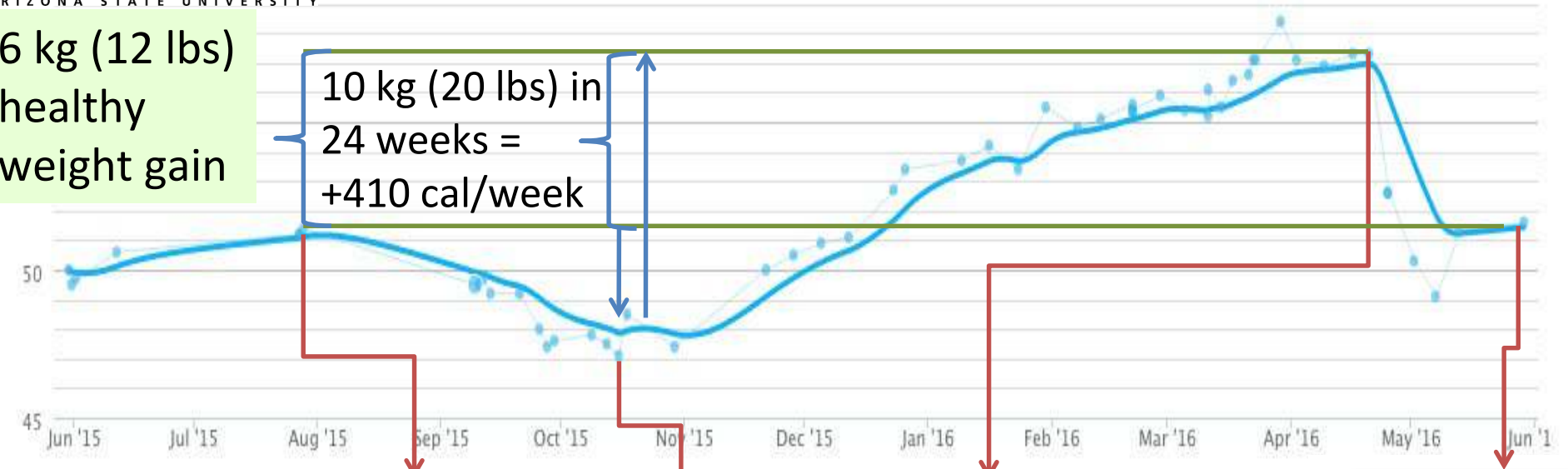
\* D. Jackemeyer, BSW, Application Scientist, Arizona State University

# Healthy Weight Gain in Pregnancy

6 kg (12 lbs) healthy weight gain

10 kg (20 lbs) in 24 weeks = +410 cal/week

one day before DOB



Conception day

Tuesday  
Jul 28 2015  
12:54 PM  
**51.4**  
kg  
**18.2**

Thursday  
Oct 15 2015  
7:52 AM  
**47.1**  
kg

Wednesday  
Apr 20 2016  
12:31 PM  
**57.3**  
kg

Sunday  
May 29 2016  
5:39 AM  
**51.6**  
kg  
**18.3**

- Healthy weight gain was achieved during pregnancy
- Original weight was recovered in few weeks

# Thank YOU !

Questions to:

[info@brezing.com](mailto:info@brezing.com)