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shady grove fertility



**2026 PCRS ANNUAL MEETING**

REPRODUCTIVE FRONTIERS: BRIDGING BIOLOGY,  
PRACTICE, AND POSSIBILITY

MARCH 18-22 | RANCHO MIRAGE, CA



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# “Weighting” for a baby: Navigating Obesity and Fertility Care

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# Disclosure Slide

- Neither I nor members of my immediate family have any actual or potential financial interests to disclose relating to the content of this presentation

# Needs Assessment Statement and Expected Learning Outcomes



Describe relationships between obesity and reproductive health and review current data on weight loss and fertility outcomes



Evaluate the safety and efficacy of anti-obesity medications in patients undergoing fertility care



Develop individualized evidence-based obesity and fertility plans



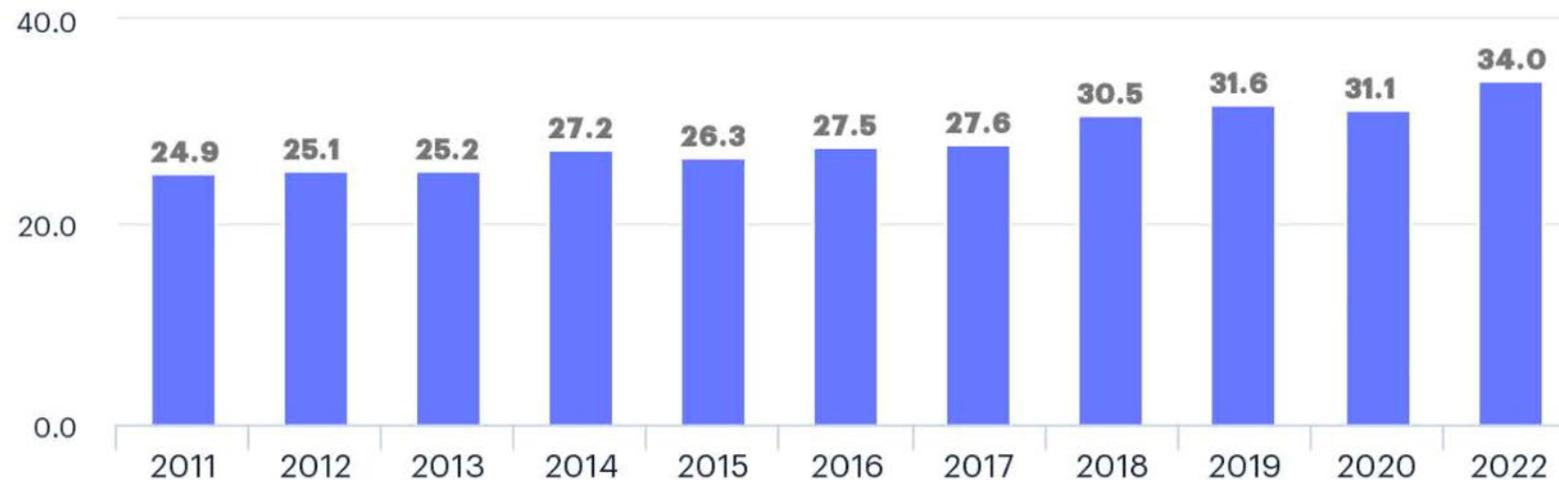
Formulate a plan for integrating multidisciplinary obesity management into clinical practice



# OBESITY AMONG WOMEN OF CHILDBEARING AGE

United States, 2011-2022

Percent of women ages 18-44



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The following states did not conduct BRFSS surveillance every year and are not included in U.S. rates for the respective years: AK(1990), AR(1990,1992), DC(1995), KS(1990,1991), HI(2004), NV(1990,1991), NJ(1990), WY(1990-1993). Obesity is defined as a Body Mass Index of 30 or more. Body Mass Index (BMI) is a number calculated from a person's weight and height. Percent reported is among women ages 18-44. U.S. rate is the median for this indicator.

Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention. Retrieved March 3, 2025, from [www.marchofdimes.org/peristats](http://www.marchofdimes.org/peristats).



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# Pause for Limitations

What a current BMI does not capture...

- Onset/duration
- Nutrition
- Activity
- Mental health
- Co-morbidities, insulin resistance, inflammation
- Genetics
- Socioeconomic status
- Race/ethnicity

*\*Presentation is intended to be gender inclusive*



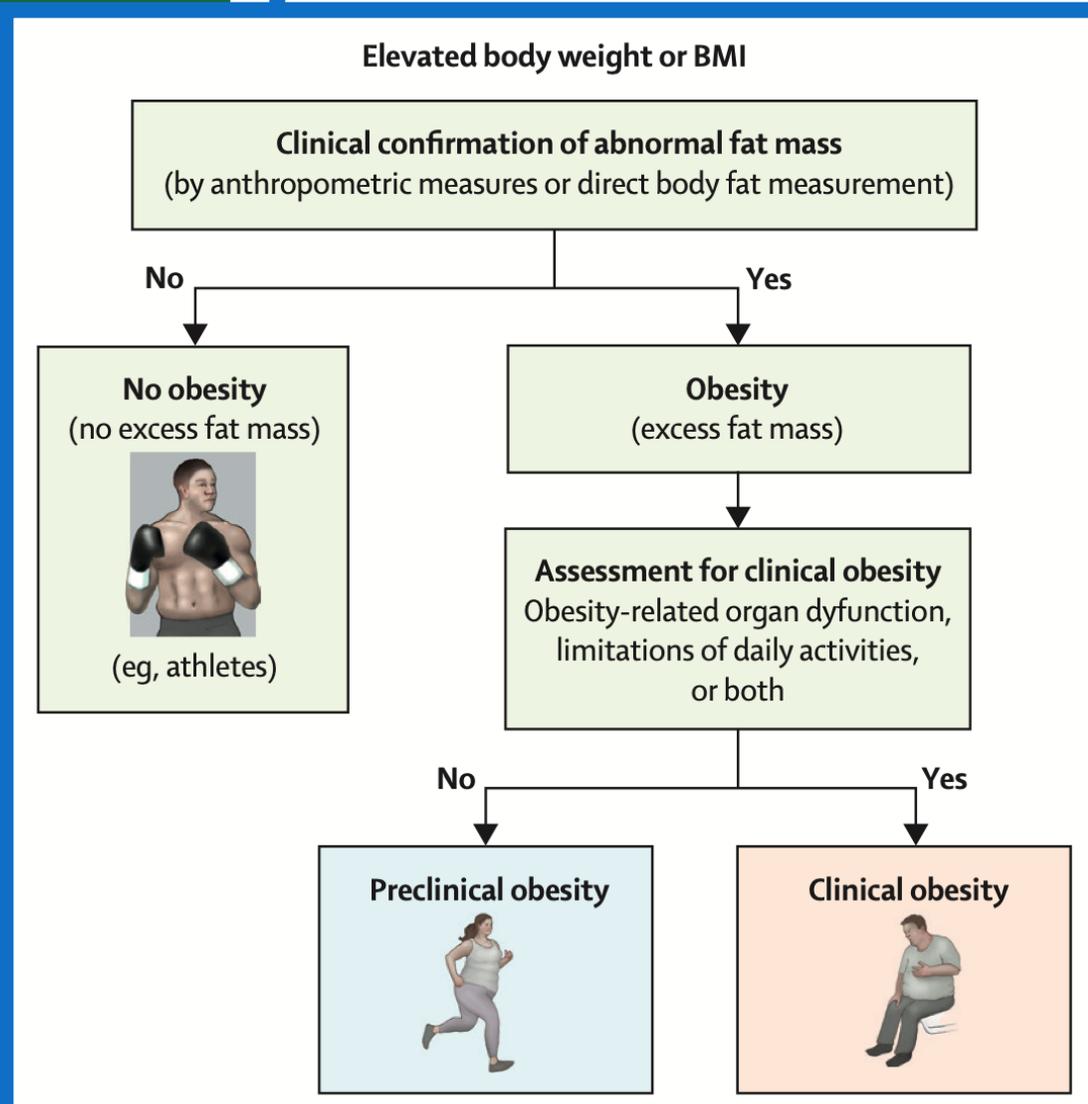
# The Lancet Diabetes & Endocrinology Commission

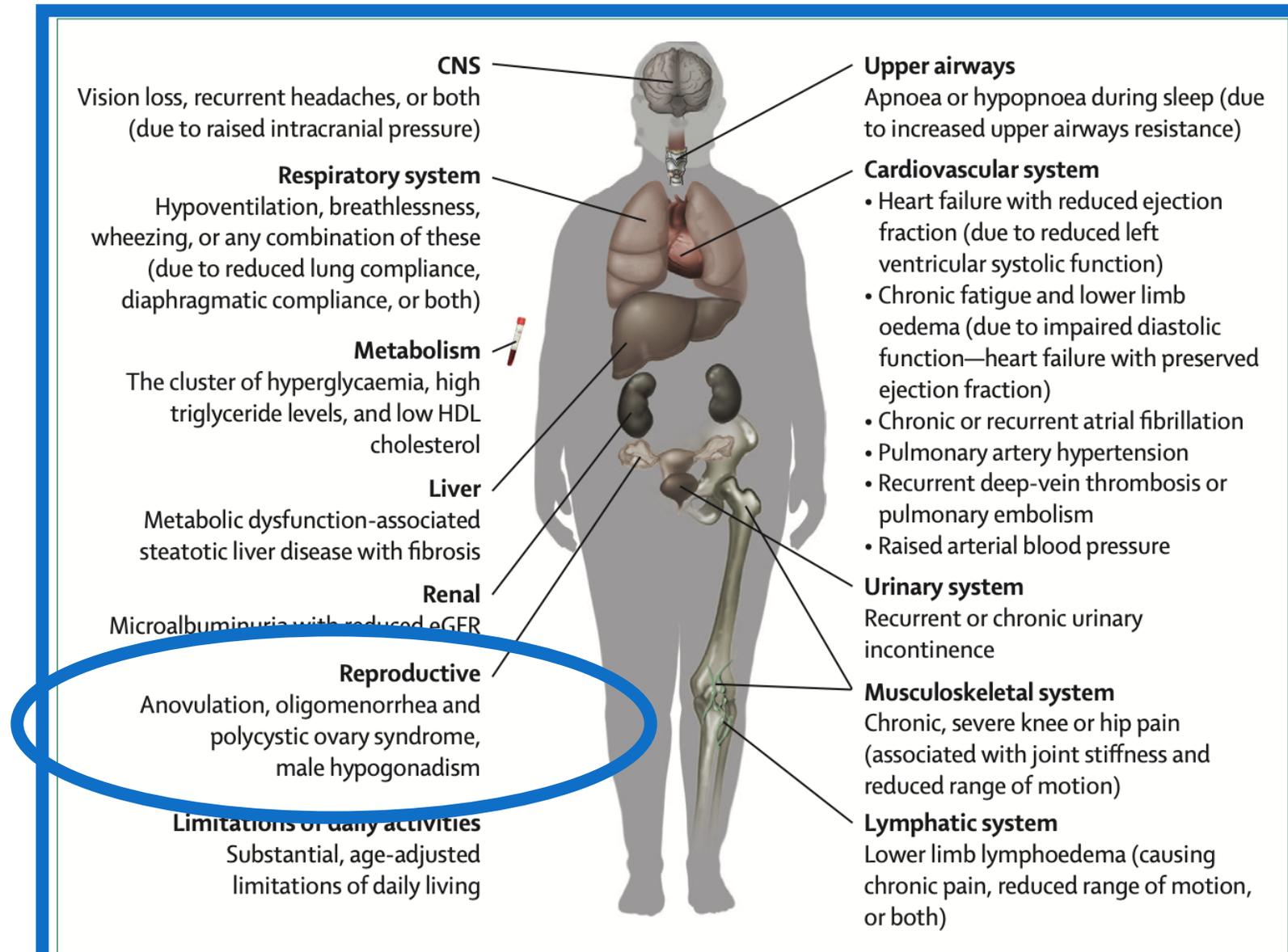
## Definition and diagnostic criteria of clinical obesity

Francesco Rubino, David E Cummings, Robert H Eckel, Ricardo V Cohen, John P H Wilding, Wendy A Brown, Fatima Cody Stanford, Rachel L Batterham, I Sadaf Farooqi, Nathalie J Farpour-Lambert, Carel W le Roux, Naveed Sattar, Louise A Baur, Katherine M Morrison, Anoop Misra, Takashi Kadowaki, Kwang Wei Tham, Priya Sumithran, W Timothy Garvey, John P Kirwan, José-Manuel Fernández-Real,

Clinical obesity = systemic, chronic illness directly and specifically caused by excess adiposity.

Preclinical obesity = excess adiposity coexisting with preserved health





**Figure 6: Diagnostic criteria for clinical obesity in adults**





## Obesity influences all aspects of women's reproductive health.

- Endometrial hyperplasia/cancer
- Surgical morbidity
- Earlier menarche
- Worsened menopausal symptoms

### • *Fertility*

- *Ovulatory dysfunction/ TTC*
- *Miscarriage risks*
- *Maternal-Fetal Risks*
- *ART outcomes*



# Ovulatory Dysfunction

30%-36% of women with obesity have menstrual cycle irregularities

- Range 10-50%

Amen/oligomenorrhea increases with increasing degrees of overweight or obesity in adulthood and in adolescence

- Anovulatory women have a greater waist circumference and more abdominal fat than ovulatory women of similar BMI

Ovulatory menstrual cycles in women with obesity

- Lower total cycle LH and FSH
- Decreased early follicular phase LH pulse amplitude
- Longer follicular phases and shorter luteal phases
- Decreased luteal phase progesterone metabolite

Not all high BMI oligomenorrhea is PCOS!!!



# Miscarriage Risks

- Spontaneous con

- 2006-2009

- Obe

- 2014 Me

- 13.6

- Obe

- Recurrent M

- Systematic R

- 6 Qualitative studies

- 2 Quantitative studies

- Obesity: OR 1.75; 95% CI, 1.24–2.47;  $P=0.001$

- ADT

- $\geq$  or  $=25$  kg/m<sup>2</sup>

## In summary...

- Association has been consistently shown
- Adjusted OR's between 1.2 and 1.9

- 2019 1<sup>st</sup> FET:

- Obesity: aOR 1.46; 95% CI 1.15-1.87



# Miscarriage Risks

- Genetics

- Products of conception
  - 54% aneuploid in BMI 30+
  - 66% aneuploid in BMI <30



- Preimplantation embryos
  - Same regardless of BMI



- Hormonal

- Inflammation

- Co-morbidities: IR, HTN, OSA, etc.

## The association of euploid miscarriage with obesity

Jacqueline C. Lee, M.D.,<sup>a</sup> Lia A. Bernardi, M.D., M.S.C.I.,<sup>b</sup> and Christina E. Boots, M.D., M.S.C.I.<sup>b</sup>

**Association of body mass index with embryonic aneuploidy**  
Kara N. Goldman, M.D., Brooke Hodes-Wertz, M.D., M.P.H., David H. <sup>a, b, H.</sup> and Jamie A. Grifo, M.D., Ph.D.

**Maternal body mass index is not associated with increased rates of maternal embryonic aneuploidy**  
<sup>a, b, H.</sup> Lee, M.D.,<sup>a</sup> Emily S. Jungheim, M.D., M.S.C.I.,<sup>a</sup> Katrina Merrion, M.S.,<sup>b</sup>

**Relationship between paternal factors and embryonic aneuploidy of paternal origin**  
Marissa L. Bonus, M.D.,<sup>a</sup> Dana B. McQueen, M.D.,<sup>b</sup> Rachel Ruderman, M.D., M.P.H.,<sup>a</sup> Lydia Hughes, M.D.,<sup>a</sup> Katrina Merrion, M.S.,<sup>c</sup> Melissa K. Maisenbacher, M.S.,<sup>c</sup> Eve Feinberg, M.D.,<sup>d</sup> and Christina Boots, M.D., M.S.C.I.<sup>a</sup>



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# Maternal – Fetal Risk

- Pregnancy

- Excess gestational weight gain
- Preeclampsia
- Insulin resistance, glucose intolerance, diabetes
- Cesarean delivery
- Anesthesia
- Preterm deliveries
  - Indicated
  - And, spontaneous preterm labor

- Postpartum

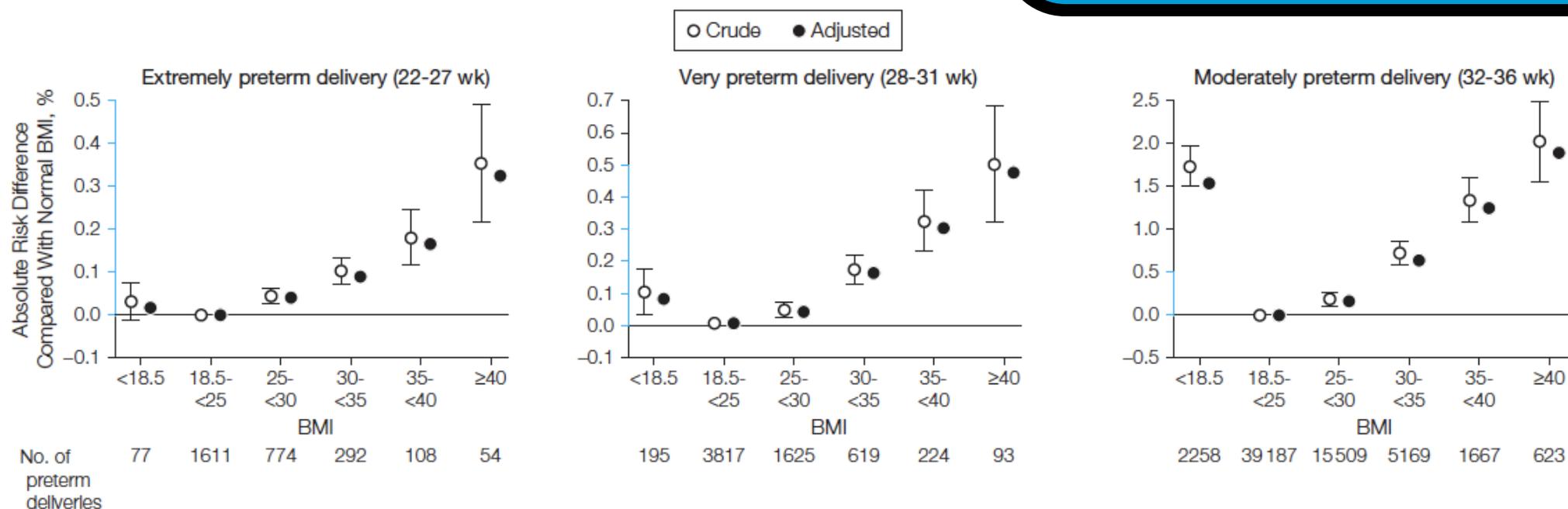
- Venous thromboembolism
- Depression
- Difficulty with breastfeeding
- Weight retention



# Maternal – Fetal Risk

- Do not want diminish the serious consequences
- Highest risk factors for preterm delivery: #1 prior preterm (absolute risk of recurrence of 20.3%), #2 multiples, #3 uterine/cervical abnormalities

B Absolute risk difference of preterm delivery by maternal BMI (reference, BMI 18.5-<25)



A, Odds ratios (ORs) were estimated both from the data set with complete covariate information and after multiple imputation of missing values. ORs were adjusted for maternal age, parity, smoking, education, maternal height, maternal country of birth, and year of delivery. B, Absolute risks attributable to body mass index (BMI) were estimated from ORs in the complete case analysis. Y-axis scale shown in blue indicates range from 0% to 0.5%.





# Maternal – Fetal Risk

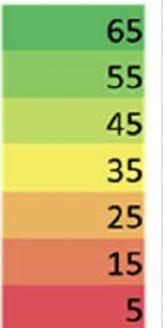
## Next generation

- Obesity
- Cardiovascular disease
- Insulin resistance



# ART Outcomes

Age, y	BMI, kg/m <sup>2</sup>							
	<18.5	18.5–24.9	25.0–29.9	30.0–34.9	35.0–39.9	40.0–44.9	45.0–49.9	≥50
	Underweight	Normal weight	Overweight	Class I obesity	Class II obesity	Class III obesity	Morbid obesity	Super obesity
<30	65	64	59	60	50	48	40	25
30	60	63	57	59	54	48	20	20
31	61	59	57	54	46	40	30	.
32	61	58	55	53	43	44	35	22
33	45	56	52	54	44	37	43	.
34	44	51	48	42	44	40	43	.
35	47	50	44	46	42	44	38	17
36	41	43	40	42	43	39	33	.
37	39	39	38	35	38	24	33	30
38	30	32	33	30	25	20	25	21
39	10	25	27	27	28	23	11	.
40	19	20	19	21	17	12	31	.
41	6	13	15	12	19	14	7	.
42	2	11	9	11	9	11	14	.
>42	0	3	4	5	2	5	0	.



Cumulative likelihood of live birth (%) on the basis of maternal age and BMI among 51,959 first fresh IVF cycles that started in 2014 + 16,067 frozen embryo cycles between 2014 and 2015, representing data from >90% of IVF cycles in the United States and Puerto Rico. Note that cumulative live birth refers to the live birth rate after both fresh and frozen transfers of embryos derived from the first fresh IVF stimulation and retrieval. BMI = body mass index; IVF = in vitro fertilization. (From Goldman et al. [74]. Reprinted by permission of the publisher.)

# Frozen embryo transfer outcomes decline with increasing female body mass index with female but not male factor infertility: analysis of 56,564 euploid blastocyst transfers

Jennifer B Bakkensen<sup>1</sup>, Danielle Strom<sup>2</sup>, Christina E Boots<sup>3</sup>

Table 2. Cycle outcomes by BMI category (N = 56,564 patients)<sup>a</sup>

	<18.5 N=1,612	18.5-24.9 N=31,666	25-29.9 N=13,419	30-34.9 N=5,885	35-39.9 N=2,774	40-44.9 N=893	45-49.9 N=229	>50 N=86
Clinical pregnancy	63.3%	65.9%	65.8%	63.9%	59.7%	57.2%	52.8%	46.5%
aOR (95% CI) <sup>b</sup>	0.80 (0.70-0.90)	Ref	1.00 (0.96-1.06)	0.91 (0.85-0.97)	0.76 (0.70-0.84)	0.73 (0.63-0.85)	0.59 (0.44-0.78)	0.51 (0.31-0.83)
Pregnancy loss	12.5%	11.4%	12.5%	14.3%	17.6%	19.8%	17.4%	20.0%
aOR (95% CI) <sup>b</sup>	1.05 (0.84-1.32)	Ref	1.10 (1.01-1.20)	1.20 (1.07-1.35)	1.52 (1.32-1.76)	1.69 (1.35-2.12)	1.00 (0.58-1.72)	1.50 (0.68-3.29)
Live birth	55.0%	58.2%	57.2%	54.4%	48.8%	45.6%	43.7%	37.2%
aOR (95% CI) <sup>b</sup>	0.79 (0.70-0.89)	Ref	0.97 (0.93-1.02)	0.86 (0.81-0.92)	0.67 (0.62-0.74)	0.62 (0.54-0.72)	0.61 (0.45-0.81)	0.46 (0.28-0.75)
<b>Among diagnosis of Male factor only (N = 10,854)</b>								
	<18.5 N= 263	18.5-24.9 N= 6,047	25-29.9 N= 2,743	30-34.9 N= 1,114	35-39.9 N= 496	40-44.9 N=152	45-49.9 N=31	>50 N=8
Clinical pregnancy	60.8%	67.4%	67.8%	66.7%	64.3%	57.9%	61.3%	62.5%
aOR (95% CI) <sup>b</sup>	0.66 (0.49-0.89)	Ref	1.06 (0.95-1.18)	0.98 (0.84-1.14)	0.93 (0.75-1.16)	0.71 (0.50-1.02)	1.01 (0.45-2.25)	1.26 (0.24-6.49)
Pregnancy loss	9.4%	10.4%	11.8%	12.5%	14.1%	17.1%	15.8%	0.0%
aOR (95% CI) <sup>b</sup>	0.94 (0.52-1.70)	Ref	1.20 (0.99-1.46)	1.17 (0.89-1.53)	1.50 (1.06-2.14)	1.28 (0.68-2.40)	1.65 (0.49-5.51)	
Live birth	54.8%	60.2%	59.4%	58.1%	55.0%	48.0%	51.6%	62.5%
aOR (95% CI) <sup>b</sup>	0.67 (0.50-0.91)	Ref	0.99 (0.89-1.10)	0.94 (0.81-1.08)	0.83 (0.68-1.03)	0.68 (0.48-0.97)	0.86 (0.40-1.84)	1.70 (0.33-8.79)



# Does weight loss help?

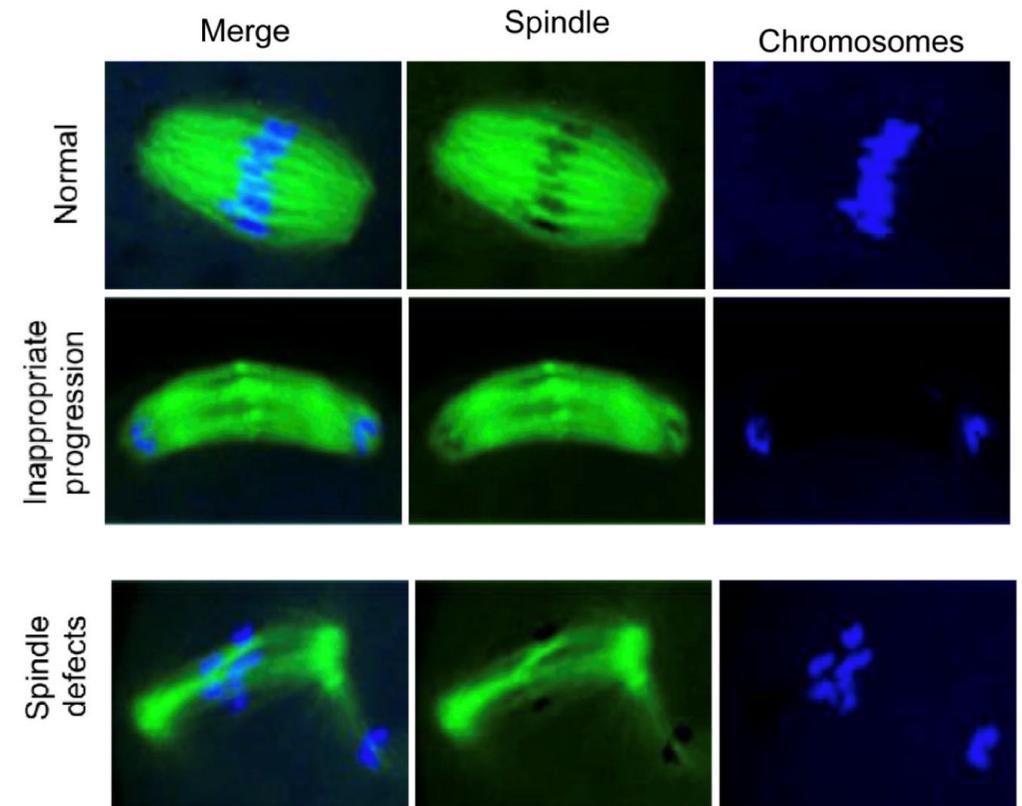
## Mouse Model

*Reprod Fertil Dev.* 2015 May ; 27(4): 716–724. doi:10.1071/RD14251.

**The adverse effect of obesity/high fat diet on oocyte quality and metabolism is not reversible with resumption of regular diet in mice**

**Kasey A Reynolds<sup>1</sup>, Anna L Boudoures<sup>1</sup>, Maggie M-Y Chi<sup>1</sup>, Qiang Wang<sup>2</sup>, and Kelle H Moley<sup>1</sup>**

<sup>1</sup>Department of Obstetrics and Gynecology, Washington University in St. Louis, USA



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# Does weight loss improve fertility outcomes?

OWL  
PCOS  
Study

Dutch  
LIFEstyle  
Study

Swedish  
Study

FIT-  
PLESE  
Study

Summary:

- Increased weight loss
- Higher spontaneous conception
- Same healthy live birth rate
- Higher miscarriage rate

**No studies with  
GLP1a  
Few after bariatric  
surgery**

# Effectiveness of preconception weight loss interventions on fertility in women: a systematic review and meta-analysis

Ann E. Caldwell, Ph.D.,<sup>a</sup> Anna M. Gorczyca, Ph.D.,<sup>b</sup> Andrew P. Bradford, Ph.D.,<sup>c</sup>  
Jacinda M. Nicklas, M.D., M.P.H.,<sup>d</sup> Robert N. Montgomery, Ph.D.,<sup>e</sup> Heather Smyth, Ph.D.,<sup>f</sup>  
Shannon Pretzel, B.A.,<sup>g</sup> Thy Nguyen, B.A.,<sup>g</sup> Kristen DeSanto, M.S.,<sup>h</sup> Celia Ernstrom, B.S.,<sup>g</sup>  
and Nanette Santoro, M.D.<sup>c</sup>

- Higher pregnancy with no impact on livebirth or miscarriage rates.
- *Findings do not support one-size-fits-all recommendation for weight loss through lifestyle modification and/or medication in women with overweight or obesity immediately before conception*





# Personalized Discussion

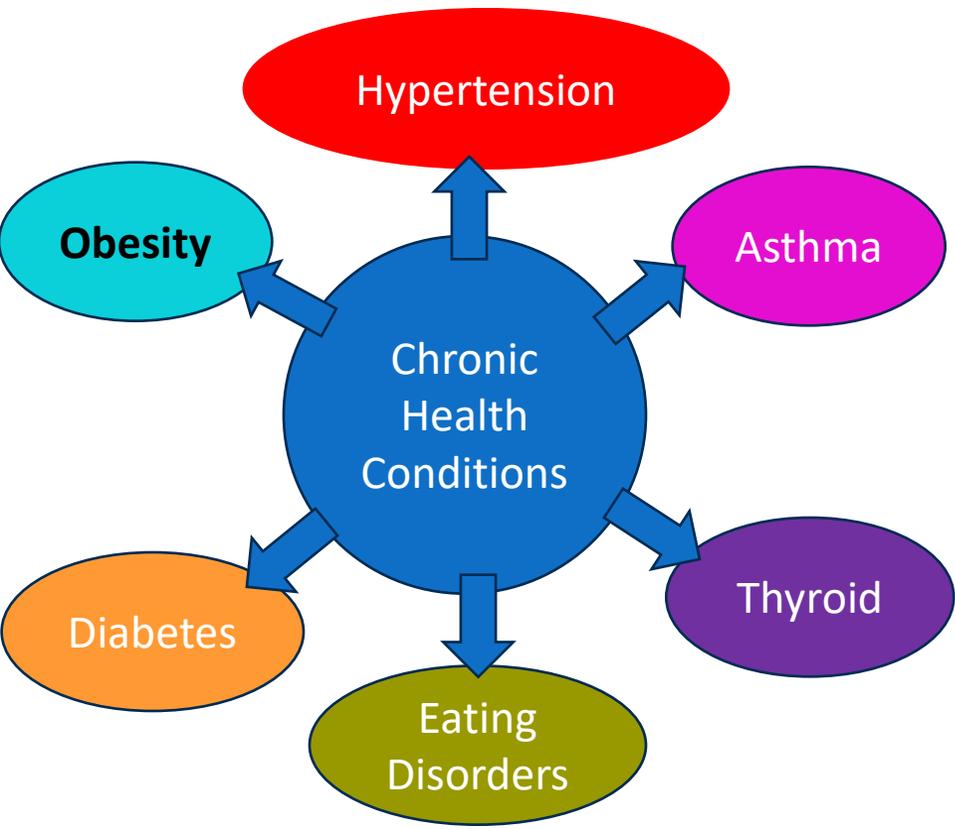
## Weight Loss

- Ovulation status
- Access oocyte retrieval
- Metabolic optimization
- BP, glucose, liver

## Direct to Fertility Treatment

- Unclear fertility benefit if ovulatory
- No change in LBR
- Delaying pregnancy
- Risk of weight regain





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**Our goal in REI is to support achieving a healthy and safe pregnancy.**

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Preconception health correlates with prenatal health and pregnancy outcomes.

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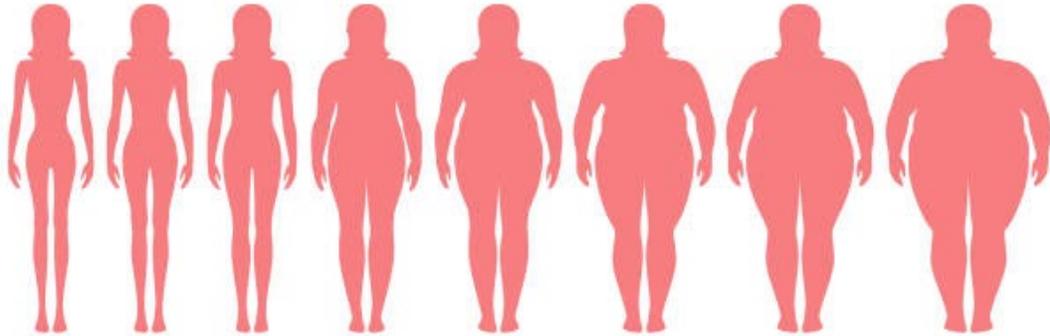
Prepare for pregnancy: **adequate nutrition** while simultaneously **managing chronic diseases**

---

**Do not negate that obesity is a chronic health condition.**



# Weight Bias:



---

Lazy

---

Unmotivated

---

Not compliant

---

Not doing enough

---

Doesn't care

---

Doesn't try hard enough

---

No will power

---

Poor diet



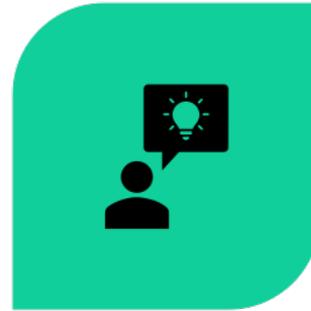
# Reflect on implicit bias:



EDUCATE YOURSELF  
ABOUT BIAS



TAKE AN IMPLICIT  
ASSOCIATION TEST



PRACTICE MINDFULNESS  
IN COMMUNICATION AND  
DECISION-MAKING



SLOW DOWN  
JUDGEMENTS AND  
CLINICAL DECISIONS



# 5 A's Framework

1



**Ask:** Permission to discuss weight/non-judgmental

2



**Assess:** history, barriers, goals, lifestyle, nutrition, mental health

3



**Advise:** Education, impact on reproduction, options

4



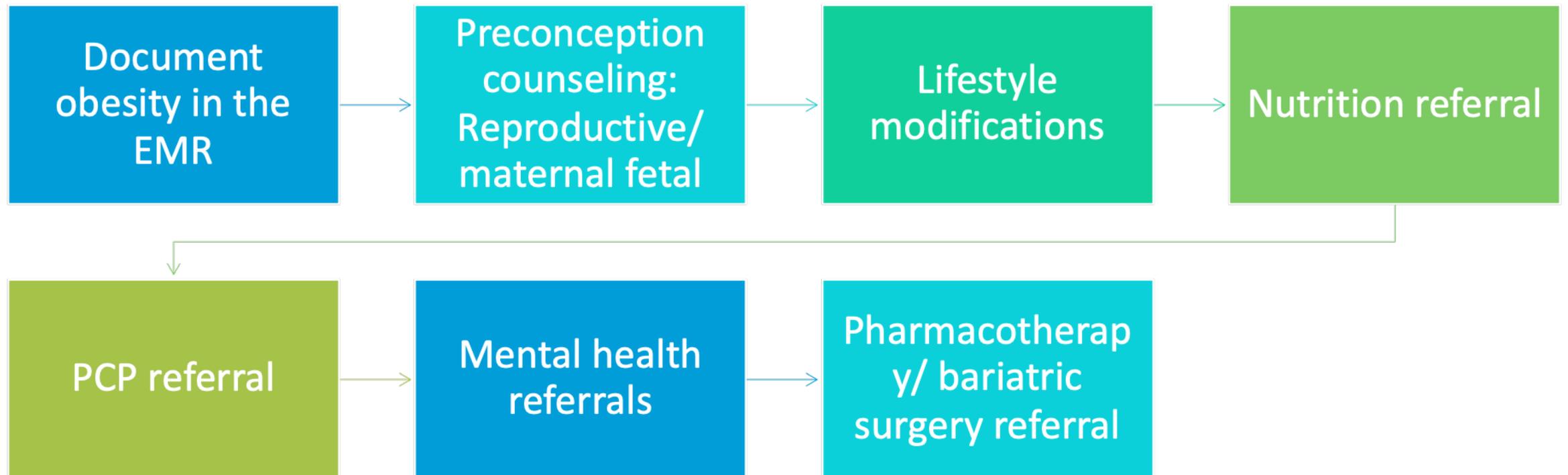
**Agree:** Collaborate with pt for a personalized plan

5



**Assist:** Verbalize your support, address barriers, make referrals

# Personalized Treatment for Fertility Patients **with** Obesity



## Semaglutide/Ozempic/Wegovy:

- Selective glucagon-like peptide-1 (GLP1) receptor agonist
- Increases glucose-dependent insulin secretion, decreases inappropriate glucagon secretion, slows gastric emptying; also works in areas of the brain to decrease food intake
- 5 tiered doses, once weekly SQ injection
- 4 weeks minimum at each dose



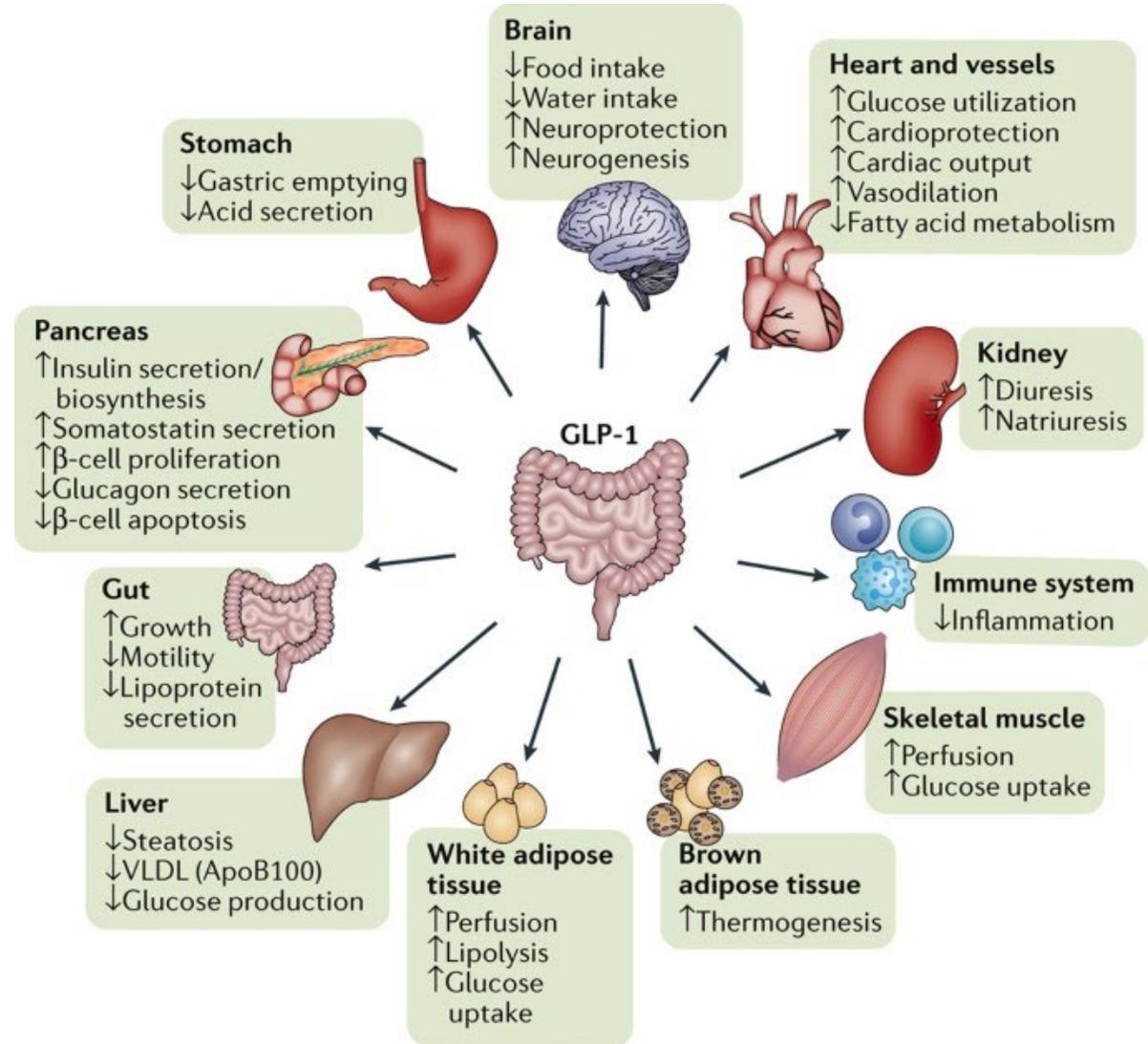
\*At month 5 and on, you may either stay at 1.7 mg or increase to 2.4 mg. Work with your health care provider to determine which dose is right for you.

## Tirzepatide/Mounjaro/Zepbound:

- Glucose-dependent insulinotropic polypeptide (GIP) receptor and glucagon-like peptide-1 (GLP1) receptor agonist
- Increases glucose-dependent insulin secretion, decreases inappropriate glucagon secretion, slows gastric emptying, and decreases food intake
- 6 tiered doses, once weekly SQ injection
- 4 weeks minimum at each dose



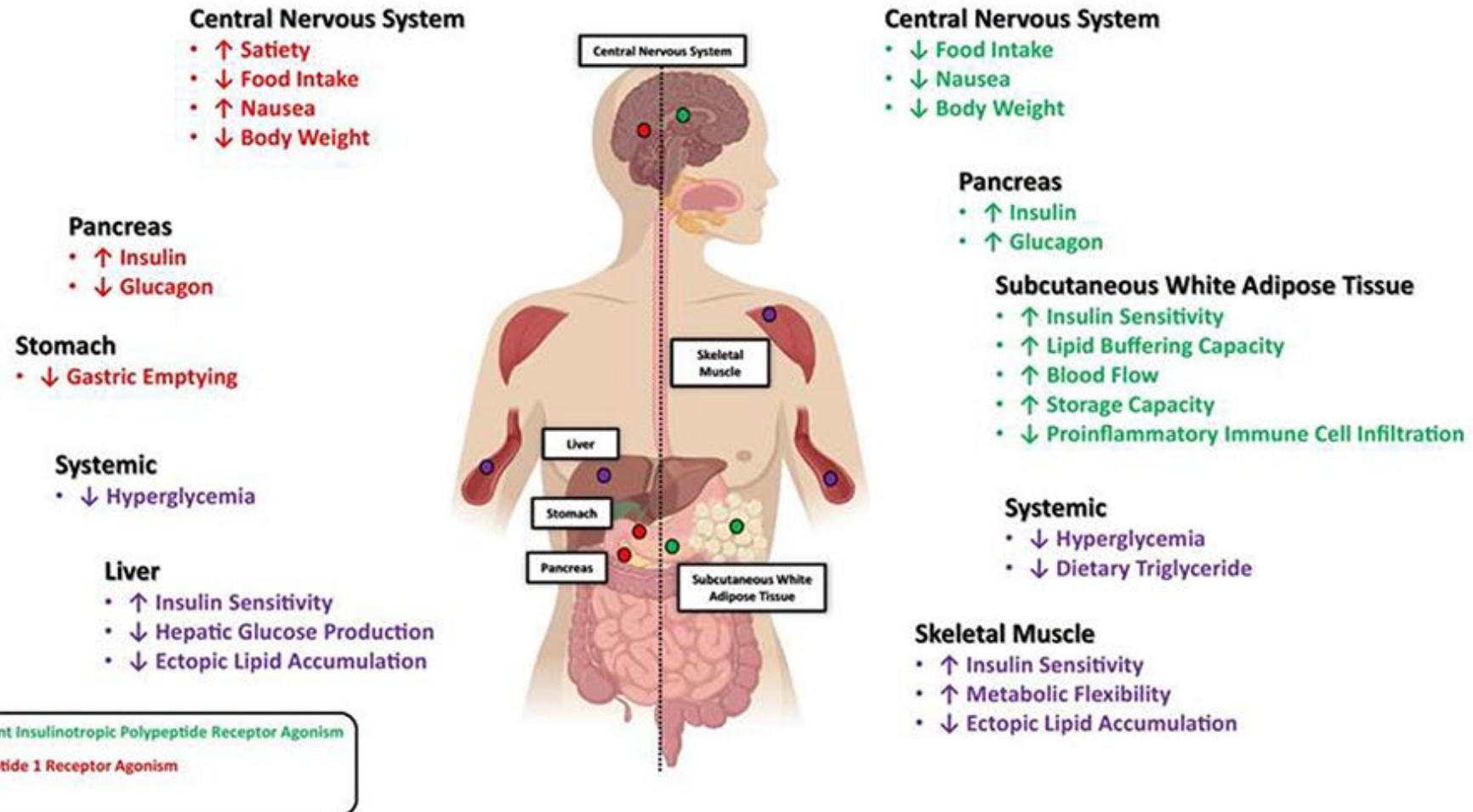
# Glucagon-like Peptide - 1



# Glucose depending insulinotropic Polypeptide = Gastric inhibitory polypeptide (GIP)

## Glucagon-like Peptide-1 Receptor Agonism

## Glucose-dependent Insulinotropic Polypeptide Receptor Agonism





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# Prescribing:

Medical obesity-BMI > 30

BMI < 30 with at least one weight related comorbidity

**No personal/family hx of Medullary Thyroid Cancer or Multiple Endocrine Neoplasia Syndrome Type 2, pancreatitis, pregnancy**

Multidisciplinary: Nutritionist/Behavioral Therapy/PCP/Physical Activity

Long term treatment of obesity

# Prescribing cont.

Weekly injection

Slows the GI system, feel full longer, less “food noise”

Lowest dose for longest time

Check in: nutritional status, wt loss, physical activity, mental health, side effects

No continuous lab monitoring needed

Side effects: GI: N/V/D/C, rare serious GI





# When to stop!

- No studies on GLP1 during ovarian stimulation
- Anesthesia consideration
- Stop at stim start
- Semaglutide: 2 months prior to pregnancy



Because of the potential for fetal harm, discontinue WEGOVY® in patients at least 2 months before they plan to become pregnant to account for the long half-life of semaglutide [see *Use in Specific Populations* (8.1)].

- Tirzepatide: no time on US insert- 4 weeks prior to pregnancy (CA insert)

- **Pregnancy:** May cause fetal harm. When pregnancy is recognized, discontinue ZEPBOUND. (8.1)
- **Females of Reproductive Potential:** Advise females using oral contraceptives to switch to a non-oral contraceptive method or add a barrier method of contraception for 4 weeks after initiation and for 4 weeks after each dose escalation. (8.3)

ZEPBOUND KwikPen is contraindicated during pregnancy (see [2 CONTRAINDICATIONS](#)). If a patient wishes to become pregnant, ZEPBOUND KwikPen should be discontinued at least 1 month before a planned pregnancy due to the long half-life of tirzepatide.



# Models of obesity care for fertility patients:

- APP led clinics
  - Referral from REI
  - If pt has obesity med coverage- refer to PCP- no prior auth available
  - Assess/prescribe/manage
  - Goals met → Back to REI for conversion to treatment
- Multidisciplinary Team:
  - P.E.A.R.L.
  - Small team with interest/expertise within the division
  - REI MD, Pharmacist, APP, MFM
  - Referrals to Psych, Dieticians





Well-Being  
over  
Weight Loss

- Compassion/ empathy
- Referral to experts
  - Obesity specialist
  - Dietician
  - Mental health
  - Become an expert in your clinic!*
- Optimizing health at every size
- Evidence-based, individualized care
  - Improve quality of care at higher BMI
- Prevention:
  - Pre-Pre-Conception
  - Preventing weight gain
  - Optimize other co-morbidities
  - Hope for the next generation

# Q&A



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