Maximizing Long-Term Surgical Success:

The Emerging Role of Obesity Medications

Currax™ pharmaceuticals LLC

Featured faculty

Richard Cohen, MD, PhD

President, IFSO
Director, The Center for the Treatment of Obesity and Diabetes
Oswaldo Cruz German Hospital
Sao Paulo, Brazil

Andres Acosta, MD, PhD

Associate Professor of Medicine
Director, Nutrition and Obesity Research Program
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Rochester, Minnesota, USA

Precision Obesity and Bariatrics: **The Next Frontier**

Andres Acosta, MD, PhD

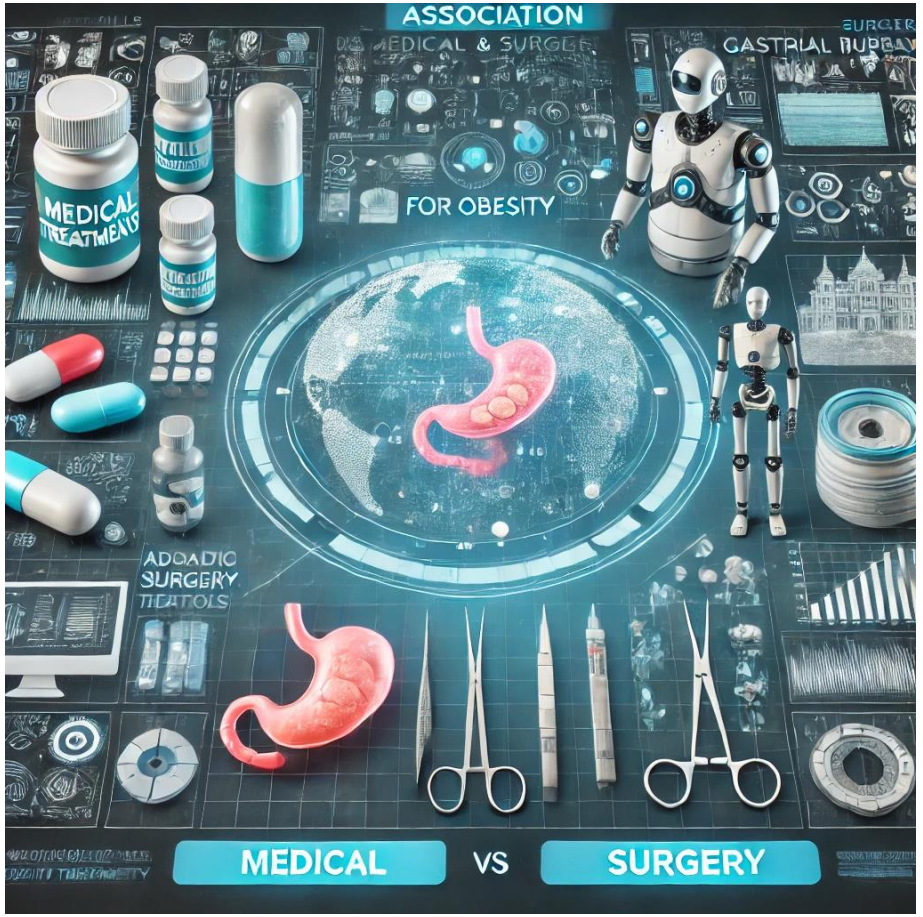
Currax™ pharmaceuticals LLC

Metabolic and Bariatric Surgery: Pathways to Better Outcomes

RICARDO COHEN

Director, The Center for the treatment of Obesity and Diabetes Hospital Alemao Oswaldo Cruz,
São Paulo Brazil

President IFSO Global
Past President SBCBM (2011-2012)
Past President IFSO LAC (2018-2019)



IFSO

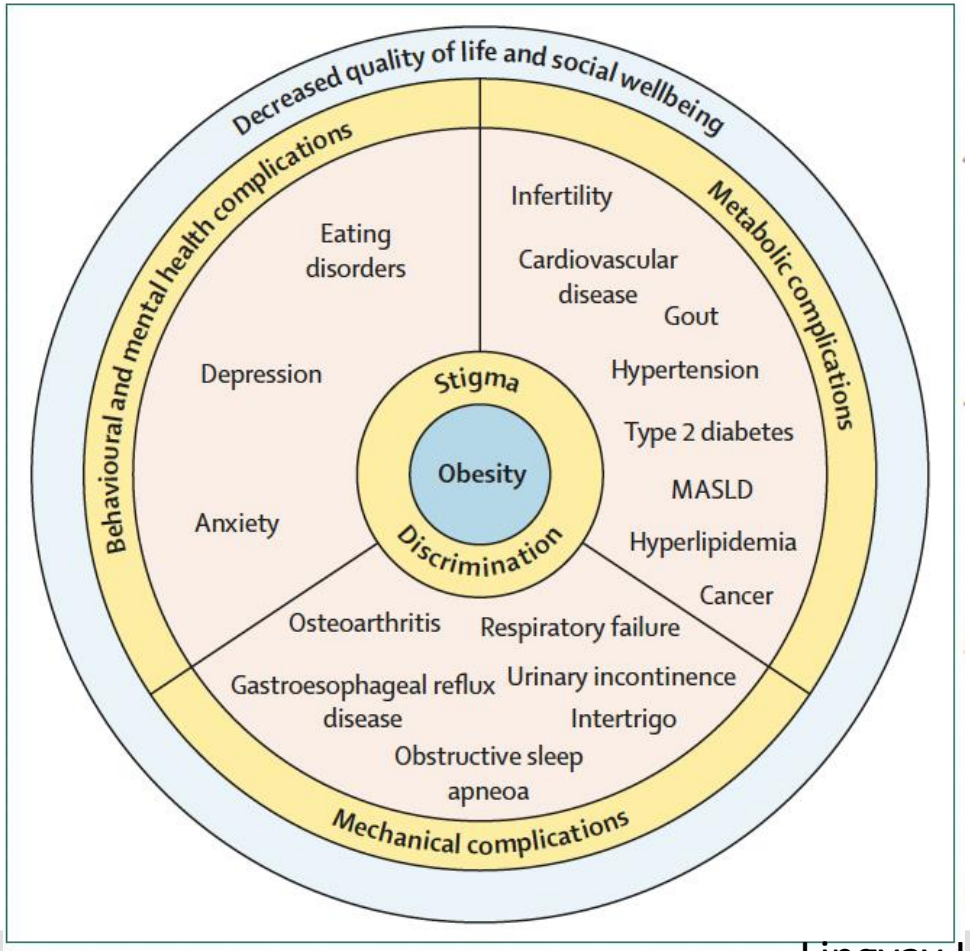
OSWALDO CRUZ
CENTRO ESPECIALIZADO EM OBESIDADE E DIABETES

Disclosures

- Research Grant, Johnson & Johnson Medtech
- Research Grant, Medtronic
- Research Grant, GI Dynamics
- Research Grant, Hospital Oswaldo Cruz Bioscience Institute
- Research Grant,Marlex, Brazil
- Paid lectures, Johnson & Johnson Medtech, Medtronic, NovoNordisk, Merck, Boston Scientific

- SAB: Morphic Medical, Medtronic, Johnson & Johnson,Regeneron

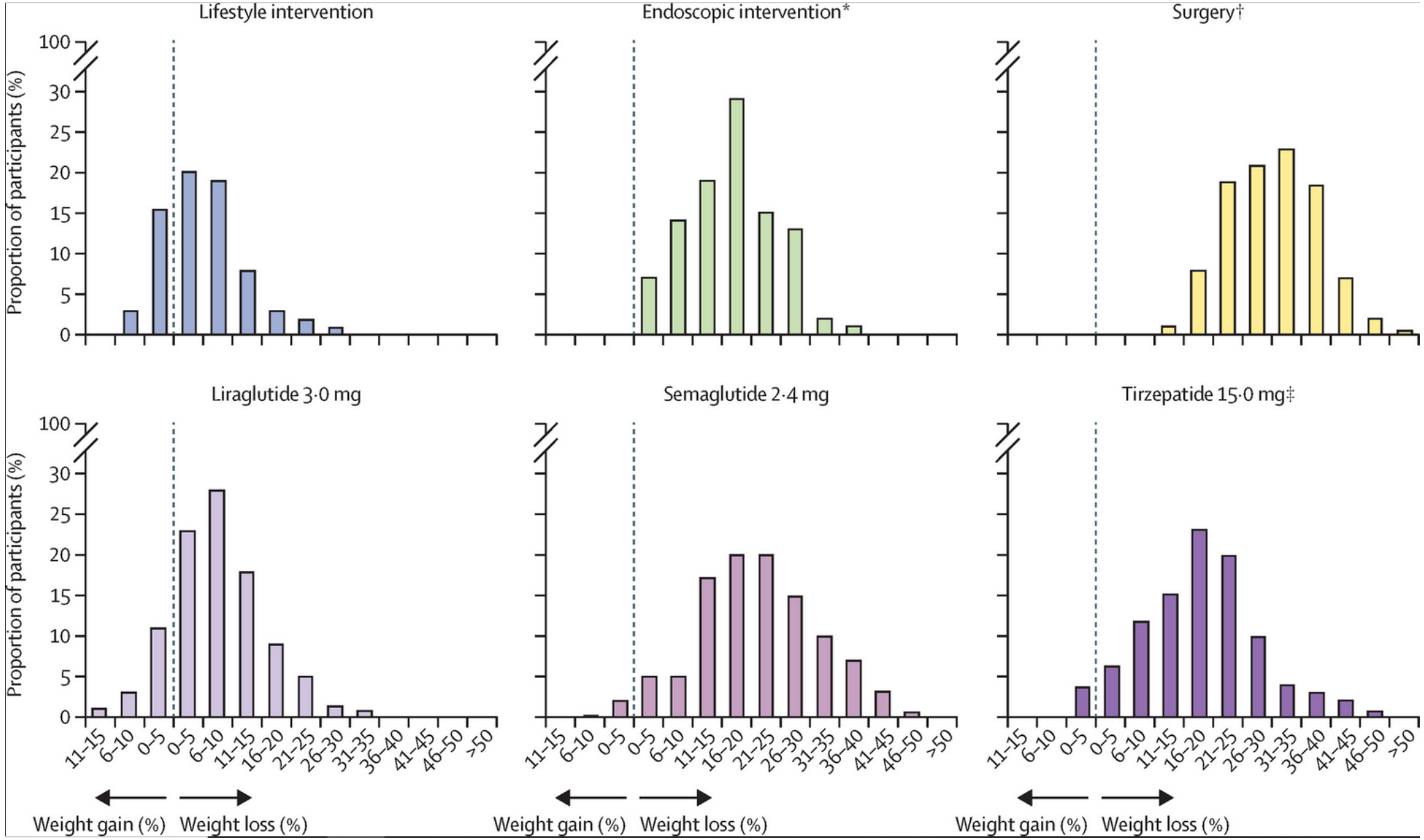
Obesity Is Not Just “Weight”



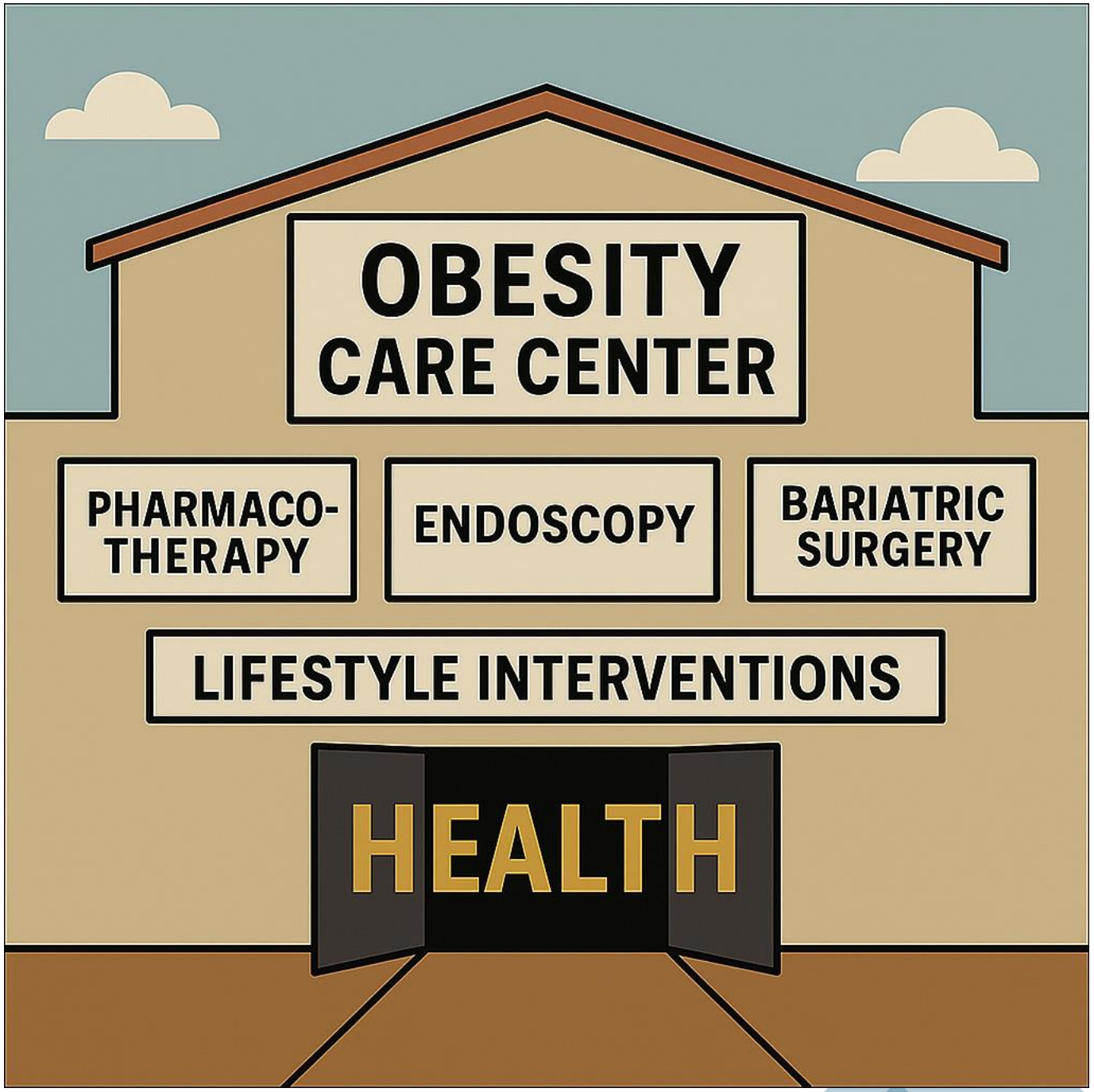
Clinical obesity is a multifaceted complex disease with signs, symptoms and complications

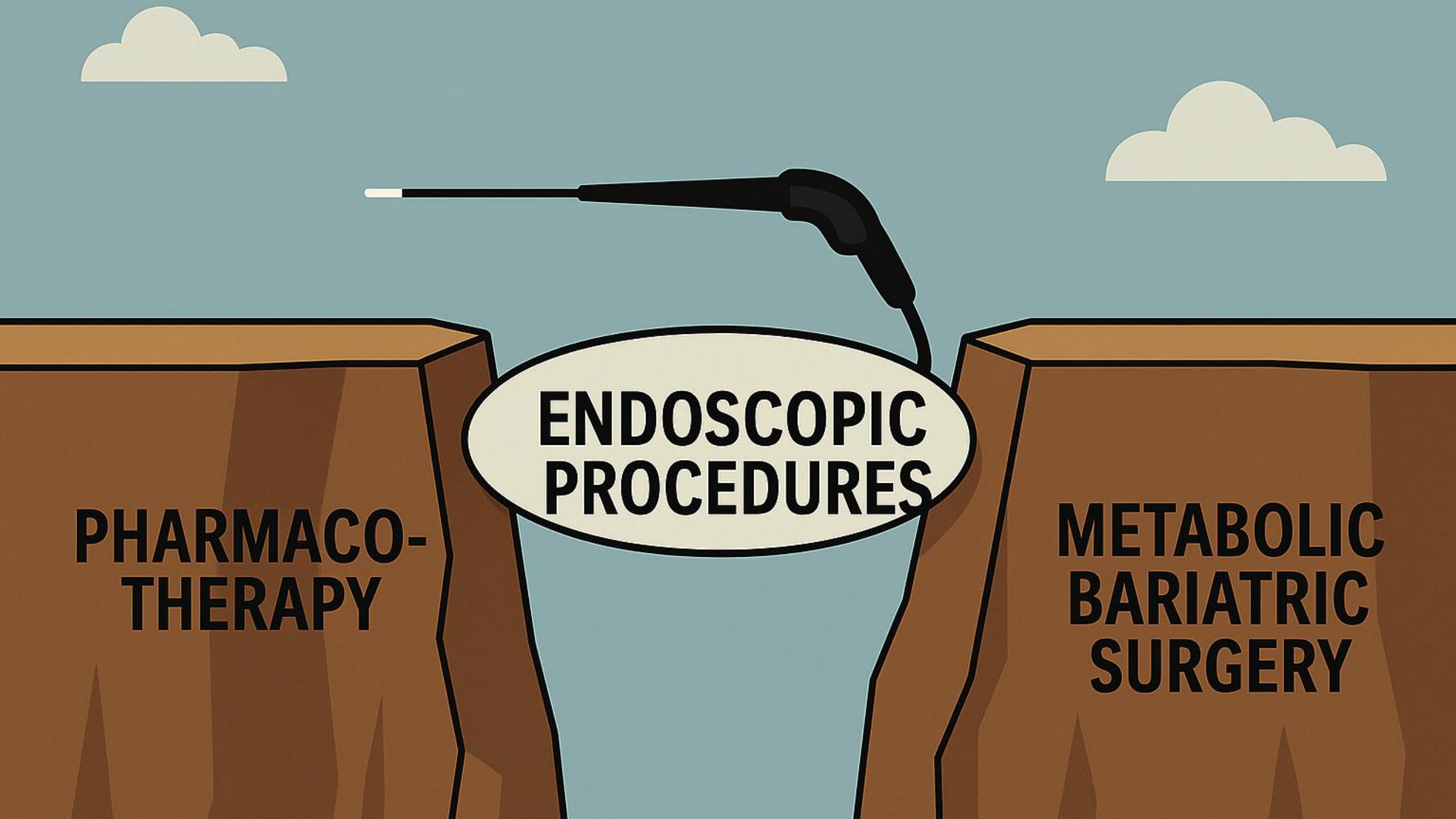
Lingvay I, Cohen RV et al, Lancet 2024

Heterogeneous response to obesity treatments

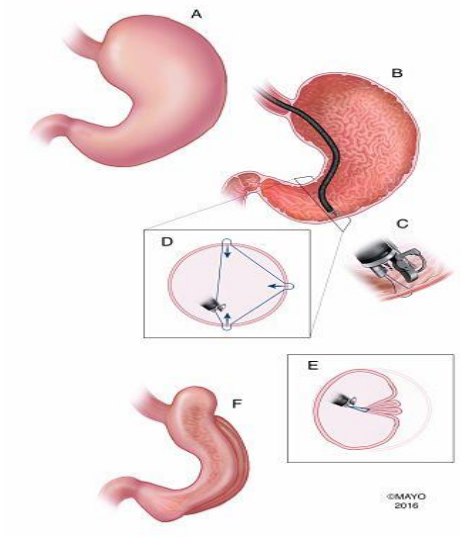


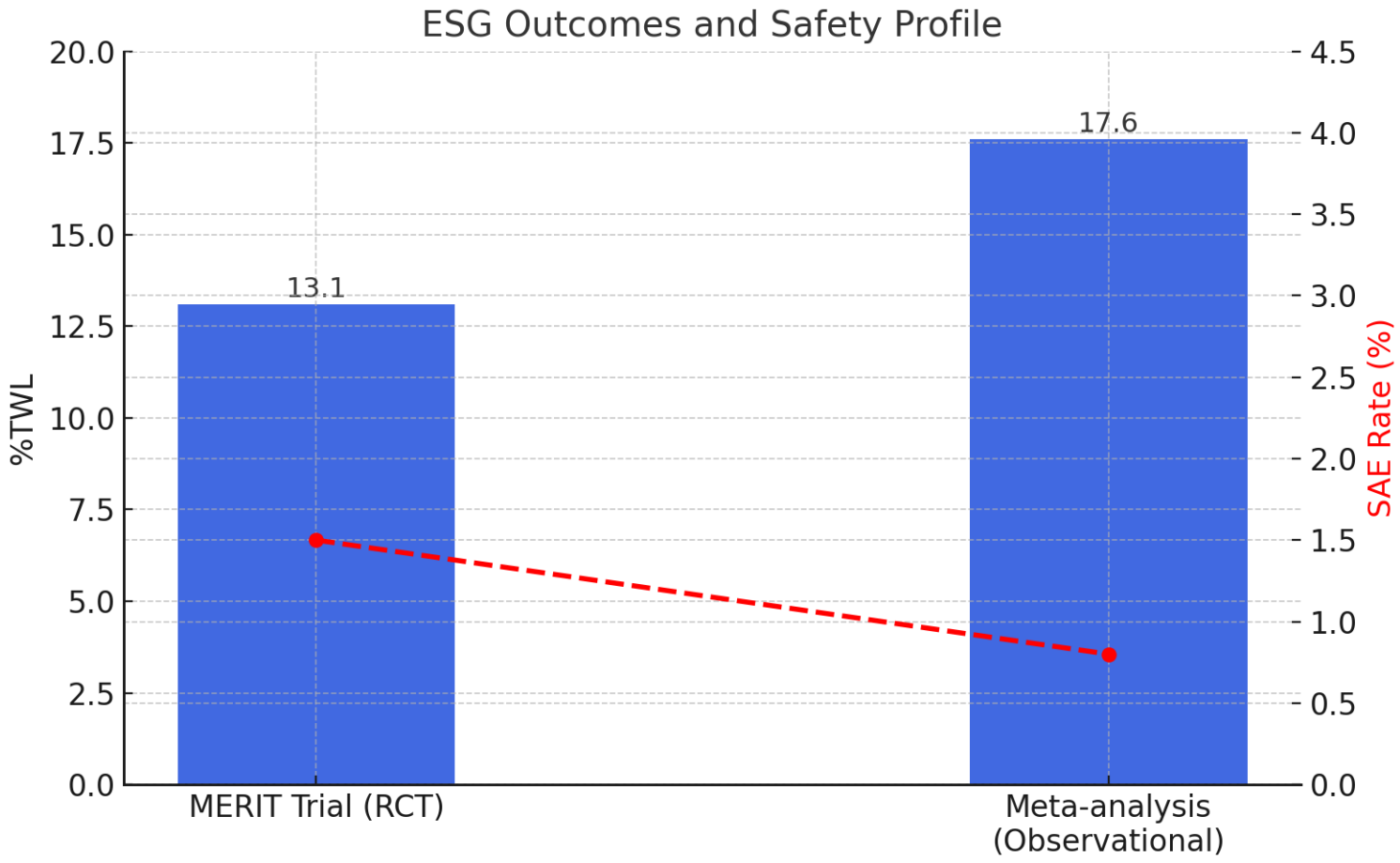
Perdomo C, Cohen RV et al, Lancet, 2023


OBESITY
CARE CENTER
PHARMACO-
THERAPY
ENDOSCOPY
BARIATRIC
SURGERY
LIFESTYLE INTERVENTIONS
HEALTH


ENDOSCOPIC PROCEDURES
PHARMACO-THERAPY
METABOLIC BARIATRIC SURGERY

Endoscopic Sleeve Gastroplasty





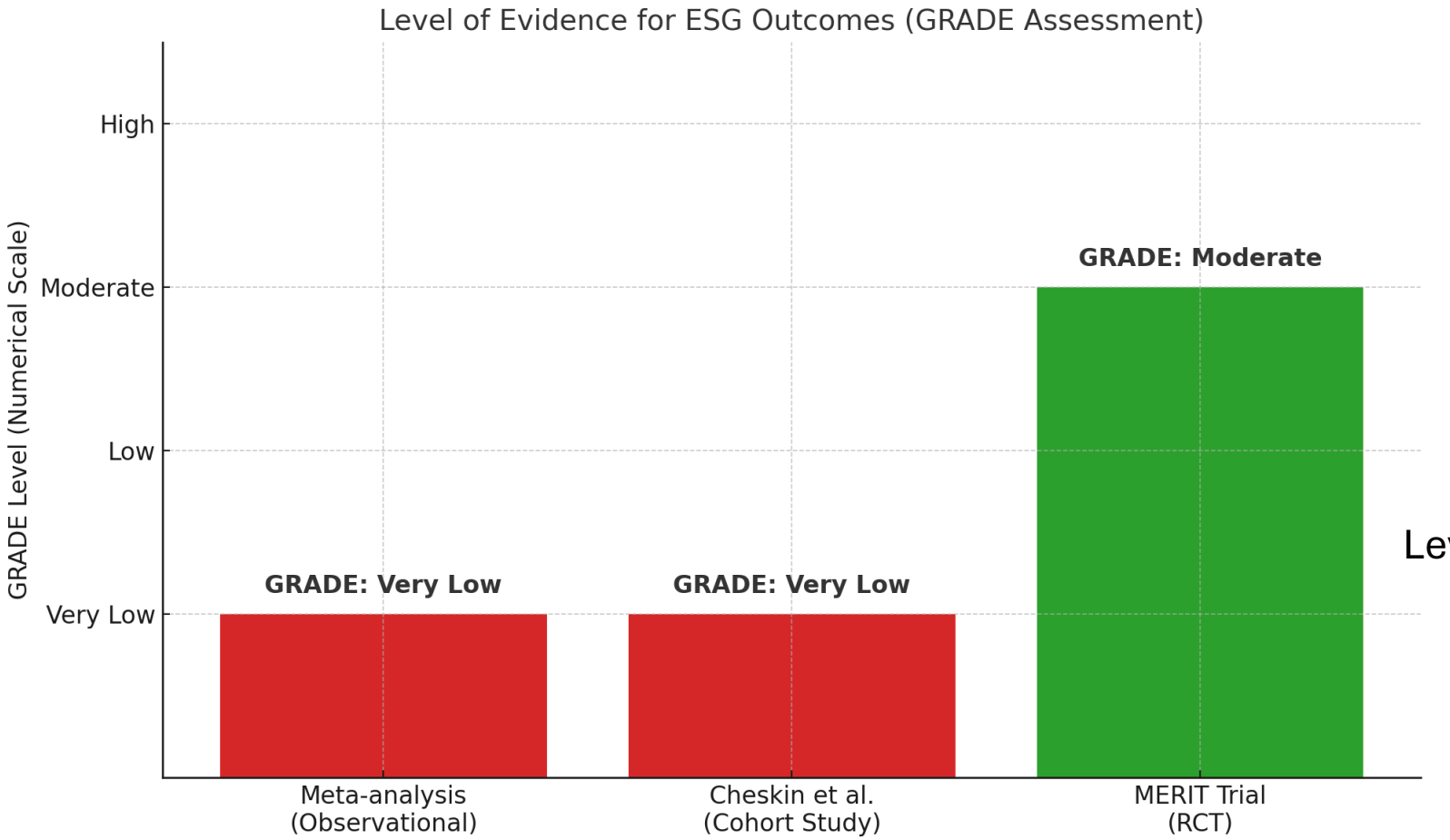
15,398 ESG procedures

Obesity Surgery (2024) 34:4318–4348
https://doi.org/10.1007/s11695-024-07510-z

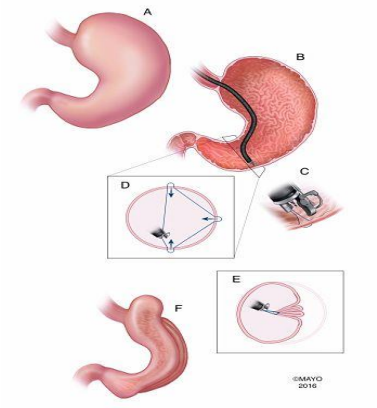
RESEARCH

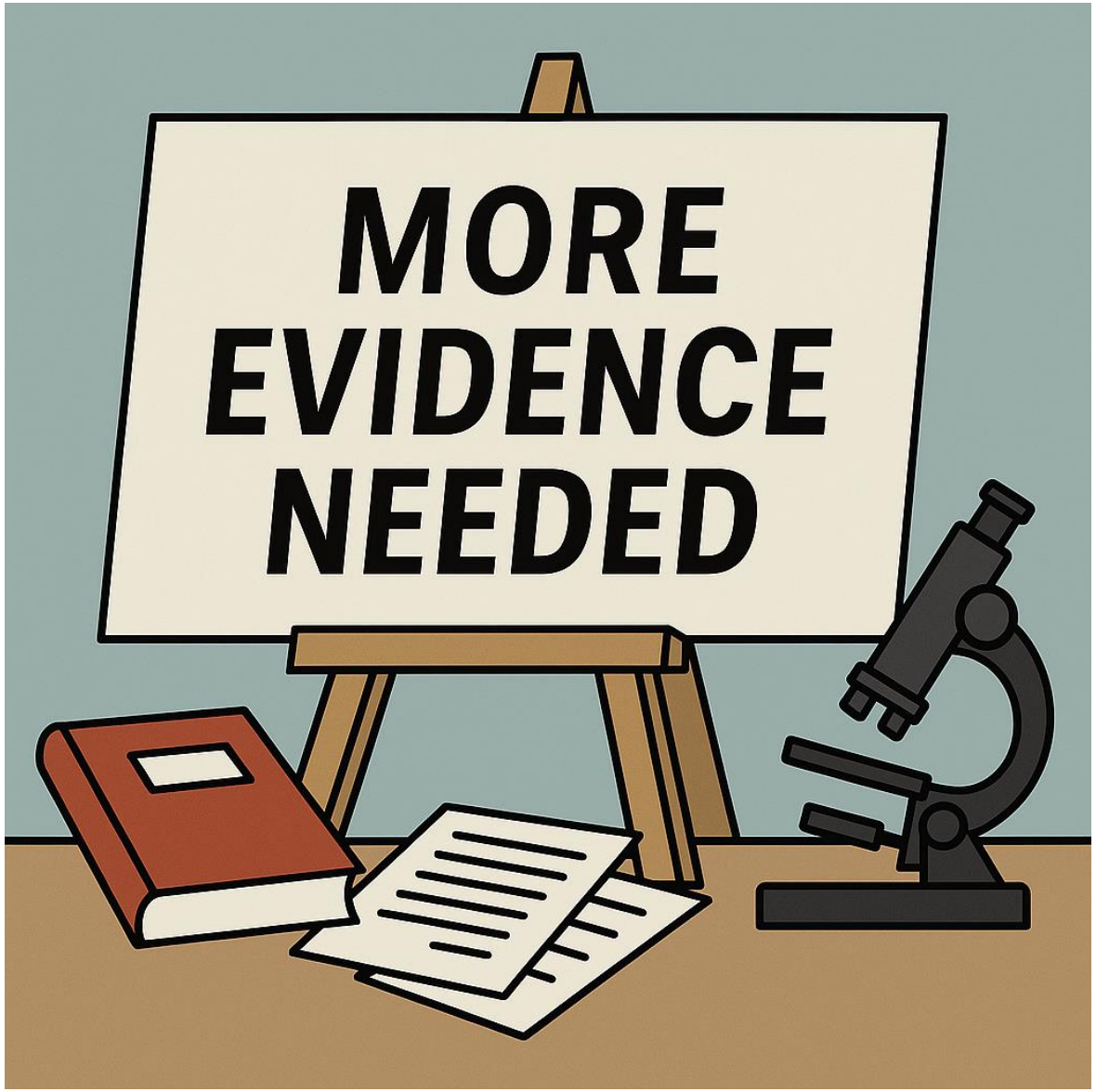
IFSO Bariatric Endoscopy Committee Evidence-Based Review and Position Statement on Endoscopic Sleeve Gastroplasty for Obesity Management

Barham K. Abu Dayyeh[1,10] · Christine Stier[2] · Aayed Alqahtani[3] · Reem Sharaiha[4] · Mohit Bandhari[5] · Silvana Perretta[6] · Sigh Pichamol Jirapinyo[7] · Gerhard Prager[8] · Ricardo V. Cohen[9]

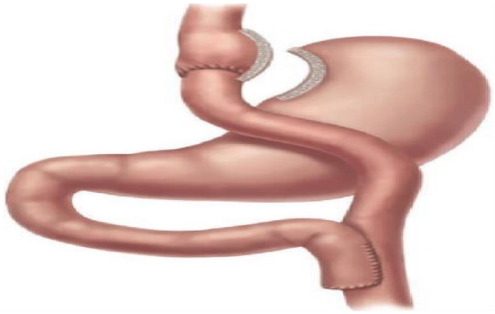


Level 1b



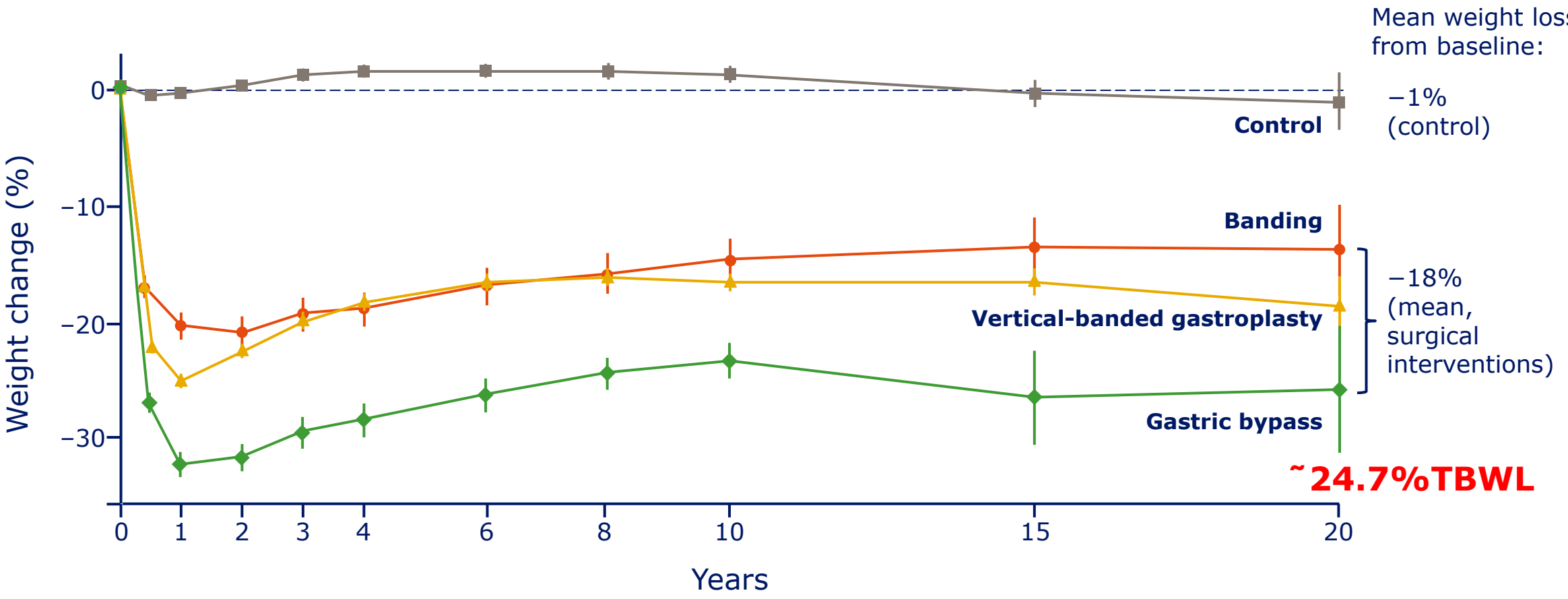


Cohen 2019;Abbudayeh,2024



Metabolic and Bariatric Surgery

Long-term significant WL



Data are mean ±95% confidence interval

Sjöström L *et al. JAMA* 2012;307:56–65

RCTs of metabolic surgery x BMT, at least 2 years of FU, glucocentric outcomes

	Surgical intervention	Follow-up duration, years	Glycaemic target	Proportion reaching glycaemic target (surgical intervention *vs* current medical treatment), %	Total bodyweight loss (surgical intervention *vs* current medical treatment), %
Dixon et al[37]	AGB	2	FPG <126 mg/dL and HbA_{1c} <6·2% (44·3 mmol/mol), without glucose-lowering agents	73% *vs* 13%	20% *vs* 1%
Cohen et al[21]	RYGB	2	HbA_{1c} <6·5% (47·5 mmol/mol), regardless of glucose-lowering agents	71% *vs* 51%	26% *vs* 5%
Simonson et al[38]	RYGB	3	FPG <126 mg/dL and HbA_{1c} <6·5% (47·5 mmol/mol) regardless of glucose-lowering agents	42% *vs* 0%	25% *vs* 5%
Ikramuddin et al[39]	RYGB	5	HbA_{1c} <7% (53·0 mmol/mol), regardless of glucose-lowering agents	55% *vs* 14%	22% *vs* 10%
Courcoulas et al[40]	RYGB *vs* AGB	5	HbA_{1c} <6·5 (47·5 mmol/mol) or FPG <126 mg/dL, without glucose-lowering agents	30% (RYGB) *vs* 19% (AGB) *vs* 0%	25% (RYGB) *vs* 15% (AGB) *vs* 6%
Wentworth et al[41]	AGB	5	FPG <126 mg/dL and 2 h blood glucose concentration <200 mg/dL (75 g glucose oral challenge test)	23% *vs* 9%	12% *vs* 2%
Schauer et al[42]	RYGB *vs* sleeve gastrectomy	5	HbA_{1c} <6% (42·1 mmol/mol), regardless of glucose-lowering agents	29% (RYGB) *vs* 23% (sleeve gastrectomy) *vs* 5%	23% (RYGB) *vs* 19% (sleeve gastrectomy) *vs* 5%
Mingrone et al[43]	RYGB *vs* biliopancreatic diversion	10	FPG <100 mg/dL and HbA_{1c} <6·5% (47·5 mmol/mol), without glucose-lowering agents	25% (RYGB) *vs* 50% (biliopancreatic diversion) *vs* 5%	37% (RYGB) *vs* 42% (biliopancreatic diversion) *vs* 7%

HbA_{1c}=glycated haemoglobin. FPG=fasting plasma glucose. AGB=adjustable gastric banding. RYGB=Roux-en-Y gastric bypass.

Table 1: **Randomised controlled trials with follow-up duration of at least 2 years comparing bariatric surgery with current medical treatment**

Lingvay ….Cohen Lancet 2022

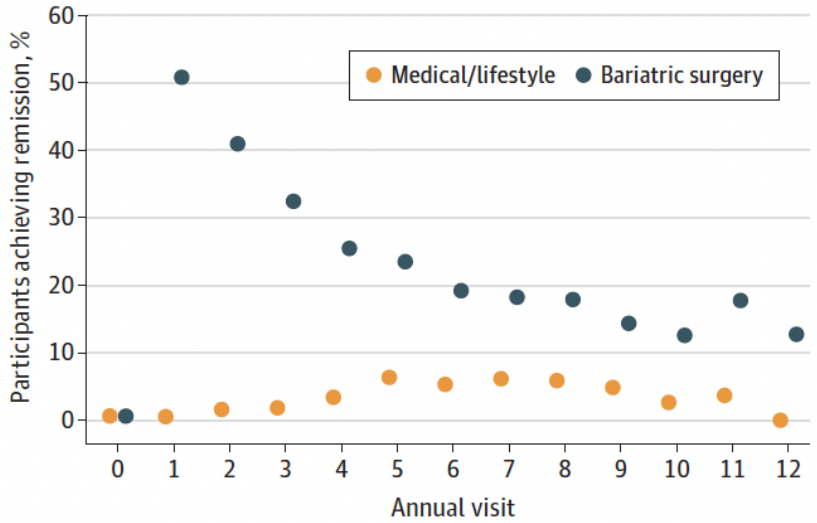
JAMA | Original Investigation

Long-Term Outcomes of Medical Management vs Bariatric Surgery in Type 2 Diabetes

Anita P. Courcoulas, MD; Mary Elizabeth Patti, MD; Bo Hu, PhD; David E. Arterburn, MD; Donald C. Simonson, MD, ScD; William F. Gourash, PhD; John M. Jakicic, PhD; Ashley H. Vernon, MD; Gerald J. Beck, PhD; Philip R. Schauer, MD; Sangeeta R. Kashyap, MD; Ali Aminian, MD; David E. Cummings, MD; John P. Kirwan, PhD

2024

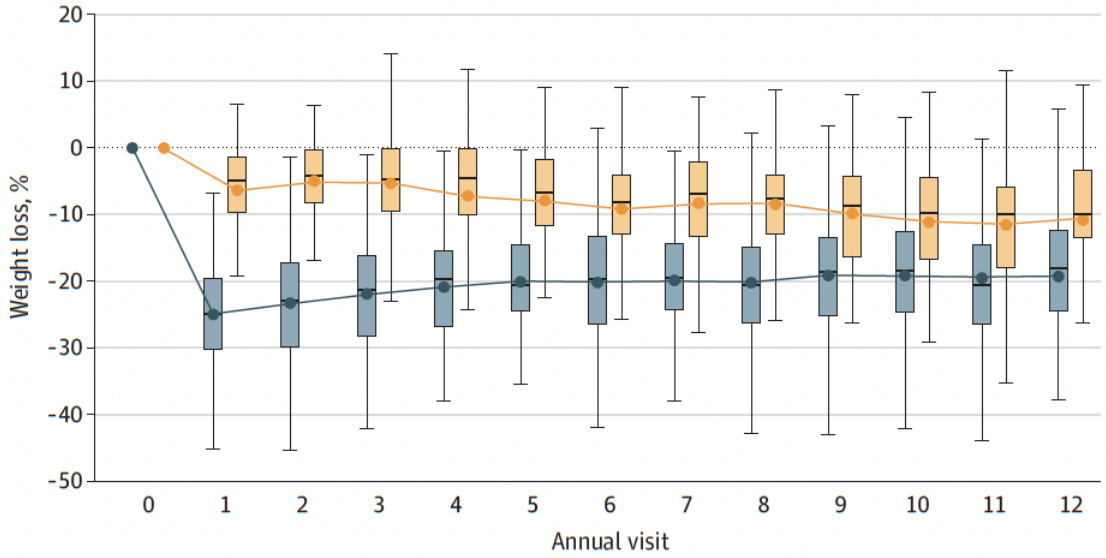
Figure 3. Diabetes Remission



No. of participants													
Medical/lifestyle	96	92	87	82	78	84	76	79	72	70	67	55	31
Bariatric surgery	166	164	151	149	140	146	108	131	116	125	117	99	82

Remission was defined as hemoglobin A_{1c} less than 6.5% and not receiving any medications for diabetes.

C Weight loss



No. at risk													
Bariatric surgery	166	164	161	158	144	149	122	139	121	126	121	106	85
Medical/lifestyle	96	91	84	86	79	78	77	75	73	73	70	60	34

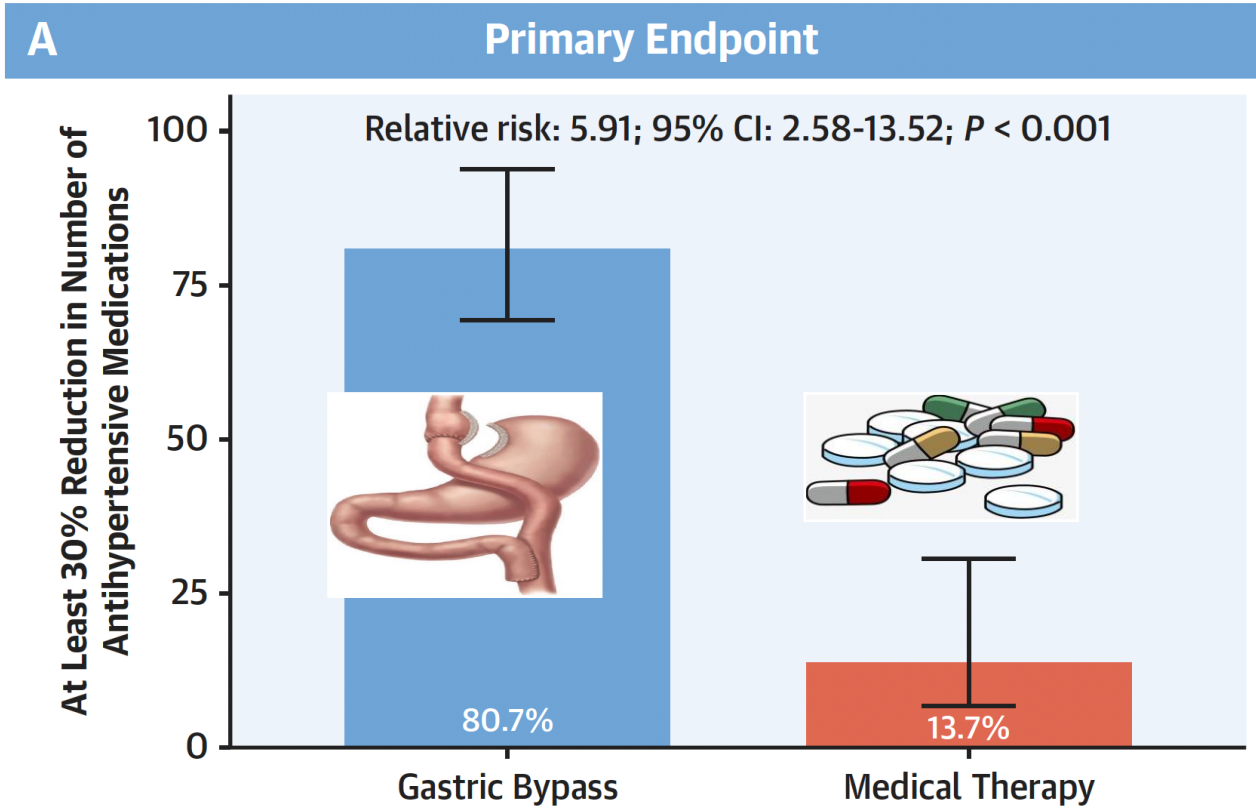
Non- glucocentric endpoints

ORIGINAL RESEARCH

Randomized Trial of Effect of Bariatric Surgery on Blood Pressure After 5 Years

Carlos A. Schiavon, MD,[a,b] Alexandre B. Cavalcanti, MD,[a] Juliana D. Oliveira, CN,[a,b] Rachel H.V. Machado, CN,[a] Eliana V. Santucci, PT,[a] Renato N. Santos, STAT,[a] Julia S. Oliveira, STAT,[a] Lucas P. Damiani, STAT,[a] Débora Junqueira, MD,[a] Helio Halpern, MD,[c] Frederico de L.J. Monteiro, MD,[c] Patricia M. Noujaim, MD,[b] Ricardo V. Cohen, MD,[d] Marcio G. de Sousa, MD,[e] Luiz A. Bortolotto, MD,[f] Otavio Berwanger, MD,[g] Luciano F. Drager, MD[f,h,i]

Primary outcome was at least a 30% reduction in total number of antihypertensive medications



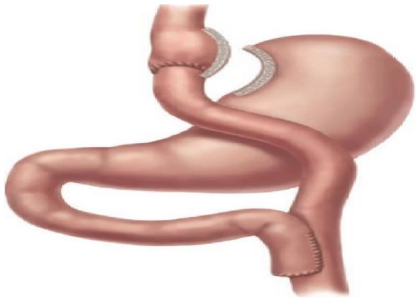
JACC, Feb 2024

MOMS TRIAL

Gastric bypass *versus* best medical treatment for diabetic kidney disease: 5 years follow up of a single-centre open label randomised controlled trial

Ricardo V. Cohen,[a,*] Tiago Veiga Pereira,[b,c] Cristina Mamédio Aboud,[a] Tarissa Beatrice Zanata Petry,[a] José Luis Lopes Correa,[a] Carlos Aurélio Schiavon,[d] Carlos Eduardo Pompílio,[a] Fernando Nogueira Quirino Pechy,[a] Ana Carolina Calmon da Costa Silva,[a] Lívia Porto Cunha da Silveira,[a] Pedro Paulo de Paris Caravatto,[a] Helio Halpern,[a] Frederico de Lima Jacy Monteiro,[a] Bruno da Costa Martins,[a] Rogerio Kuga,[a] Thais Mantovani Sarian Palumbo,[a] Allon N. Friedman,[e] and Carel W. le Roux[f,g]

The Lancet , online Nov 11,2022



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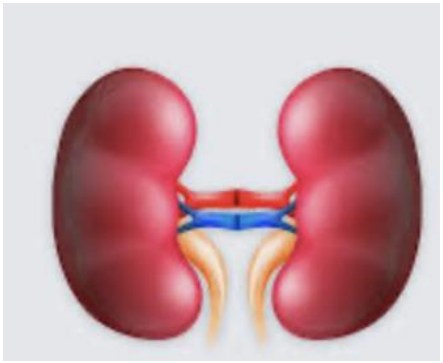


MOMS trial

Endpoints

- **Primary endpoint**

➢uACR<30 mg/g

- Secondary endpoints

➢CKD remission

➢Metabolic control (A1c<6%;FPG<100 mg/dl;LDL<100mg/dl (<70 if CV+);HDL>50; TG<150mg/dl; SBP<130 mmHg ;DBP<80 mmHg

➢Weight-loss

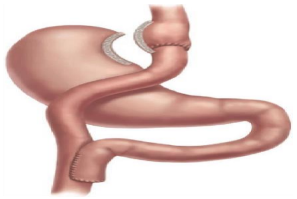
➢Use of T2D medications

➢Neuropathy/Retinopathy

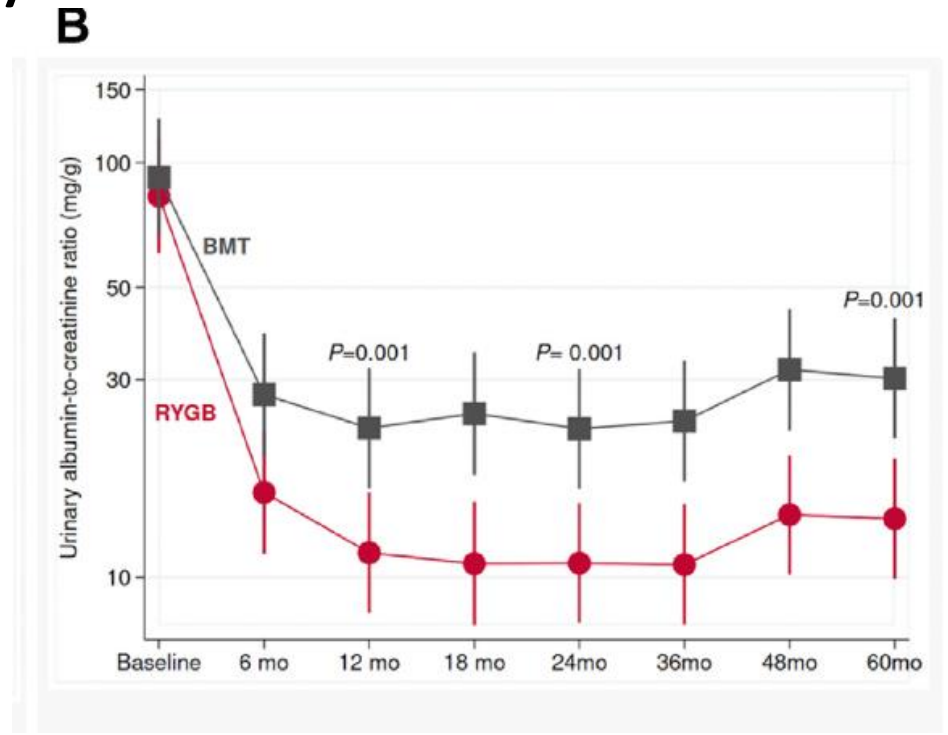
➢QOL

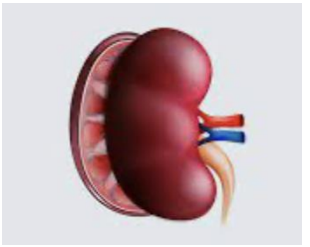
MOMS trial – 5 years outcomes

Primary outcome – uACR- continuous variable

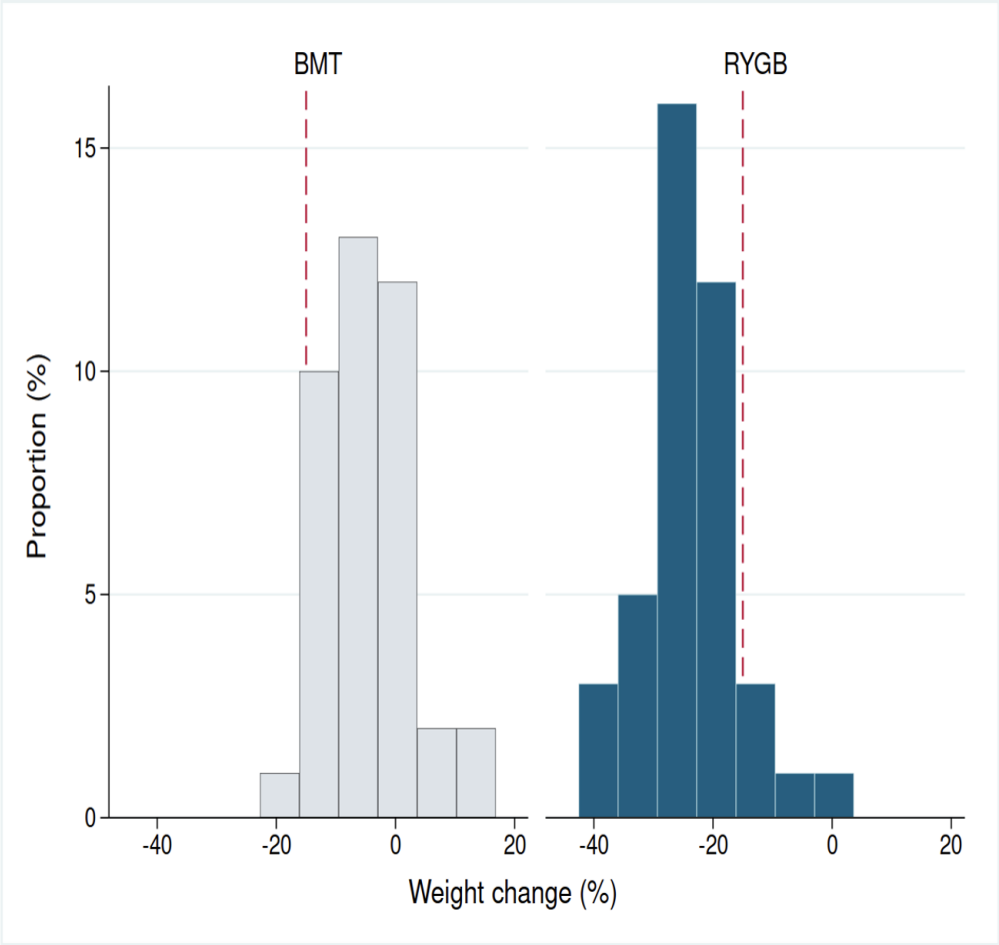


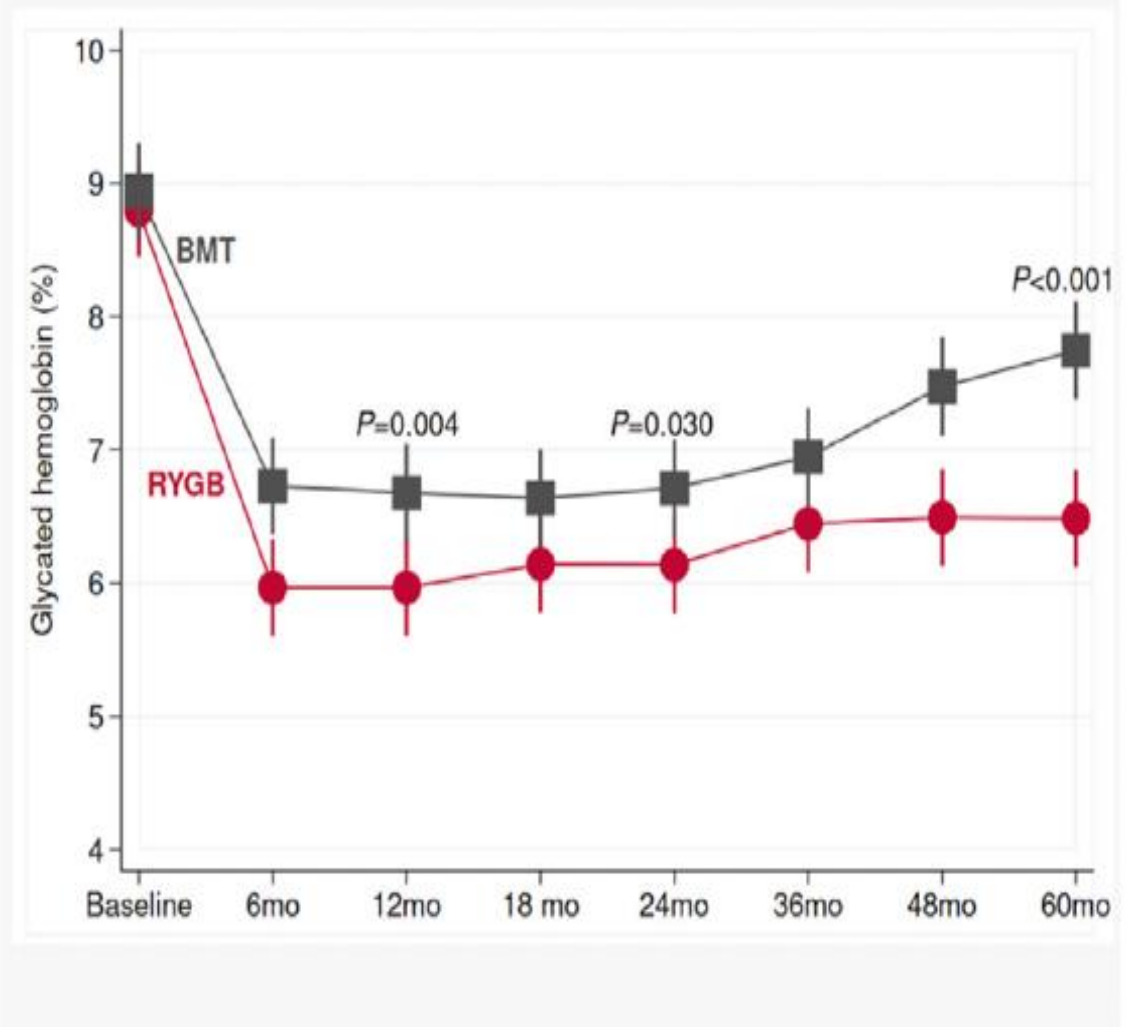
+ BMT





The geometric mean for albuminuria levels was 46% lower after RYGB (P = 0.001)





Only 22.5% BMT achieved >15% TBWL

90% RYGB >15% TBWL

NO BMT pt reached normal BMI

53% after RYGB (P < 0.001)

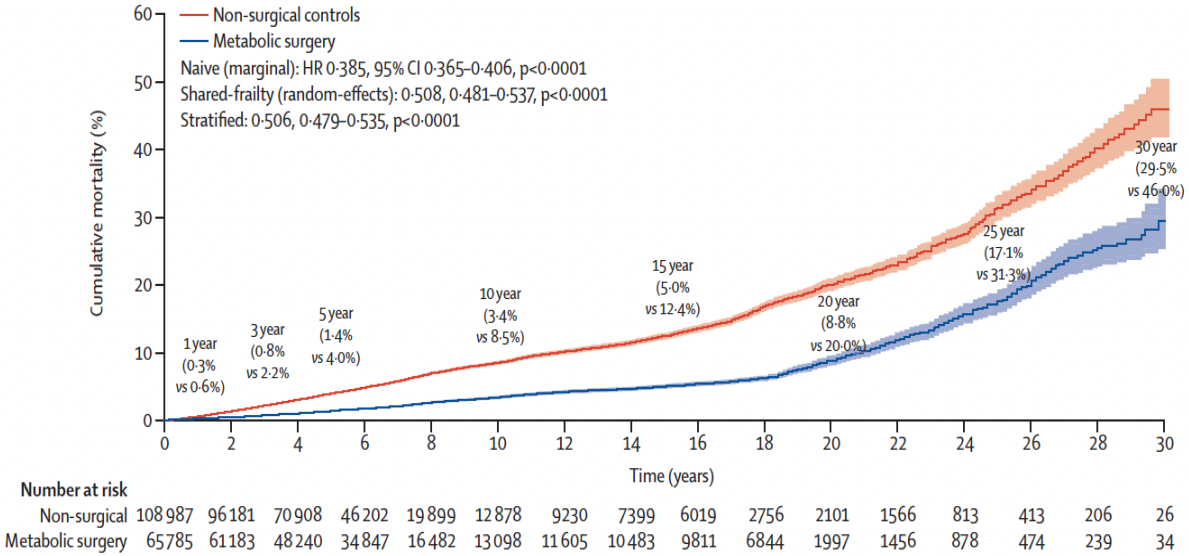
Glycemic control

Cv events and mortality

Association of metabolic–bariatric surgery with long-term survival in adults with and without diabetes: a one-stage meta-analysis of matched cohort and prospective controlled studies with 174 772 participants

Nicholas L Syn, David E Cummings*, Louis Z Wang*, Daryl J Lin*, Joseph J Zhao, Marie Loh, Zong Jie Koh, Claire Alexandra Chew, Ying Ern Loo, Bee Choo Tai, Guowei Kim, Jimmy Bok-Yan So, Lee M Kaplan, John B Dixon, Asim Shabbir*

Lancet, 05/21



Metanalysis

174.772 pts

✓**Reduction of all-cause mortality**

✓Overall ~ 50%

✓Pre-existing T2D ~ 60% reduction

✓No T2D @ baseline ~ 30% reduction

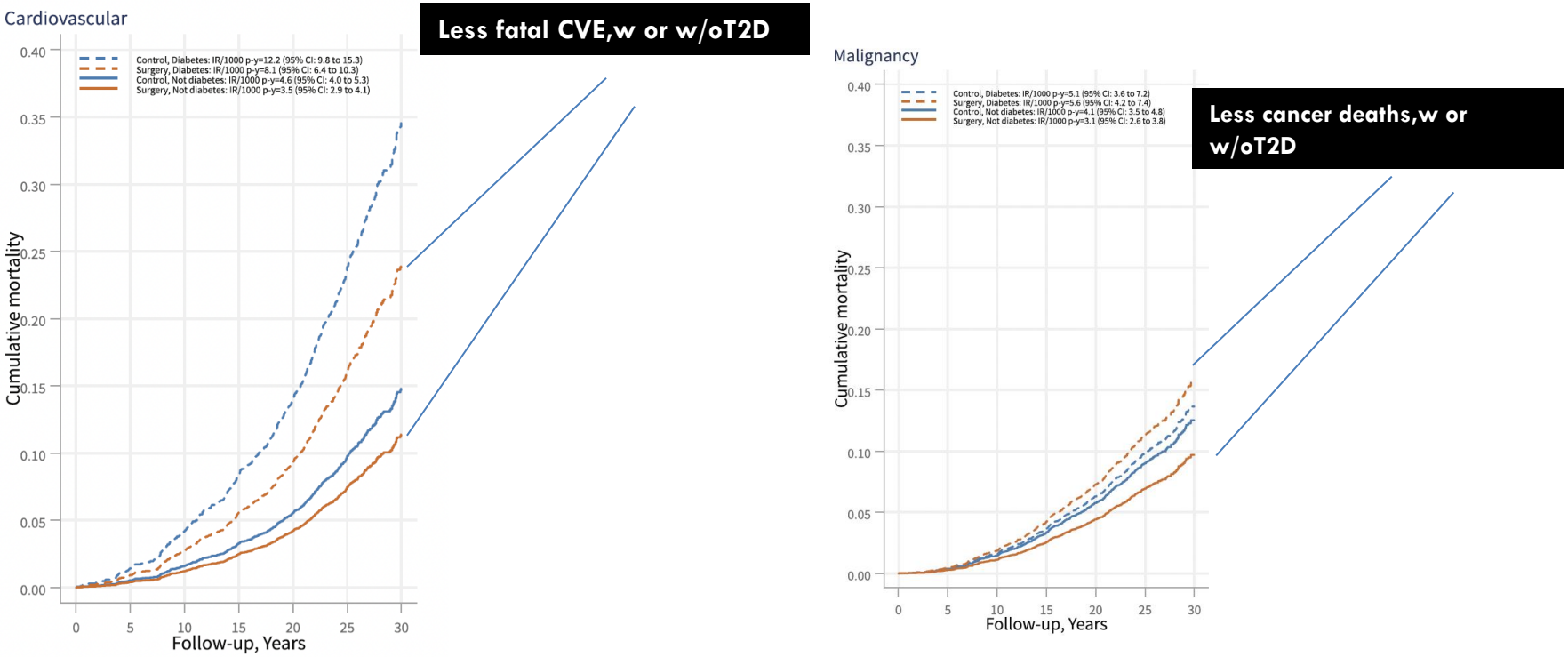
International Journal of Obesity www.nature.com/ijo

Life expectancy after bariatric surgery or usual care in patients with or without baseline type 2 diabetes in Swedish Obese Subjects

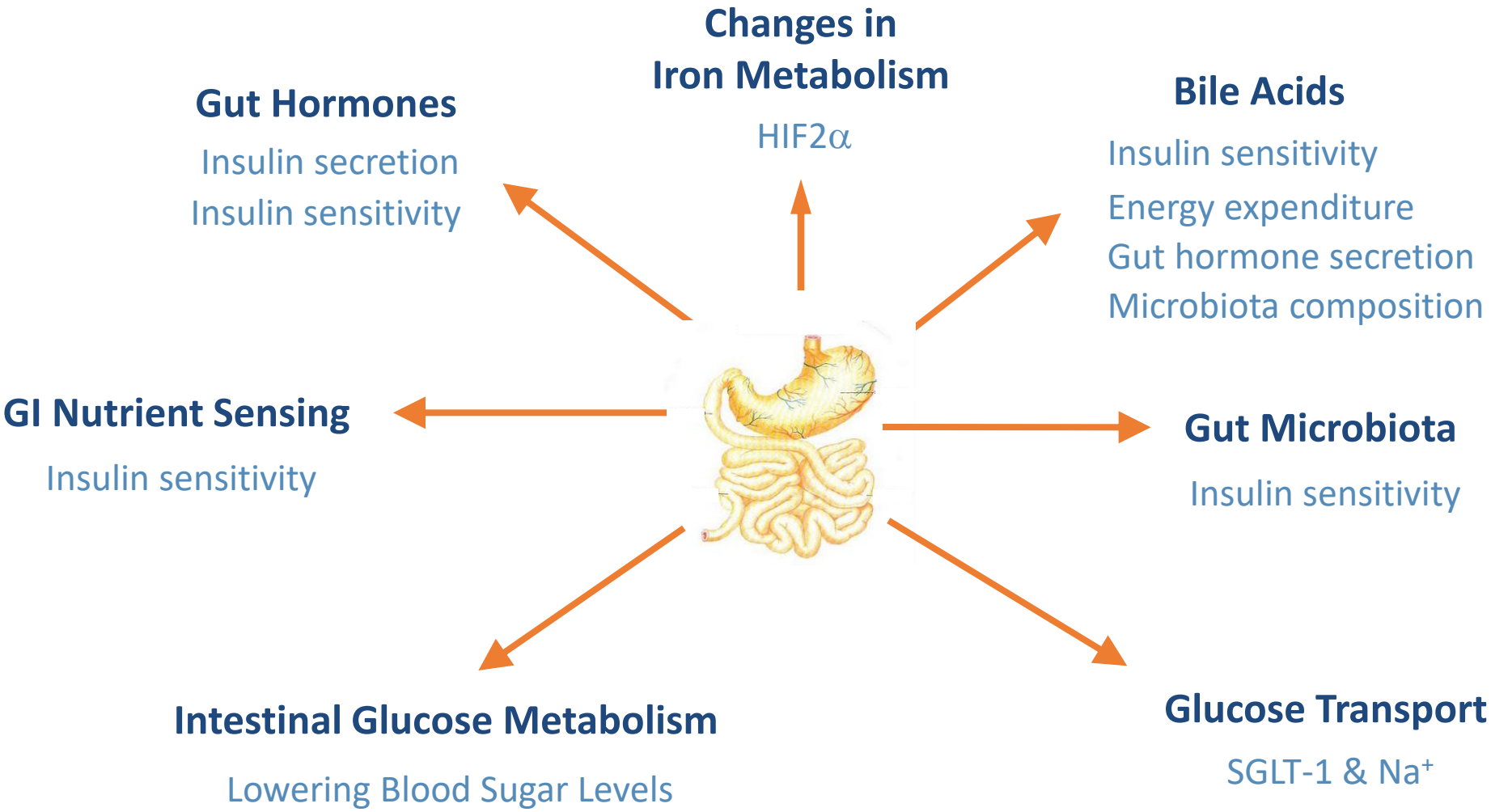
July12,2023

Lena M. S. Carlsson[1], Björn Carlsson[1,2], Peter Jacobson[1], Cecilia Karlsson[1,3], Johanna C. Andersson-Assarsson[1], Felipe M. Kristensson[1,4], Sofie Ahlin[1,5], Per-Arne Svensson[1,6], Magdalena Taube[1], Ingmar Näslund[7], Kristjan Karason[1], Markku Peltonen[8] and Kajsa Sjöholm[1]✉

26 years FU, SOS study



MBS physiological Mechanisms



Complications and mortality continuous decrease

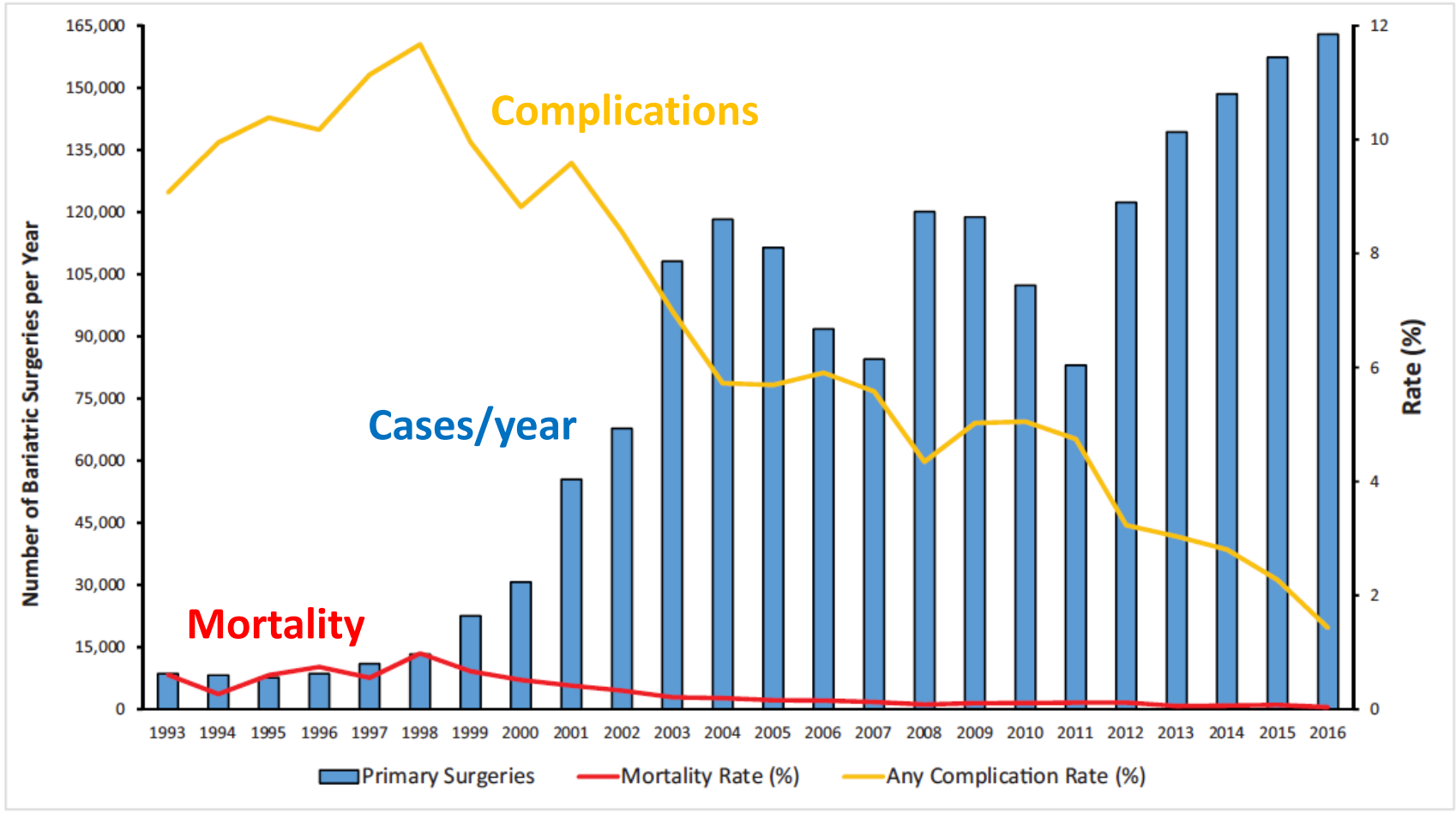


FIGURE 2. Number of inpatient primary bariatric surgery procedures and initial admission complication and mortality rates in the United States from 1993 to 2016.

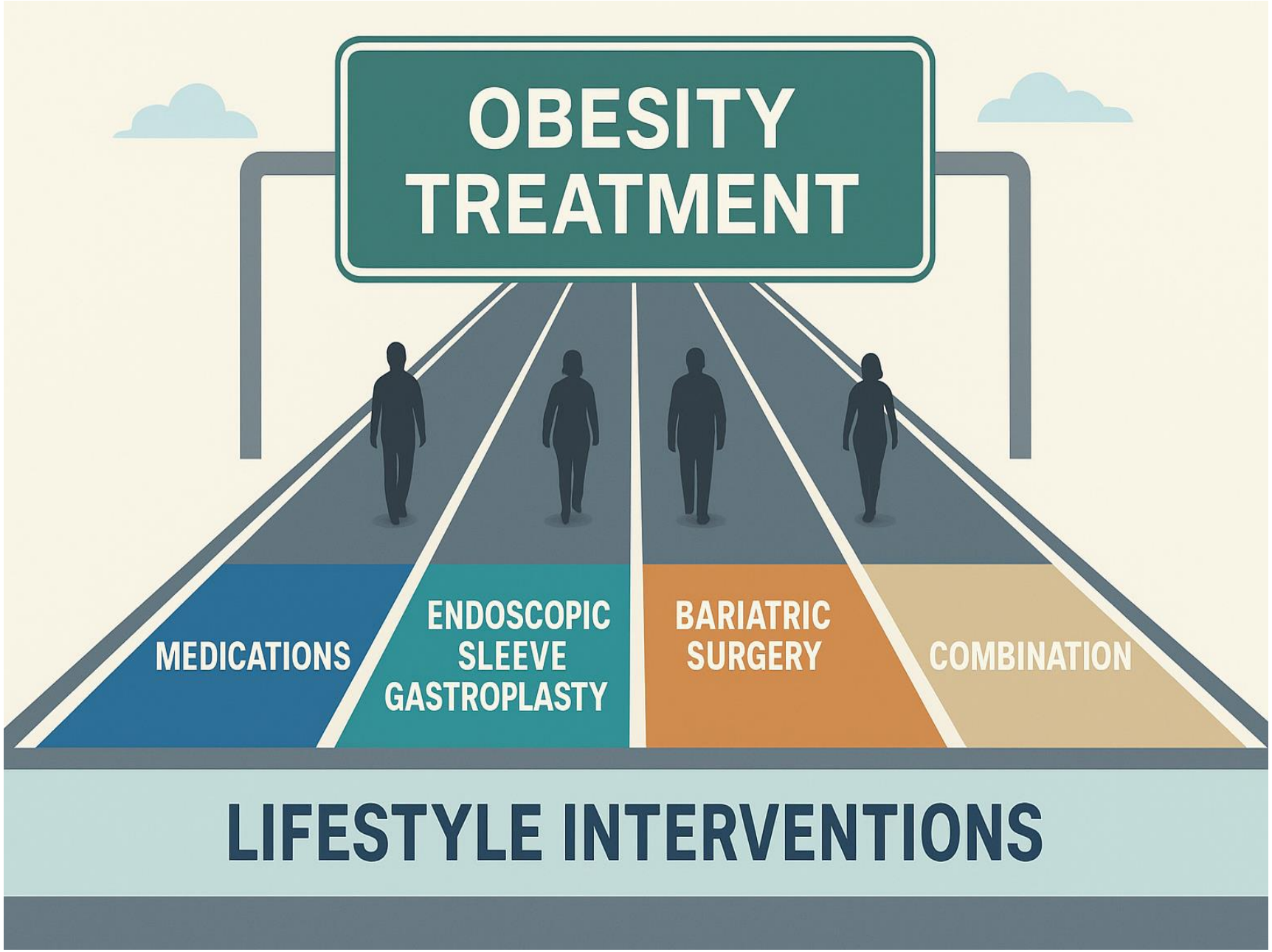
There is no magic bullet for obesity

*Ildiko Lingvay, Priya Sumithran, Carel W le Roux, *Ricardo V Cohen*
ricardo.cohen@haoc.com.br

Lancet DE, July 2023

DECISIONS ARE MORE IMPORTANT THAN INCISIONS

BEST OUTCOMES


OBESITY TREATMENT
MEDICATIONS
ENDOSCOPIC SLEEVE GASTROPLASTY
BARIATRIC SURGERY
COMBINATION
LIFESTYLE INTERVENTIONS

Contents lists available at ScienceDirect

Obesity Pillars

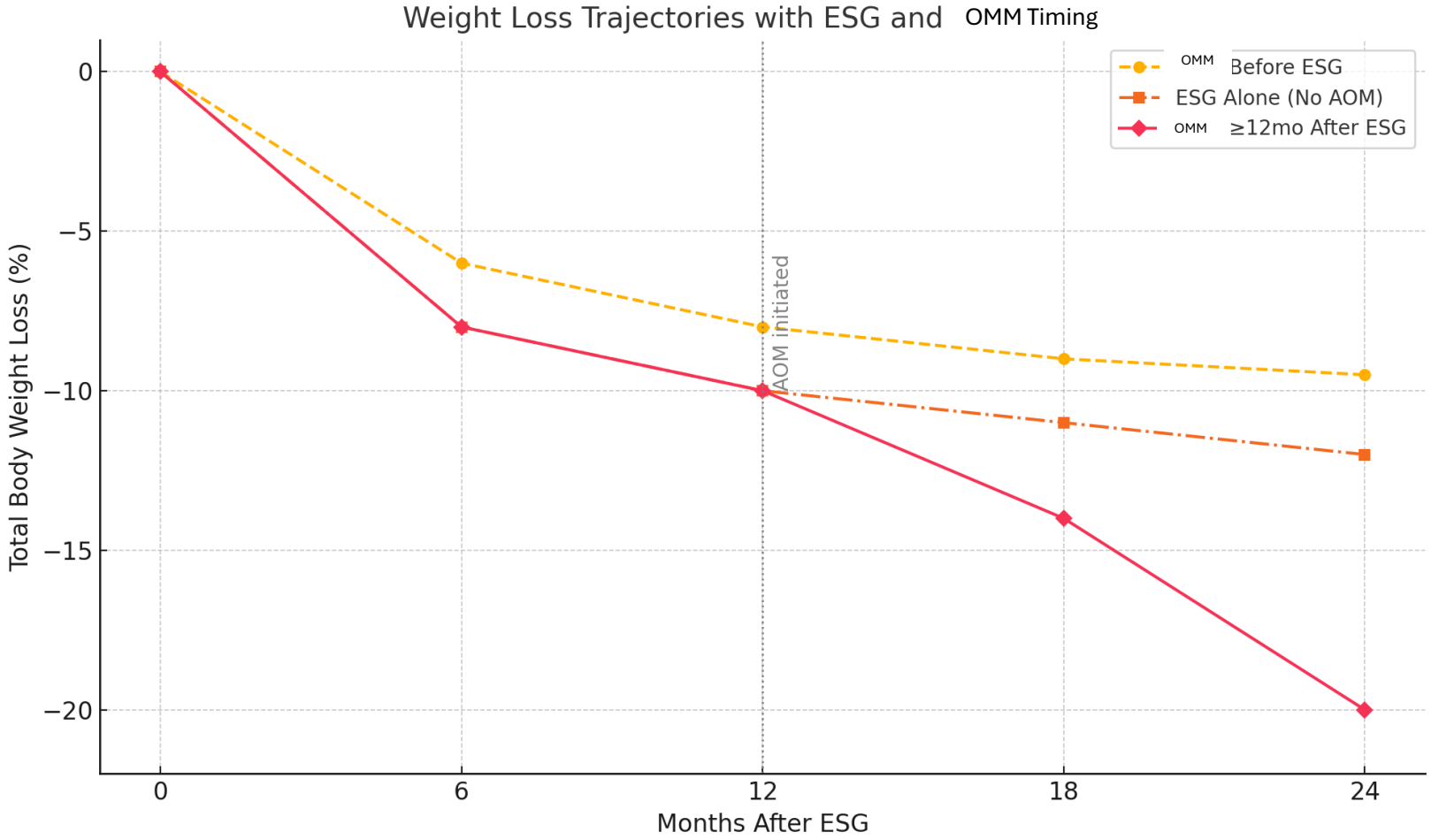
2024

journal homepage: www.journals.elsevier.com/obesity-pillars

Outcomes of concomitant antiobesity medication use with endoscopic sleeve gastroplasty in clinical US settings

Khushboo Gala [a], Wissam Ghusn [a], Vitor Brunaldi [a], Christopher McGowan [b], Reem Z. Sharaiha [c], Daniel Maselli [b], Brandon Vanderwel [d], Prashant Kedia [e], Michael Ujiki [f], Eric Wilson [g], Eric J. Vargas [a], Andrew C. Storm [a], Barham K. Abu Dayyeh [a,*]

70% Sema and Liraglutide
30% other agents, including NB



Obesity Surgery
https://doi.org/10.1007/s11695-020-04934-1

IFSO

BRIEF COMMUNICATION

Check for updates

Bariatric Surgery: There Is a Room for Improvement to Reduce Mortality in Patients with Type 2 Diabetes

Carel W. le Roux [1] · Johan Ottosson [2,3] · Erik Näslund [2,4] · Ricardo V. Cohen [5] · Erik Stenberg [2,3] · Magnus Sundbom [2,6] · Ingmar Näslund [2,3]

Received: 6 July 2020 / Revised: 13 August 2020 / Accepted: 14 August 2020
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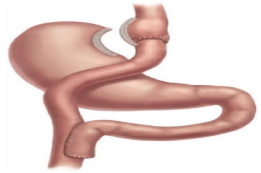
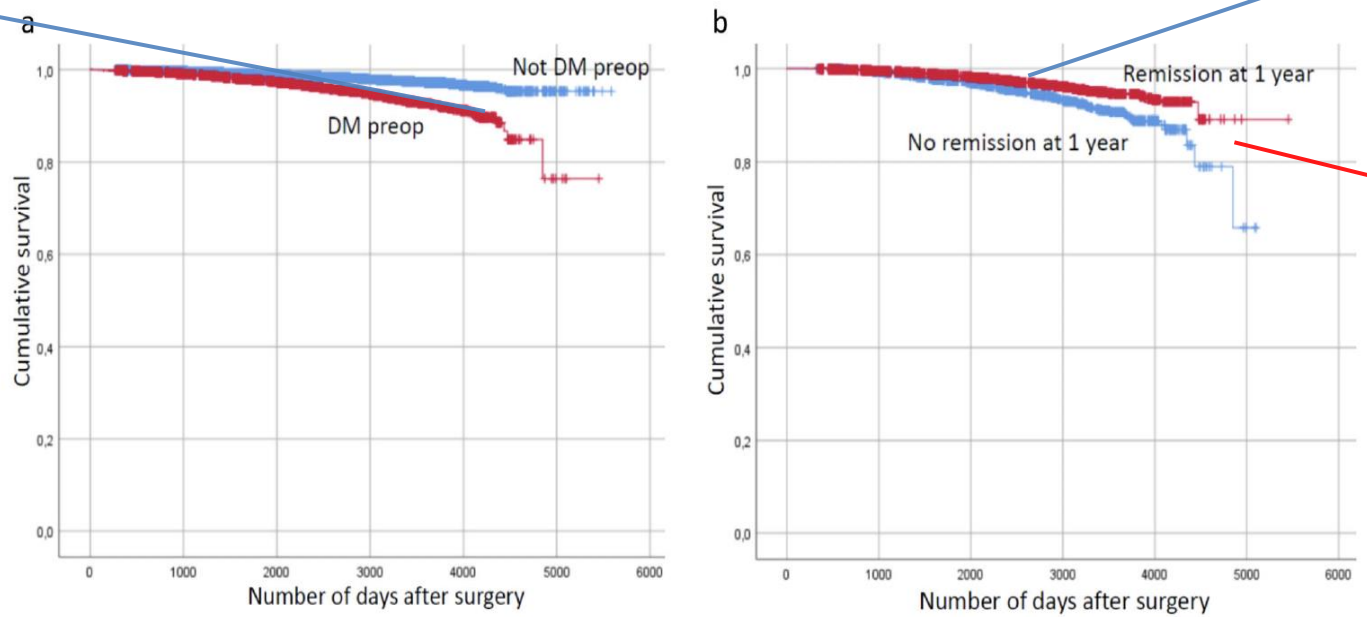


SoReg, Scandinavian Obesity Surgery Registry

65,345 pts up to 10y FU, all after RYGB

RYGB pts with T2D have higher mortality during FU than without T2D

Adjuctive pharmacotherapy



Lower mortality if T2D remission @1y

JAMA | Original Investigation

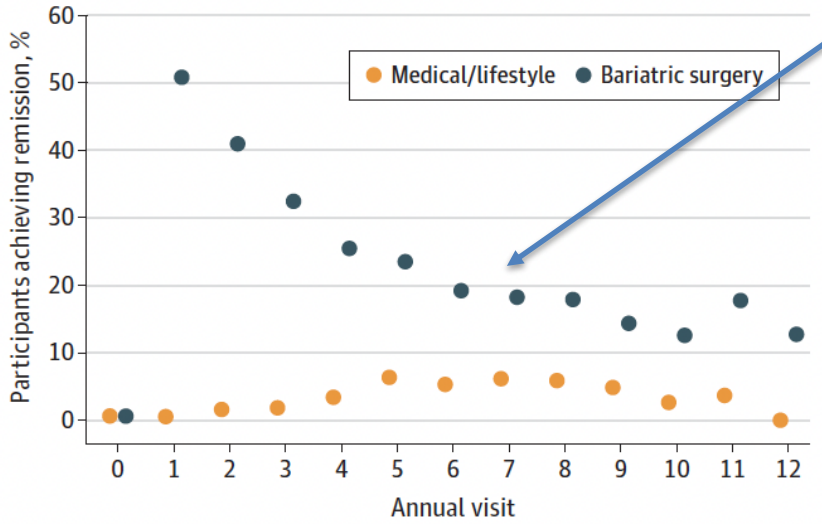
Long-Term Outcomes of Medical Management vs Bariatric Surgery in Type 2 Diabetes

Anita P. Courcoulas, MD; Mary Elizabeth Patti, MD; Bo Hu, PhD; David E. Arterburn, MD; Donald C. Simonson, MD, ScD; William F. Gourash, PhD; John M. Jakicic, PhD; Ashley H. Vernon, MD; Gerald J. Beck, PhD; Philip R. Schauer, MD; Sangeeta R. Kashyap, MD; Ali Aminian, MD; David E. Cummings, MD; John P. Kirwan, PhD

2024

Addition of pharmacotherapy

Figure 3. Diabetes Remission



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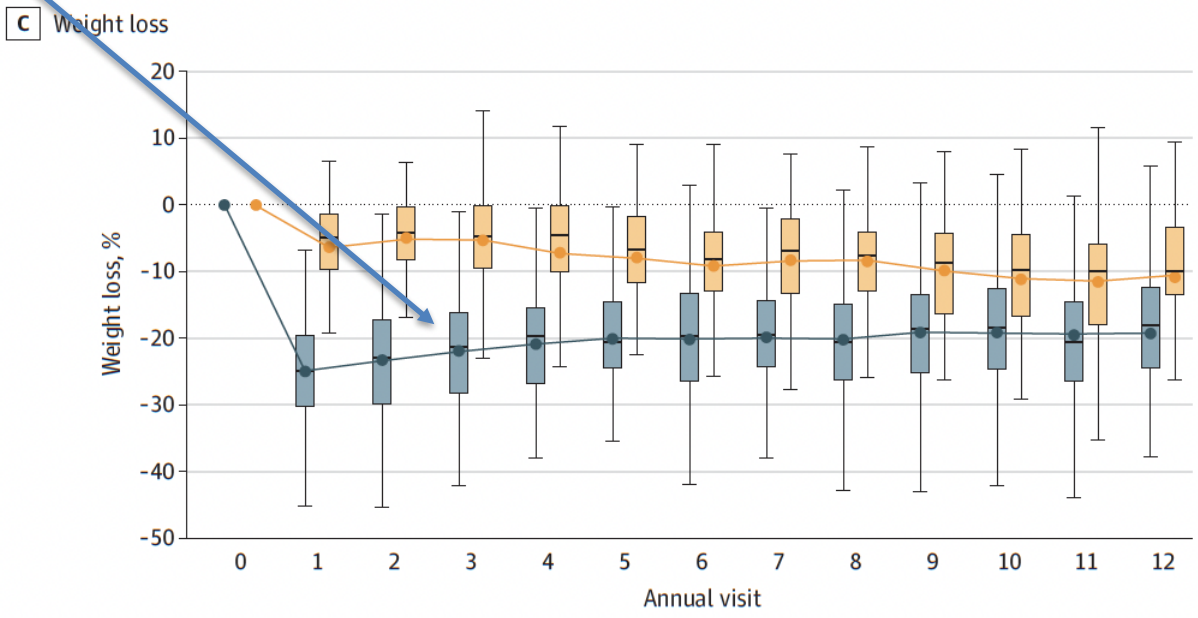

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Remission was defined as hemoglobin A_{1c} less than 6.5% and not receiving any medications for diabetes.

OXFORD

Collaborative Research

BJS, 2024, znae283

https://doi.org/10.1093/bjs/znae283

Collaborative Research Proceedings

International consensus position statement on the role of obesity management medications in the context of metabolic bariatric surgery: expert guideline by the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO)

Ricardo V. Cohen[1,*], Luca Busetto[2], Randy Levinson[3], Carel W. Le Roux[4], Paulina Salminen[5,6] and Gerhard Prager[7] on behalf of the experts of the International Consensus on the Role of Obesity Management Medications in the Context of Metabolic Bariatric Surgery

OMMs before surgery

Controversial data

OMMs before MBS

	Grade	Consensus (%)	Nr.of rounds	Nr.of total votes
There is insufficient high-level evidence to recommend the routine use of OMMs for weight loss before MBS	A+	100	2	37

Cohen RV et al, BJS, 2024

OMMs after MBS

	Grade	Consensus (%)	Nr.of rounds	Nr.of total votes
Emerging evidence indicates that the weight loss induced by OMMs is similar among people who have or have not undergone MBS	A+	100	2	36

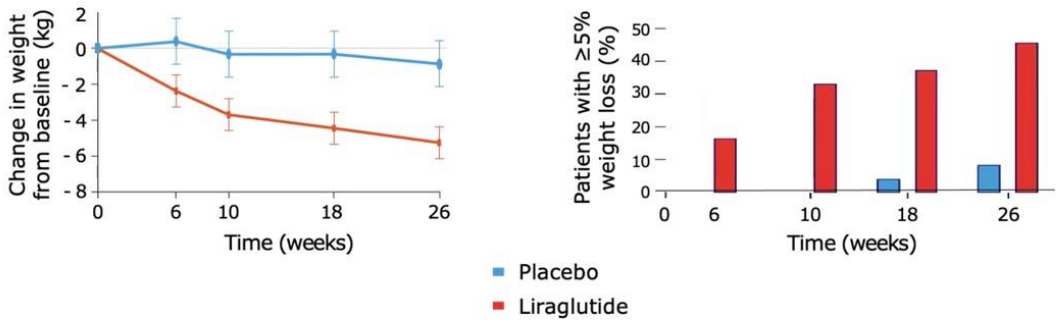
Mok et al, 2023

The BARI-OPTIMISE Randomized Clinical Trial

Postoperative pharmacotherapy augments surgical weight loss

GRAVITAS Study

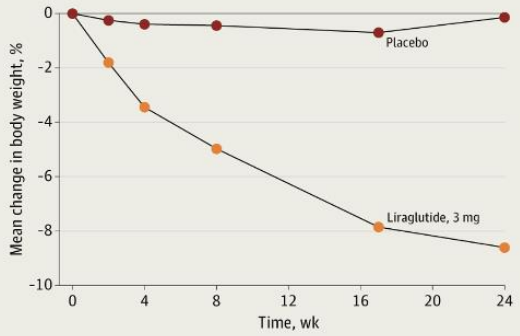
Liraglutide after Gastric Bypass in T2D



Miras AD *et al.*, *Lancet Diabetes Endocrinol* 2019

FINDINGS

Liraglutide, 3.0 mg once daily, resulted in a significantly greater reduction in body weight from baseline to week 24 compared with placebo



Mean difference: -8.0%; 95% CI, -10.4 to -5.7; *P* <.001

Cohen RV et al, BJS, 2024

OMMs after MBS

	Grade	Consensus (%)	Nr.of rounds	Nr.of total votes
When used after MBS, there appears to be no increased incidence of side effects of OMMs compared to non-surgical patients	A	97	3	34

Side Effects Reported with Liraglutide post-MBS in BARI-OPTIMISE compared with SCALE

Adverse Events (AE)[a] in the BARI-OPTIMISE Study Population

Event	Participants who experienced an AE, No. (%)		
	Placebo (n = 35)	Liraglutide (n = 35)	Total (N = 70)
Total	20 (57)	28 (80)	48 (67)
Total AEs, No.[b]	75	37	112
Gastrointestinal events			
Nausea	7 (20)	18 (51)	25 (36)
Diarrhea	2 (6)	2 (6)	4 (6)
Constipation	2 (6)	9 (26)	11 (16)
Vomiting	1 (3)	1 (3)	2 (3)
Abdominal pain	1 (3)	2 (6)	3 (4)
Abdominal bloating	0	1 (3)	1 (1)
Dyspepsia	0	1 (3)	1 (1)

Table 3. Adverse Events and Serious Adverse Events.[a]

Event	Liraglutide (N = 2481)			Placebo (N = 1242)		
	No. of Patients (%)	No. of Events	Event Rate per 100 Exposure-Years	No. of Patients (%)	No. of Events	Event Rate per 100 Exposure-Years
Adverse events in ≥5% of patients	1992 (80.3)	7191	321.8	786 (63.3)	2068	193.7
Nausea	997 (40.2)	1429	63.9	183 (14.7)	223	20.9
Diarrhea	518 (20.9)	754	33.7	115 (9.3)	142	13.3
Constipation	495 (20.0)	593	26.5	108 (8.7)	121	11.3
Vomiting	404 (16.3)	597	26.7	51 (4.1)	62	5.8
Dyspepsia	236 (9.5)	282	12.6	39 (3.1)	44	4.1
Upper abdominal pain	141 (5.7)	171	7.7	43 (3.5)	49	4.6
Abdominal pain	130 (5.2)	163	7.3	43 (3.5)	53	5.0
Nasopharyngitis	427 (17.2)	586	26.2	234 (18.8)	302	28.3
Upper respiratory tract infection	213 (8.6)	247	11.1	122 (9.8)	149	14.0
Sinusitis	128 (5.2)	141	6.3	73 (5.9)	95	8.9
Influenza	144 (5.8)	170	7.6	66 (5.3)	84	7.9
Headache	327 (13.2)	441	19.7	154 (12.4)	220	20.6
Dizziness	167 (6.7)	203	9.1	60 (4.8)	65	6.1
Decreased appetite	267 (10.8)	283	12.7	38 (3.1)	39	3.7
Back pain	171 (6.9)	210	9.4	105 (8.5)	121	11.3
Arthralgia	125 (5.0)	133	6.0	71 (5.7)	80	7.5
Fatigue	185 (7.5)	203	9.1	65 (5.2)	72	6.7
Injection-site hematoma	142 (5.7)	154	6.9	93 (7.5)	101	9.5

Mok et al, JAMA Surg 2023 (BARI-OPTIMSE); SCALE. Pi-Sunyer NEJM 2015

Side Effects Reported with Liraglutide post-MBS: Retrospective study of 117 patients compared to SCALE

TABLE 2 Side effects for liraglutide 3.0 mg

Symptom	n (%)[a]
Nausea	34 (29.1%)
Constipation	13 (11.1%)
Diarrhoea	8 (6.8%)
Fatigue	7 (6.0%)
Headache	4 (3.4%)
Rash	4 (3.4%)
Indigestion	3 (2.6%)
Vomiting	3 (2.6%)
Dry mouth	3 (2.6%)
Bloating	2 (1.7%)
Sweating	2 (1.7%)
Other[b]	9 (7.7%)

[a]Percent calculated as [(number of patients reporting the side effect)/117] × 100.
[b]Other includes abdominal pain (n = 1), bruising (n = 1), decreased glomerular filtration rate (n = 1), depression (n = 1), flu-like symptoms (n = 1), heartburn (n = 1), hot flashes (n = 1), gas (n = 1) and pancreatitis (n = 1).

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Wharton S, et. al. Clinical Obesity. 2019;9:e12323; SCALE. Pi-Sunyer NEJM 2015

Cohen RV et al, BJS, 2024

Bariatric Surgery

Real world efficacy of naltrexone/bupropion for weight management in obesity and after bariatric surgery

Sept 2025

Marie Yskout[1], Nele Steenackers[2,3], Jarne Hoste[4], Sofia Pazmino[2], Caroline Simoens[2], Nele Mattelaer[2], Ellen Deleus[2,5], Matthias Lannoo[2,5], Ann Mertens[1,2], Bart Van der Schueren[1,2] and Roman Vangoitsenhoven[1,2] ✉

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International Journal of Obesity

111 surgery-naive patients (72.5%)

40 post-MBS patients (26.1%)

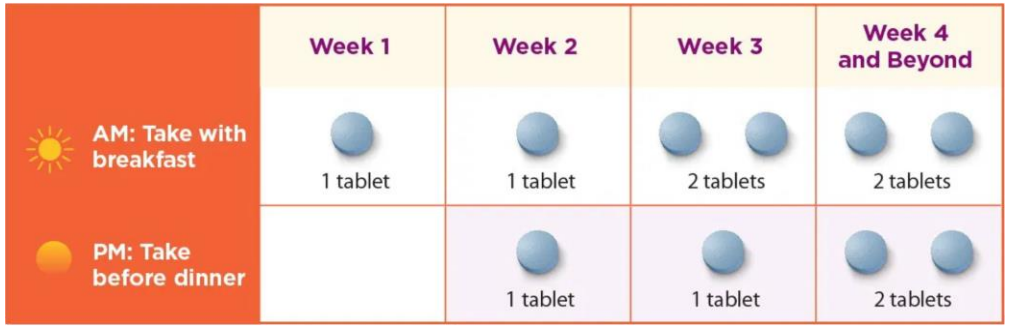
Study Overview

Predominantly female (77.5% surgery-naive, 75.0% post-MBS)

Median age: 45.0 years (surgery-naive), 51.5 years (post-MBS)

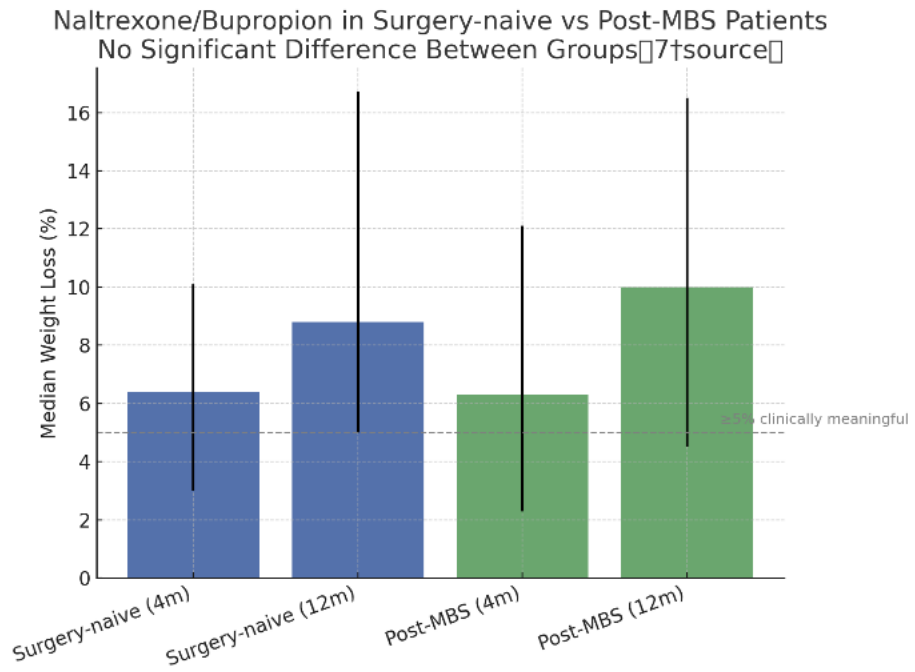
Treatment Protocol & Dosing

- **Starting dose:** 8mg naltrexone/90mg bupropion daily (one tablet)
- **Target dose:** 32mg naltrexone/360mg bupropion daily (two tablets twice daily)
- **Escalation:** Weekly increases per manufacturer protocol
- **Flexibility:** Submaximal doses allowed for:
  - Adverse effects management
  - Sufficient therapeutic response

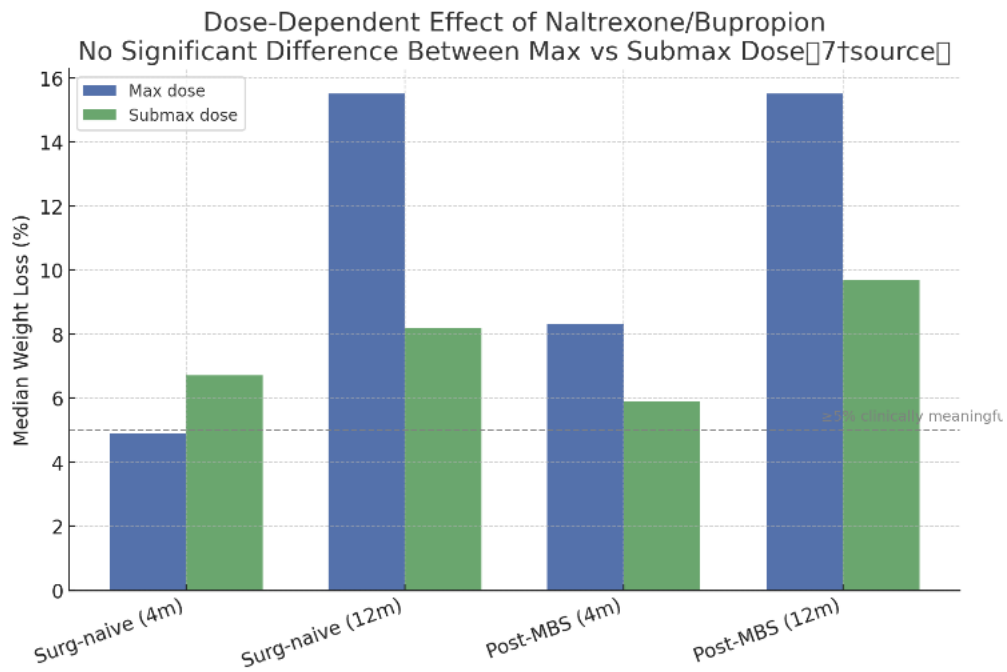


Follow-up visits were scheduled at 4 and 12 months after treatment initiation

Naltrexone/Bupropion in Surgery-naive vs Post-MBS Patients...



Dose-Dependent Effect of Naltrexone/Bupropion...

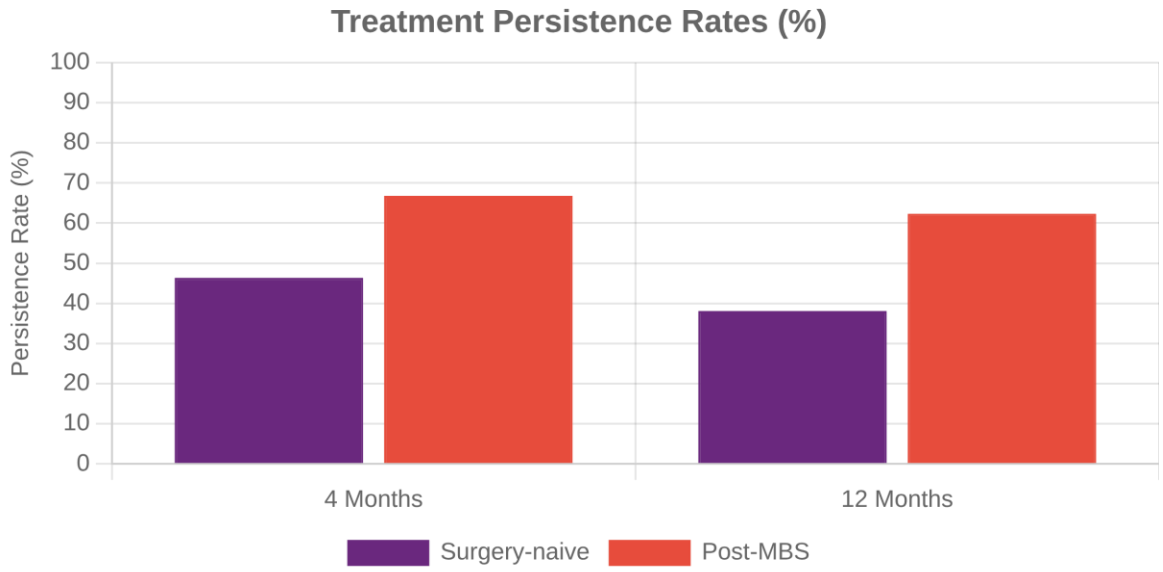


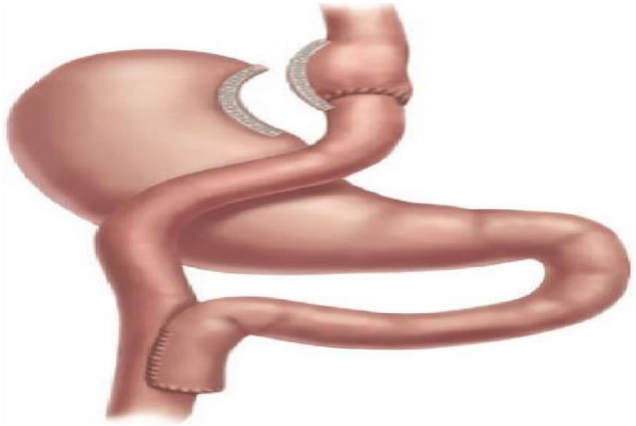
No dose-dependent effect

- **Sufficient Subjective Effect** (Primary reason)

Surgery-naive: **62.1%** Post-MBS: **63.6%**

Treatment Persistence Rates





- **4-Month Persistence:**

  Surgery-naive: 46.9% (52/111 patients)

  Post-MBS: 67.5% (27/40 patients)

- **12-Month Persistence:**

  Surgery-naive: 38.5% (20/52 patients)

  Post-MBS: 63.0% (17/27 patients)

Key Finding:

Post-MBS patients showed significantly higher treatment persistence rates at both time points

OMMs **after** MBS

When to start

	Grade	Consensus (%)	Nr.of rounds	Nr.of total votes
Treatments with OMMs after MBS should generally be withheld until the achievement of weight plateau unless there is a compelling clinical need for earlier initiation	A+	100	3	33

Disclosing the effects of MBS before the introduction of OMMs

Cohen RV et al, BJS, 2024

OMMs after MBS (OMMs or revisional surgery)

	Grade	Consensus (%)	Nr.of rounds	Nr.of total votes
For patients with recurrent weight gain, treatment with available OMMs should be considered prior to revisional surgery.	A	92	1	38

- ✓ Revisional MBS = higher morbidity, no robust data on outcomes
- ✓ Excellent safety profile and efficacy of OMMs

Cohen RV et al, BJS, 2024

Obesity Surgery (2024) 34:1917–1928
https://doi.org/10.1007/s11695-024-07206-4

REVIEW

Medium and Long-Term Weight Loss After Revisional Bariatric Surgery: A Systematic Review and Meta-Analysis

Eduardo L. S. Bastos[1] · Wilson Salgado Jr.[2] · Anna C. B. Dantas[3] · Tiago R. Onzi[4] · Lyz B. Silva[5] · Álvaro Albano[6] · Luca S. Tristão[7] · Clara L. dos Santos[7] · Antonio Silvinato[8] · Wanderley M. Bernardo[9] · For the Scientific Committee of the Brazilian Society of Bariatric and Metabolic Surgery (SBCBM)

Table 2 Analysis of the quality of evidence (GRADE) in relation to the overall rate of occurrence of the assessed outcomes

Certainty assessment								Patients (n	Certainty of evidence
Outcome	Studies (n)	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Others considerations		
BMI	23	Observational	NS	VS ($I^2 > 75$)	NS	NS	None	1,602	⨁◯◯◯ Very low
%EWL	18	Observational	NS	VS ($I^2 > 75$)	NS	NS	Publication Bias Strongly Suspected	1,031	⨁◯◯◯ Very low
%EBMIL	7	Observational	NS	VS ($I^2 > 75$)	NS	NS	None	350	⨁◯◯◯ Very low
%TWL	16	Observational	NS	VS ($I^2 > 75$)	NS	NS	None	888	⨁◯◯◯ Very low

NS, not serious; *VS*, very serious

OMMs after MBS

	Grade	Consensus (%)	Nr.of rounds	Nr.of total votes
Future research is needed to identify predictors of which patients are likely to derive substantial benefit from combined pharmaco-surgical therapy for obesity and its complications	A+	100	3	35

- ✓ Precision Medicine
- ✓ Phenotyping persons with obesity

Precision medicine in obesity treatment

GENES

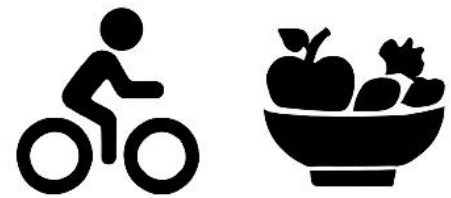
Contain genetic code for diseases with likelihoo of development

PHENOTYPE

Result of expression of organism's genes, and potential interiac- tion between two

LIFESTYLE I ENVIRONMENT

External factors, such as diet, exercise and medications as well as where we live influence our metabicm



HUNGRY BRAIN

Satiation

More calories consumed per meal

40% of patients

Tx
phentemine/topiramate

HUNGRY GUT

Satiety

Hunger quickly returns after a meal

18% of patients

Tx
GLP1 analague

EMOTIONAL HUNGER

Emotion/reward

Eating to cope with positive and neg emions

30% of patients

CONTRAVE
(naitrexone/buproprian ER)

SLOW BURNING

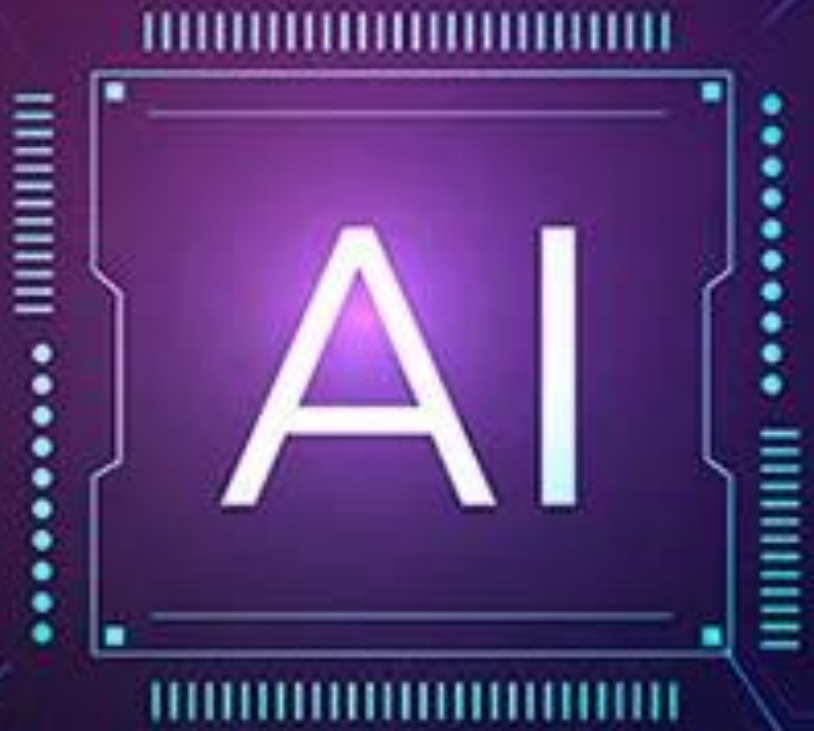
Energy expenditure

Low resting metabolic rate

12% of patients

Phentermine and increased resistance training

Personalized Treatment Selection



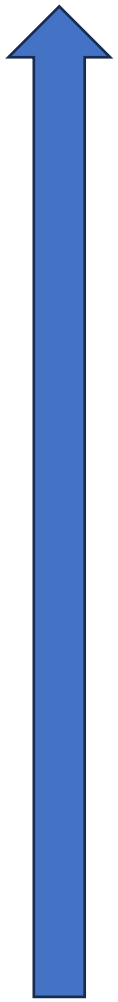
AI Analyzes medical history, exams and past treatments to recommend which patients will respond best to surgery, pharmacotherapy, combined strategies and which OMM

AI Clinical Risk Stratification and phenotyping

Obesity treatment TODAY

Oncology model
What would an oncologist do ?

Access to full spectrum of therapy



Most invasive

Least invasive

Reoperative therapy

Adjuvant therapy

Surgical treatment

Combination therapy, when needed

Neoadjuvant therapy

ESG in selected pts

Adapted from Lingvay I , Cohen RV, Lancet 2024


Thank You
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X= @rvcohen

Disclosures

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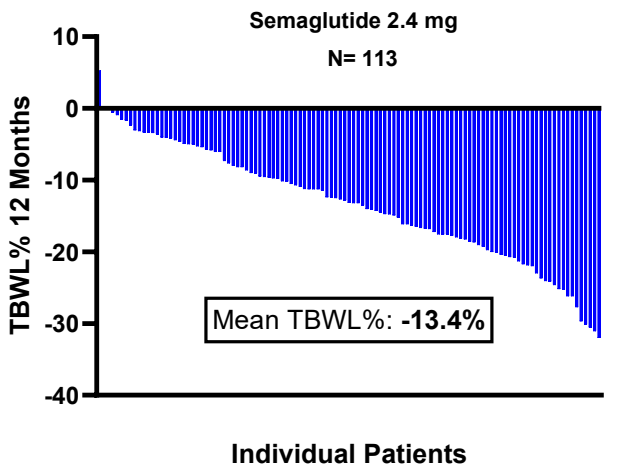
Obstacles In the obesity pandemic

HETEROGENEOUS OUTCOMES[1]



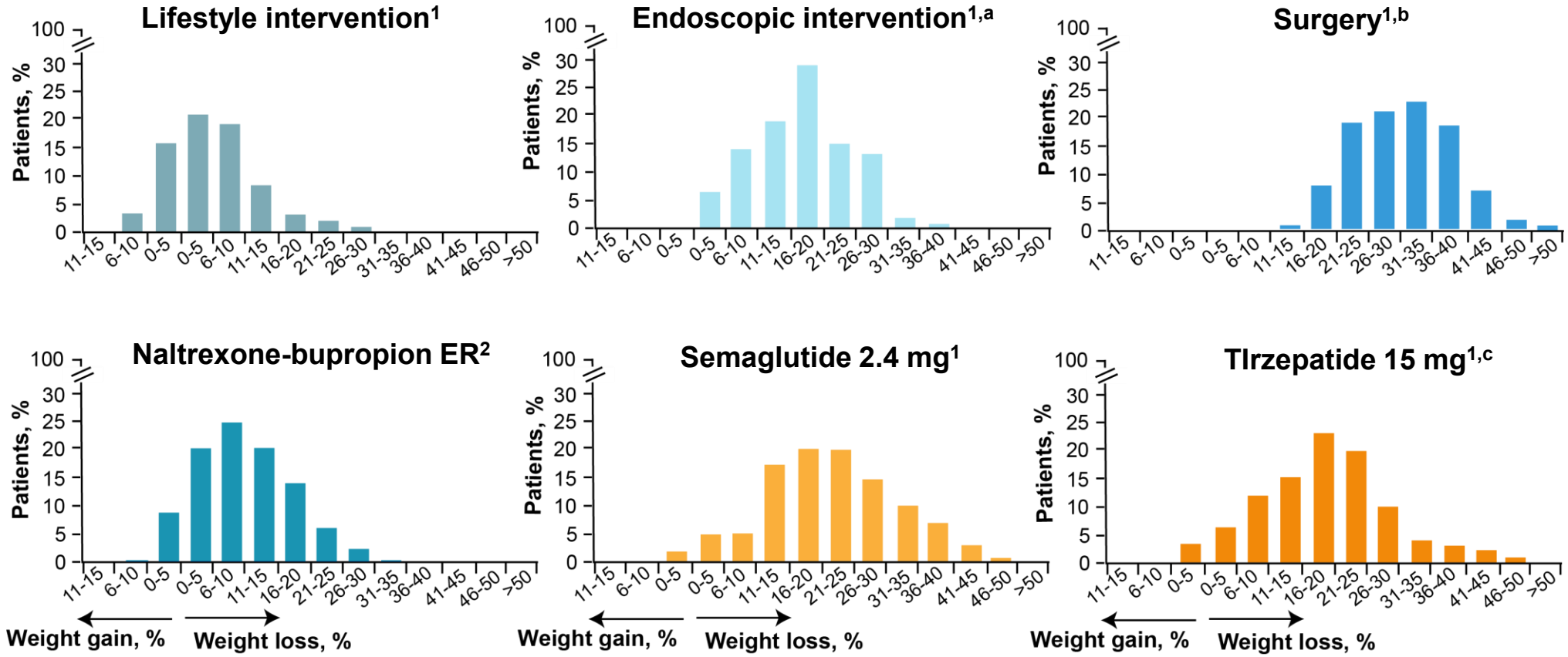
HIGH COST[2]

LIMITED PATIENT ACCESS[3]

1. Modified from Abu Dayyeh BK et al. *Lancet.* 2022;400(10350:441-451. **2.** Trujillo JM et al. *Ther Adv Endocrinol Metab*. 2021;12:2042018821997320. **3.** Ard J et al. *Adv Ther*. 2021;38(6):2821-2839.

Heterogeneity of response to weight loss interventions

Heterogeneity in weight loss response after approximately 12 months[1,2]



Only treatments for which 1-year data were available have been included. To enable comparison between different treatment modalities, percentage changes for total bodyweight are presented, as placebo-subtracted data are not usually reported in studies of lifestyle interventions and bariatric surgery. [a]For endoscopic intervention, mean results for intragastric balloon and endoscopic gastroplasty are shown for which data were available. [b]For surgery, mean results for sleeve gastrectomy and Roux-en-Y gastric bypass have been given as they account for 95% of all bariatric surgeries worldwide. [c]For tirzepatide, since published data reached only 25% weight loss or more, the proportion of participants obtaining higher weight losses has been presumptively assigned following the unimodal distribution observed for other anti-obesity medications.

1. Perdomo CM et al. *Lancet.* 2023;401:1116-1130. **2.** Data on file. Currax Pharmaceuticals LLC.

Overview of AOMs approved for long-term use

Orlistat[1]

120 mg TID
with meals (Rx)

60 mg TID
with meals (OTC)

Most common AEs[b]
- Oily spotting
- Flatus with discharge
- Fecal urgency or incontinence
- Fatty/oily stool
- Oily evacuation

Other considerations
- Drug interactions
- Decreased vitamin absorption
- Oxalate nephrolithiasis

Phentermine-topiramate ER[2,a]

7.5 mg/46 mg once daily
15 mg/92 mg once daily

Most common AEs[b]
- Paresthesia
- Dizziness
- Insomnia
- Dry mouth

Other considerations
- Controlled substance
- Known teratogenesis

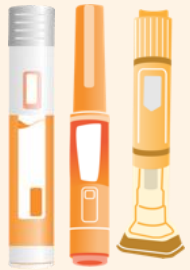
Naltrexone-bupropion ER[3]

16/180 mg BID

Most common AEs[b]
- GI AEs
- Headache
- Dizziness
- Dry mouth
- Insomnia

Other considerations
- Contraindicated in seizure disorders and uncontrolled hypertension

Incretin mimetics[4-7]



Liraglutide
3 mg QD

Semaglutide
2.4 mg weekly

Tirzepatide
5-15 mg weekly

Most common AEs[b]
- GI AEs
- Headache
- Fatigue
- Injection site reactions

Other considerations
- Risk for pancreatitis
- Risk for hypoglycemia
- Risk for greater LBM loss?

[a]Other sympathomimetic amines approved for the short-term management of obesity in the US include phendimetrazine, benzphetamine, and diethylpropion.
[b]Most frequent AEs as listed in the respective product prescribing information.
AE, adverse event; AOM, antiobesity medication; GI, gastrointestinal; LBM, lean body mass.
1. Orlistat. Prescribing information. H2-Pharma LLC; 2022. **2.** Qsymia. Prescribing information. Vivus LLC: 2024. **3.** CONTRAVE® [prescribing information]. Nalpropion Pharmaceuticals LLC.; 2024. **4.** Saxenda® Prescribing information. Novo Nordisk; 2024. **6.** Wegovy® Prescribing information. Novo Nordisk; 2024. **6.** Sargeant JA et al. *Endocrinol Metab.* 2019;34:247-262. **7.** Zepbound™ Prescribing information. Eli Lilly and Company; 2024.

Considerations for AOM selection

Orlistat[1,2]

Ideal use case

Patient who is not worried about GI adverse effects or is adhering to a very low fat diet[a]

Special benefits

- OTC formulation available
- Lower OOP costs for patients without coverage

ER phentermine/ topiramate[1,2]

Ideal use case

Patient with no CVD history, with history of migraine headache and no uncontrolled hypertension or risk of becoming pregnant

Special benefits

- Migraine prophylaxis
- Lower OOP costs for patients without coverage

Naltrexone-bupropion ER[1,2]

Ideal use case

Patient with depression, tobacco use disorder, alcohol use disorder[b], and no uncontrolled hypertension

Special benefits

- Depression
- Tobacco cessation
- Lower OOP costs for patients without coverage

Incretin mimetics[1,2]

Ideal use case

Patient with >15% weight loss clinically indicated, with CV complications, prior MI, OSA, and/or diabetes

Special benefits

- T2D
- Substantial weight loss
- OSA

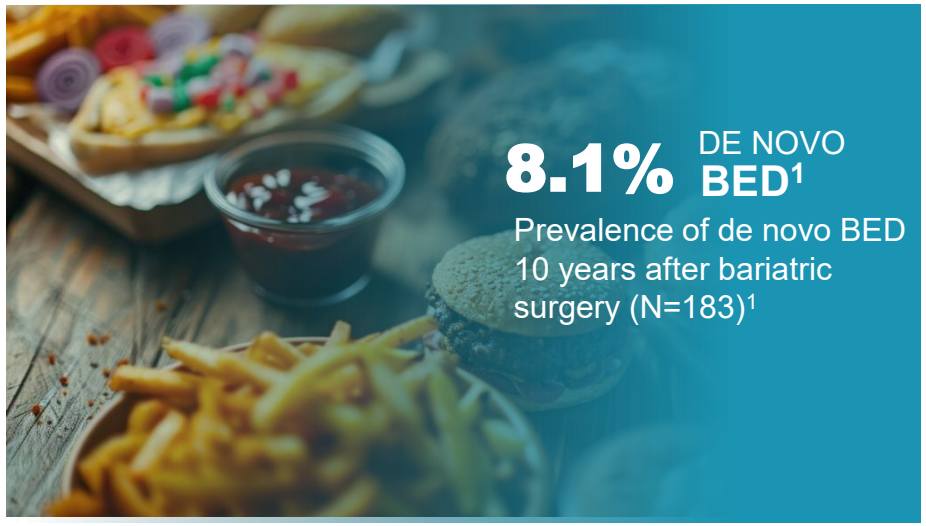
CV, cardiovascular; GI, gastrointesitnal; OOP, out-of-pocket; OSA, obstructive sleep apnea; T2D, type 2 diabetes.

[a]Also recommended to prescribe a daily multivitamin with orlistat owing to resulting malabsorption of fat soluble vitamins.

[b]ER naltrexone-bupropion contraindicated in persons undergoing abrupt discontinuation of alcohol. Monitor for mood or behavioral changes.

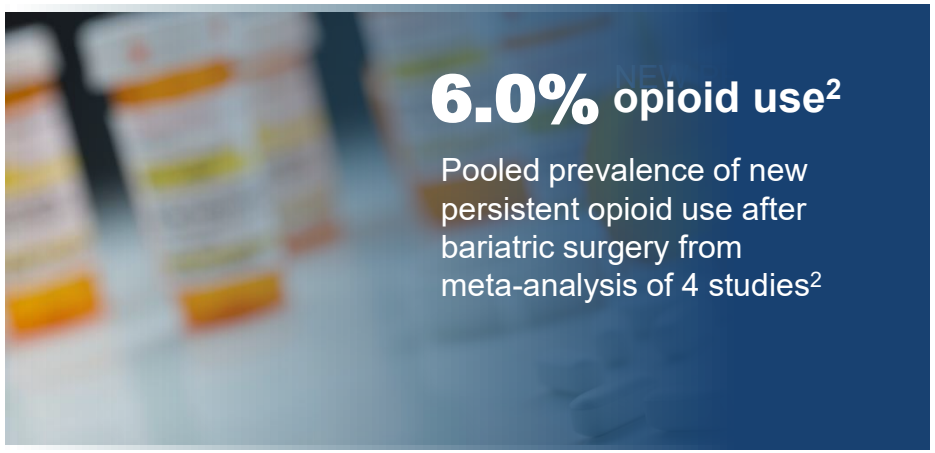
1.Lewis KH et al. *BMJ*. 2024;384:e072686. **2.** Acosta A et al. *Obesity*. 2021;29:662-671.

Should the high prevalence of addiction disorders after bariatric surgery influence AOM selection?



8.1% DE NOVO **BED**[1]

Prevalence of de novo BED 10 years after bariatric surgery (N=183)[1]



6.0% **opioid use**[2]

Pooled prevalence of new persistent opioid use after bariatric surgery from meta-analysis of 4 studies[2]

UP TO **7.3X** **increased risk of AUD**[3]

Among patients after bariatric surgery from review of 10 observational and/or retrospective cohort studies[3]

7% TO **21%** **New-onset AUD**[4]

Among post-bariatric surgical patients from a review of medium- and long-term studies[4]

The risk of AUD post-surgery is greater with RYGB compared with sleeve gastrectomy and LAGB.[3,4]

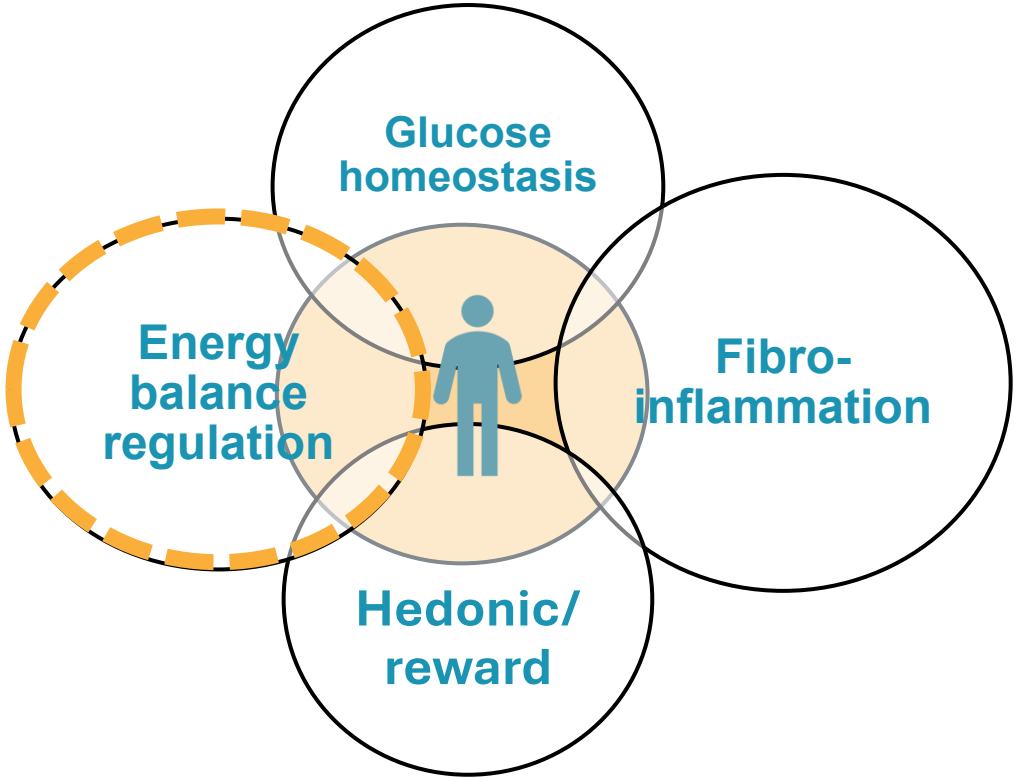
AUD, alcohol use disorder; BED, binge eating disorder; LAGB, laparoscopic adjustable gastric banding; RYGB, Roux-en-Y gastric bypass.

1. Reas DL et al. *Eur Eating Disord Rev*. 2025;33:544-550. **2.** Nasser K et al. *Surg. Endosc*. 2023;37:703-714. **3.** Scheen AJ et al. *Diabetes Metab*. 2025;51:101612. **4.** Kenkre JS et al. *Curr Obes Rep*. 2024;13:596-616.

Heterogeneity and complexity of obesity

Obesity-related Diseases

- Diabetes
- HTN
- CVD
- Cancer (some)
- +280 diseases



OMICS

- Exposomics
- Proteomics
- Metabolomics
- Epi-Genetics
- Genetics

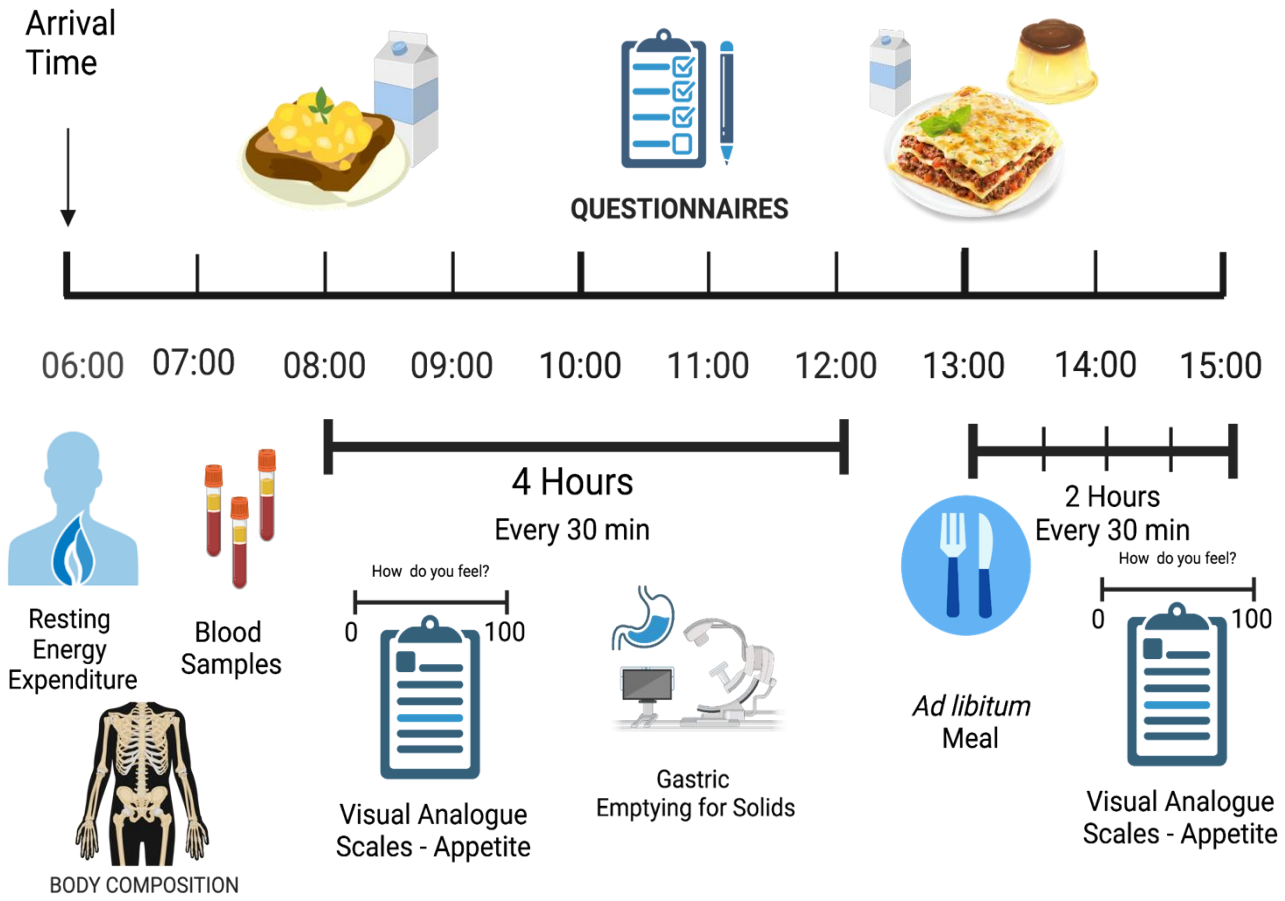
Obesity Severity = BMI - fat mass

Social Determinants of Health

BMI, body mass index; CVD, cardiovascular disease; HTN, hypertension

Understanding the heterogeneity of obesity through energy balance phenotypes

- We stratify obesity based on energy balance and behavioral phenotypic traits[1]



1. Acosta A et al. *Gastroenterology*. 2015;148:537-546.

Understanding the heterogeneity of obesity through energy balance phenotypes

- We stratify obesity based on energy balance and behavioral phenotypic traits[1]

 Satiation **Hungry Brain**	 Post-prandial satiety **Hungry Gut**
 Emotional eating **Emotional Eater**	 Energy expenditure **Slow Burn**

1. Acosta A et al. *Gastroenterology*. 2015;148:537-546.

Understanding the heterogeneity of obesity through energy balance phenotypes

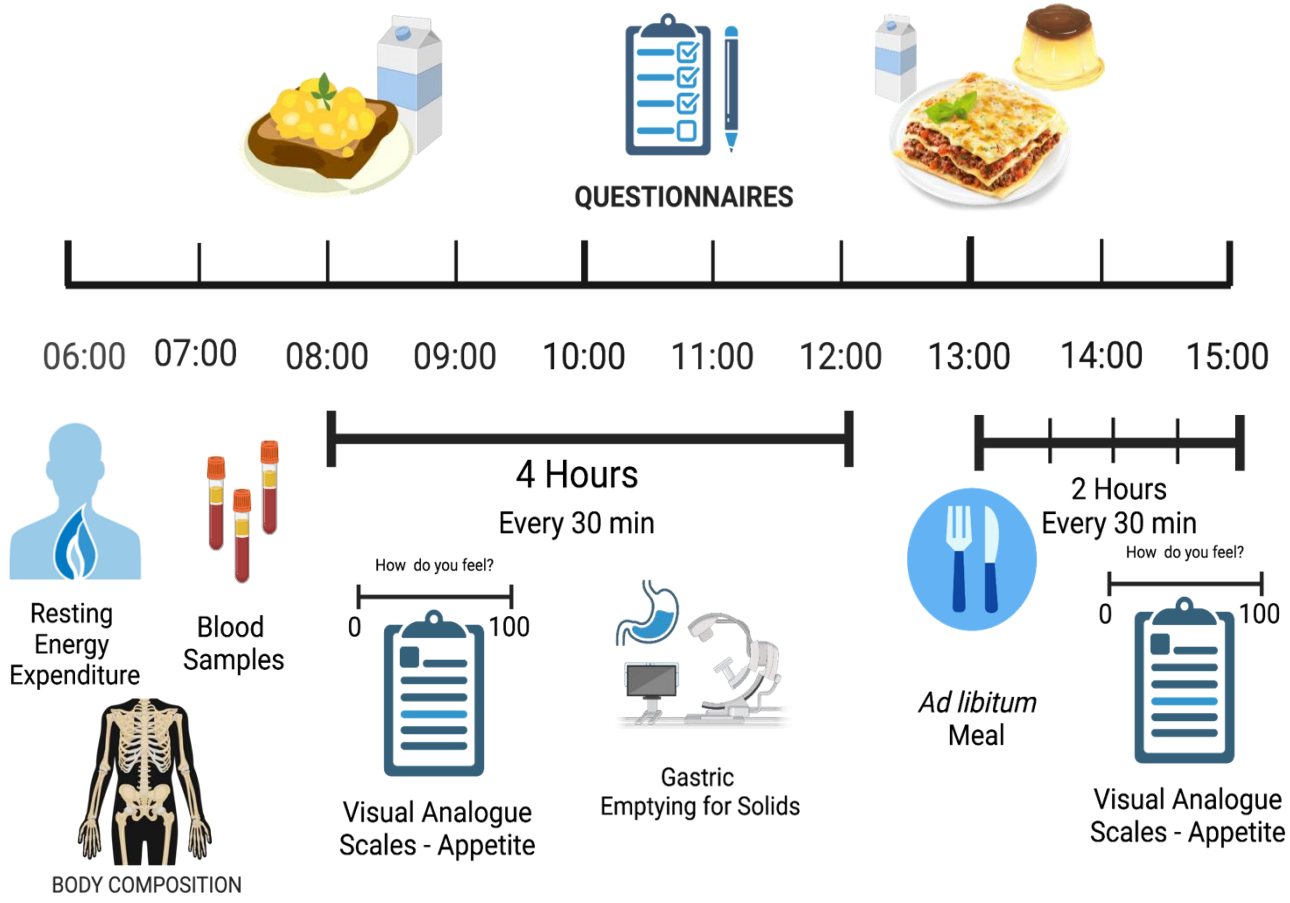
- We stratify obesity based on energy balance and behavioral phenotypic traits[1]
- Antiobesity interventions that target a specific obesity phenotype improves weight loss outcomes by **1.7 to 2 fold**[2-11]

	Hungry brain	Hungry gut	Emotional hunger	Slow Burn
LIFESTYLE INTERVENTION	Hungry brain diet	Hungry gut diet	Behavioral therapy Hungry feelings diet	• Intense exercise plan • Slow burn diet
MEDICATION[a]	Phentermine-topiramate ER	Liraglutide Semaglutide Tirzepatide	Naltrexone-bupropion ER	
ENDOSCOPY[a]	Vagal nerve block	Intragastric balloons Endoscopy sleeve gastroplasty		
SURGERY	Laparoscopic sleeve gastrectomy	Roux-en-Y gastric bypass		

1. Acosta A et al. *Gastroenterology*. 2015;148:537-546. 2. Acosta A et al. *Physiol Rep*. 2015;3(11):e12610. **3.** Halawi H et al. *Lancet Gastroenterol Hepatol*. 2017;2(12):890-899. **4.** Gómez V et al. Obesity (Silver Spring). 2016;24(9):1849-1853. **5.** Abu Dayyeh BK et al. *Clin Gastroenterol Hepatol*. 2017;15(1):37-43.e1. **6.** Vargas EJ et al. *BMJ Open Gastroenterol*. 2019;6(1):e000273. **7.** Acosta A et al. *Obesity (Silver Spring)*. 2021;29(4):662-671. **8.** Campos A et al. *Obesity Surgery*. 2022;32(8):2632-2640. **9.** Cifuentes L et al. *EClinical Medicine*. 2023;58:101923. **10.** Vargas EJ et al. *Gut*. 2023;72(6):1073-1080. **11.** Gala K et al. *Obesity Surg*. 2023;33(4):1284-1288.

Understanding the heterogeneity of obesity through energy balance phenotypes

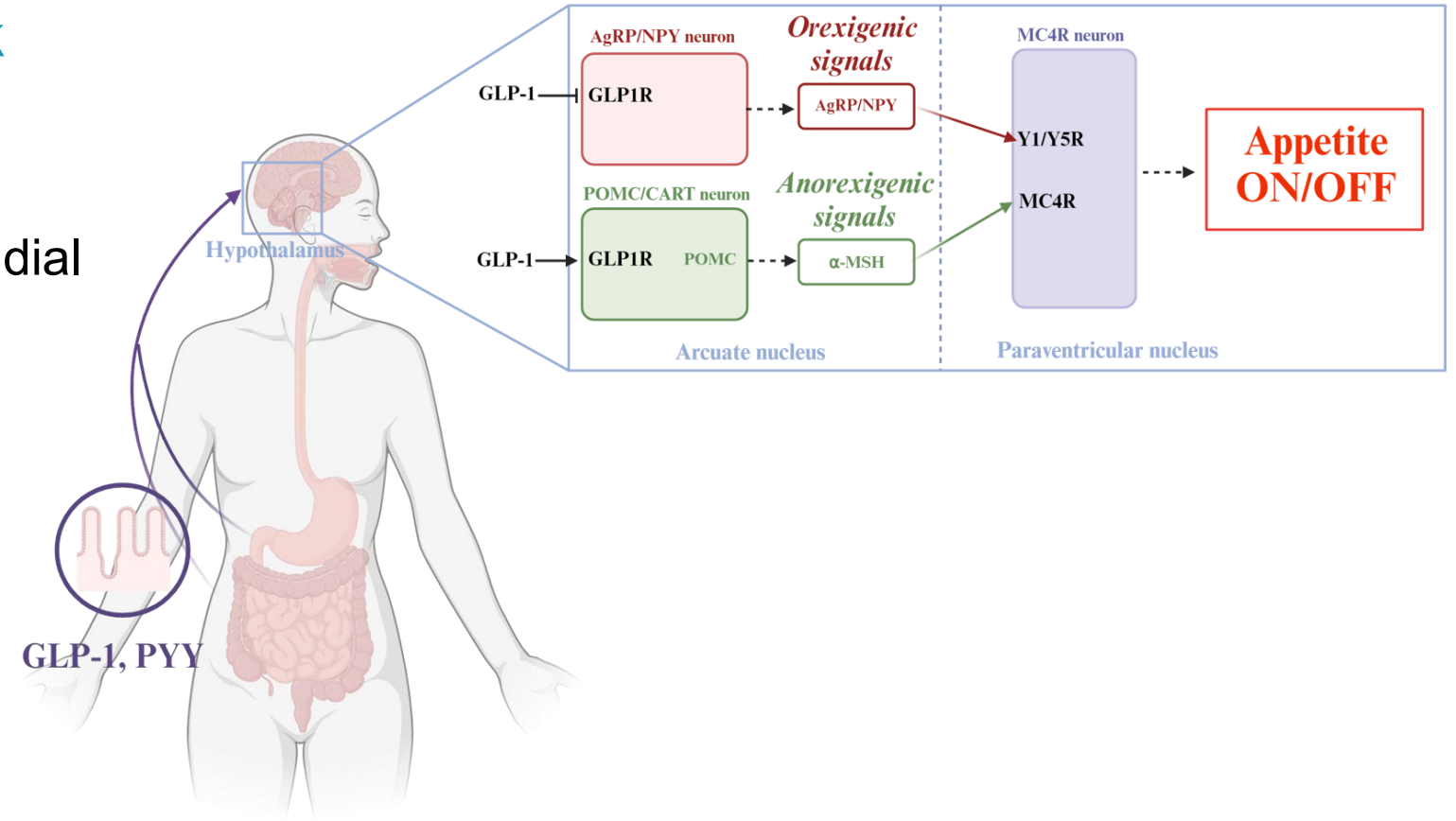
- We stratify obesity based on energy balance and behavioral phenotypic traits[1]
- Antiobesity interventions that target a specific obesity phenotype improves weight loss outcomes by **1.7 to 2 fold**[2-11]
- Phenotyping is not scalable; it is expensive, time-consuming and limited to a few academic centers[12]



1. Acosta A et al. *Gastroenterology*. 2015;148:537-546. 2. Acosta A et al. *Physiol Rep*. 2015;3(11):e12610. **3.** Halawi H et al. *Lancet Gastroenterol Hepatol*. 2017;2(12):890-899. **4.** Gómez V et al. Obesity (Silver Spring). 2016;24(9):1849-1853. **5.** Abu Dayyeh BK et al. *Clin Gastroenterol Hepatol*. 2017;15(1):37-43.e1. **6.** Vargas EJ et al. *BMJ Open Gastroenterol*. 2019;6(1):e000273. **7.** Acosta A et al. *Obesity (Silver Spring)*. 2021;29(4):662-671. **8.** Campos A et al. *Obesity Surgery*. 2022;32(8):2632-2640. **9.** CIfuentes L et al. *EClinical Medicine*. 2023;58:101923. **10.** Vargas EJ et al. *Gut*. 2023;72(6):1073-1080. **11.** Gala K et al. *Obesity Surg*. 2023;33(4):1284-1288. **12.** Anazco D, Acosta A. *Int J Obes (Lond)*. 2025;49(3):452-463.

Biomarker for obesity phenotypes

- **Machine-learning gene risk score (ML-GRS)** to predict **appetite** phenotypes
  - Hungry Gut (abnormal postprandial satiety) and Hungry Brain (abnormal satiation)
  - 41 candidate genes from the gut-adipose-brain pathway



Cifuentes L et al. *Cell Metab*. 2025;37(8):1655-1666.e5.

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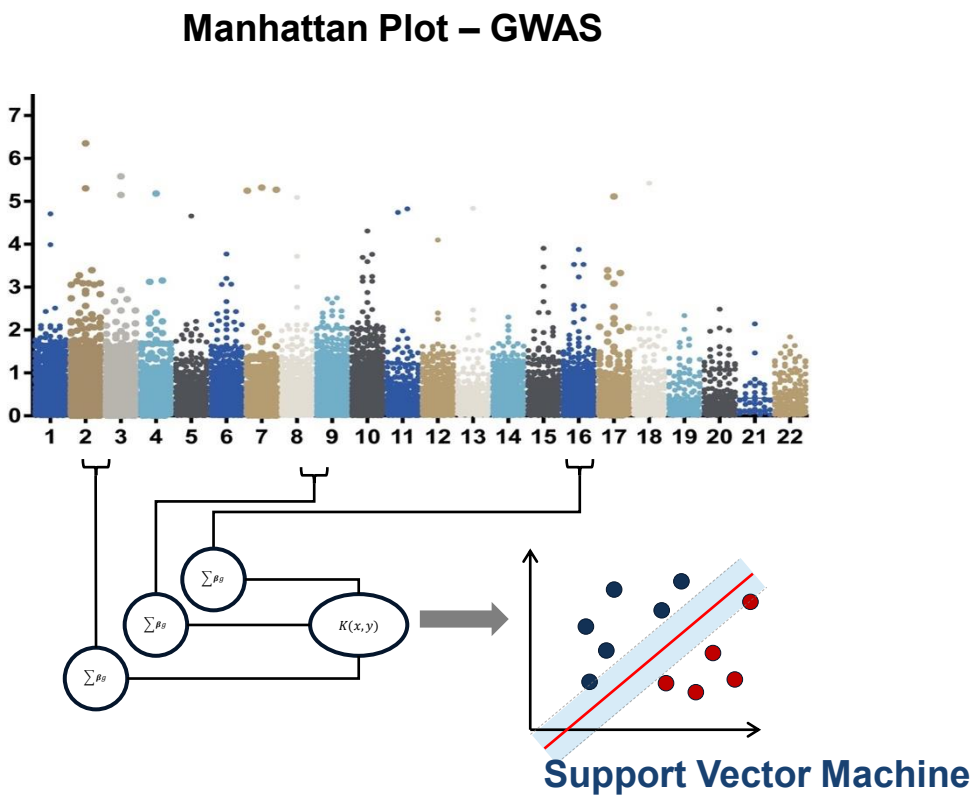
  - 41 candidate genes from the gut-adipose-brain pathway
  - Using machine-learning techniques, the most informative GRS were selected to create the biomarker to predict hungry gut phenotype

Development of ML-GRS



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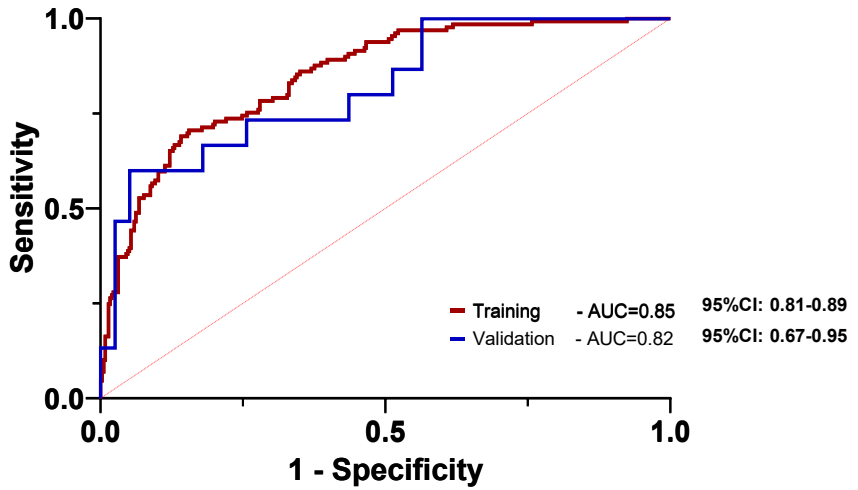
  - 41 candidate genes from the gut-adipose-brain pathway
  - Using machine-learning techniques, the most informative GRS were selected to create the biomarker to predict hungry gut phenotype

Performance of the ML-GRS model to predict appetite phenotype

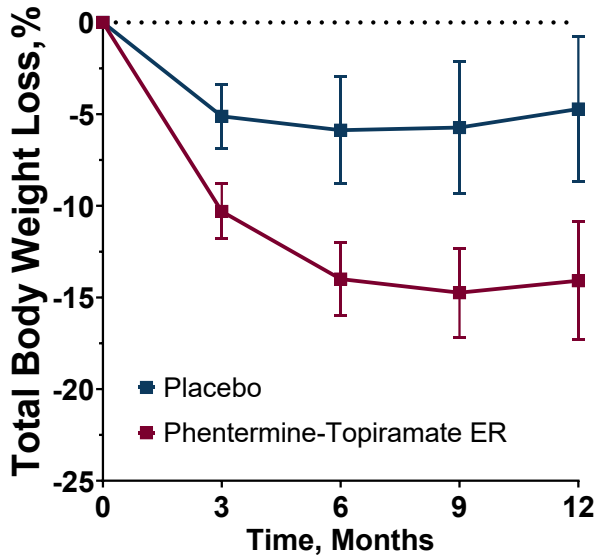
- **Hungry Gut Positive (HG+)**, as CTS - ML-GRS < 0.50
- **Hungry Brain Positive (HG+)**, as CTS - ML-GRS > 0.50



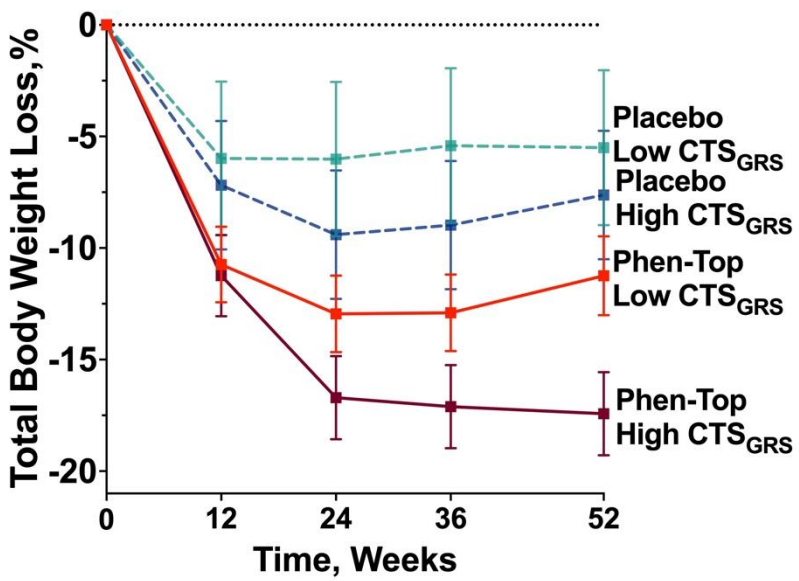
CTS, calories to satisfaction; GRS, genetic risk score; ML, machine-learning.
Cifuentes L et al. *Cell Metab*. 2025;37(8):1655-1666.e5.

Satiation or CTS_{GRS} prediction of response to phentermine-topiramate ER

All



CTS_{GRS}

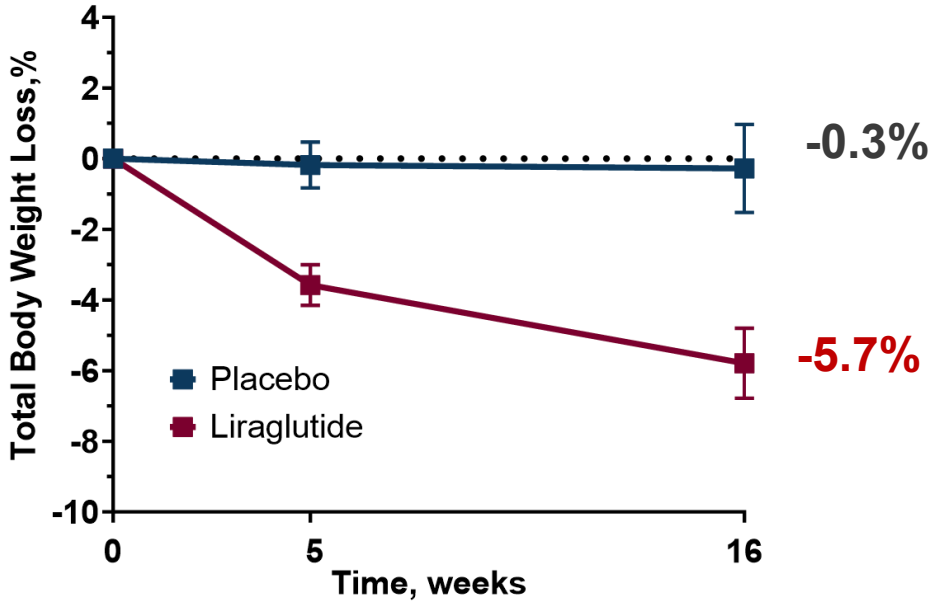


80 patients (BMI: 38 ± 6.9 kg/m^2)
From placebo-controlled, 52-week trial of
Phentermine-topiramate ER 7.5/46mg daily

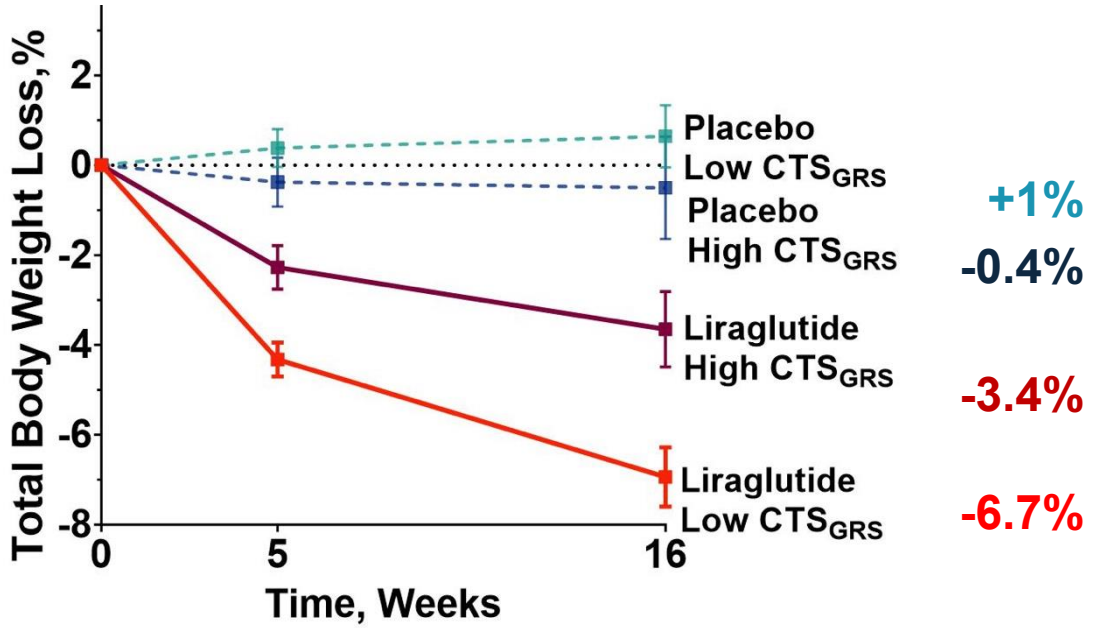
CTS, calories to satisfaction; GRS, genetic risk score.
Cifuentes L et al. *Cell Metab*. 2025;37(8):1655-1666.e5.

CTS_{GRS} prediction of response to liraglutide

All participants



CTS_{GRS}



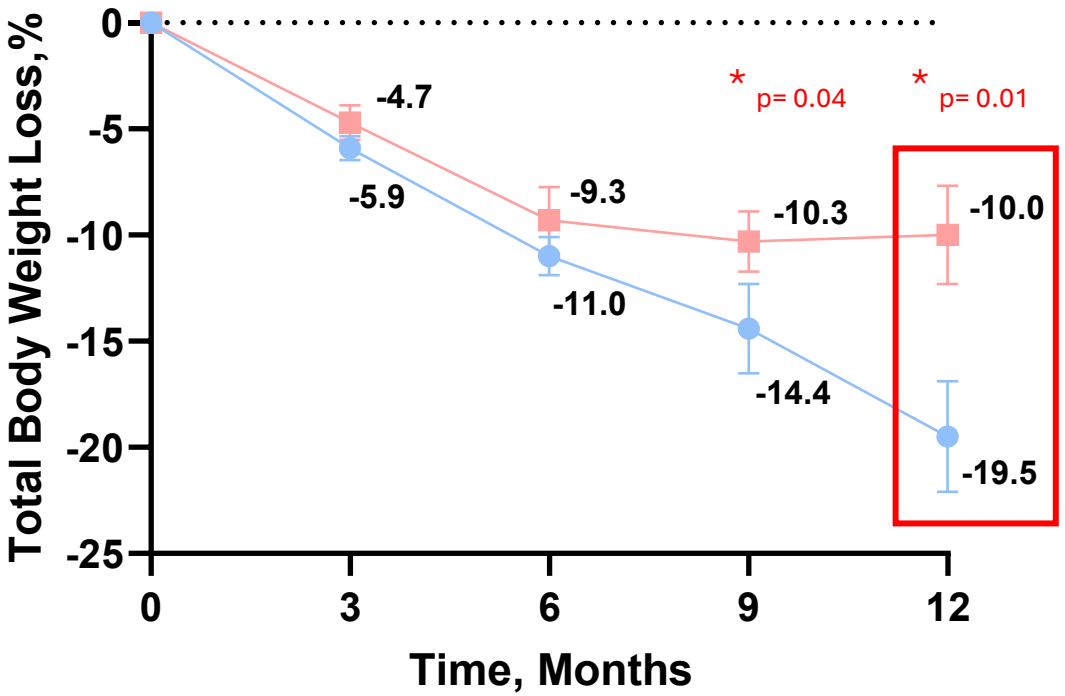
Randomized placebo-controlled, double-blinded trial[1]
Liraglutide 3 mg SC daily for 16 weeks
N= 121 patients (BMI: 39.09 ± 7.40 kg/m^2)

CTS, calories to satisfaction; GRS, genetic risk score; SC, subcutaneous.

1. Maselli et al. *Obesity*. 2022;30(8):1608-1620. **2.** Cifuentes L et al. *Cell Metab*. 2025;37(8):1655-1666.e5.

Clinical utility: hungry gut test and weight loss outcomes to semaglutide

- Prospective cohort real-world evidence of semaglutide 2.4 mg SC weekly
- N=84 patients (BMI: 38 ± 7.40 kg/m^2)



CTS_{GRS} >0.50 (high)
Hungry gut-negative

CTS_{GRS} <0.50 (low)
Hungry gut-positive

	n/N[a]				
	Start	3 months	6 months	9 months	12 months
Hungry Gut +	51/51	**36**/50	**40**/45	**24**/32	**19**/22
Hungry Gut -	33/33	**26**/33	**24**/30	**24**/27	**16**/24

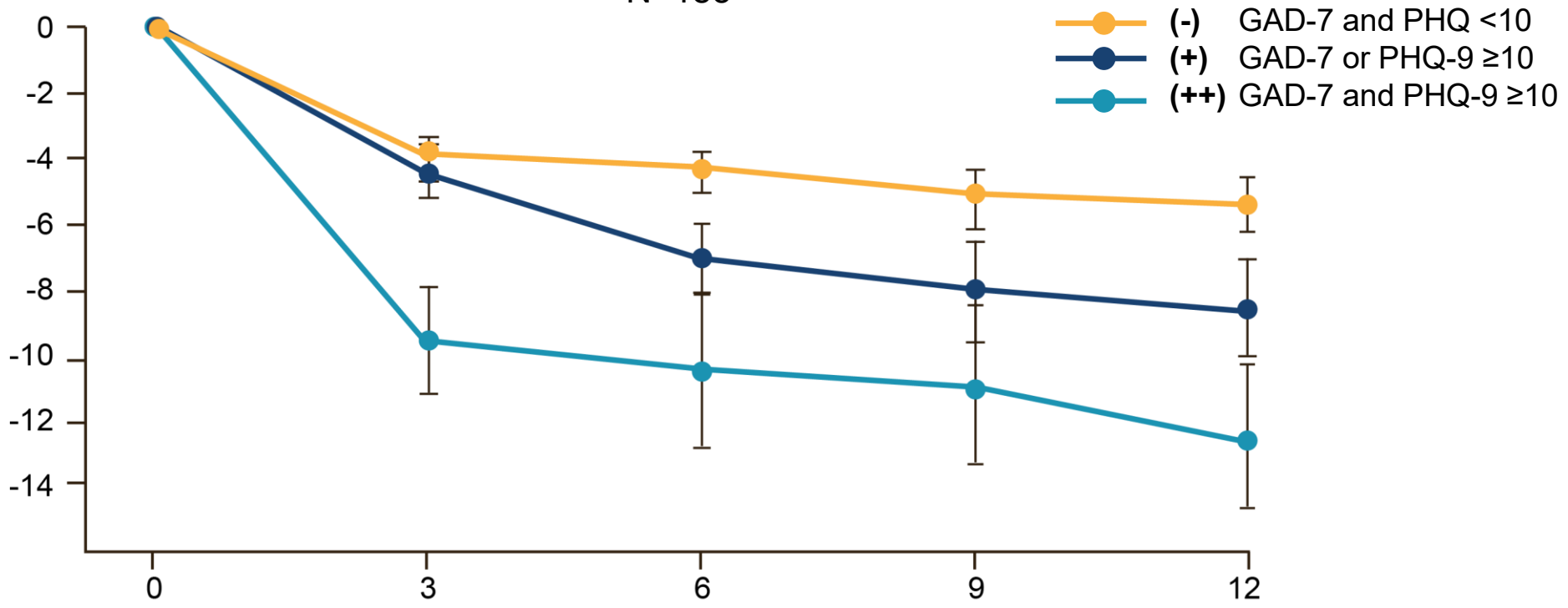
2-fold higher weight loss
associated with hungry gut-positive at 12 months compared with hungry gut-negative

CTS, calories to satisfaction; GRS, genetic risk score; SC, subcutaneous.
[a]Number of participants with weight values/number of possible particiants.
Fansa S et al. Presented at ADA. 2024.

Emotional hunger phenotype: questionnaires for clinical validity of naltrexone-bupropion ER

12-month weight loss outcomes in patients with high vs low depression/anxiety levels treated with naltrexone-bupropion ER

Retrospective, 12-month, real-world evidence
N=185



185 patients
Mean age 52.1 ±13.9 y
83% female
BMI 39.4 ± 7.5 kg/m^2

GAD-7, Generalized Anxiety Disorder-7; PHQ-9, Patient Health Questionnaire-9; TBWL, total body weight loss.
Villamarin J et al…Acosta A. Accepted at *Obesity Week* 2025.

Obesity phenotypes and endoscopic sleeve gastroplasty: multicenter study

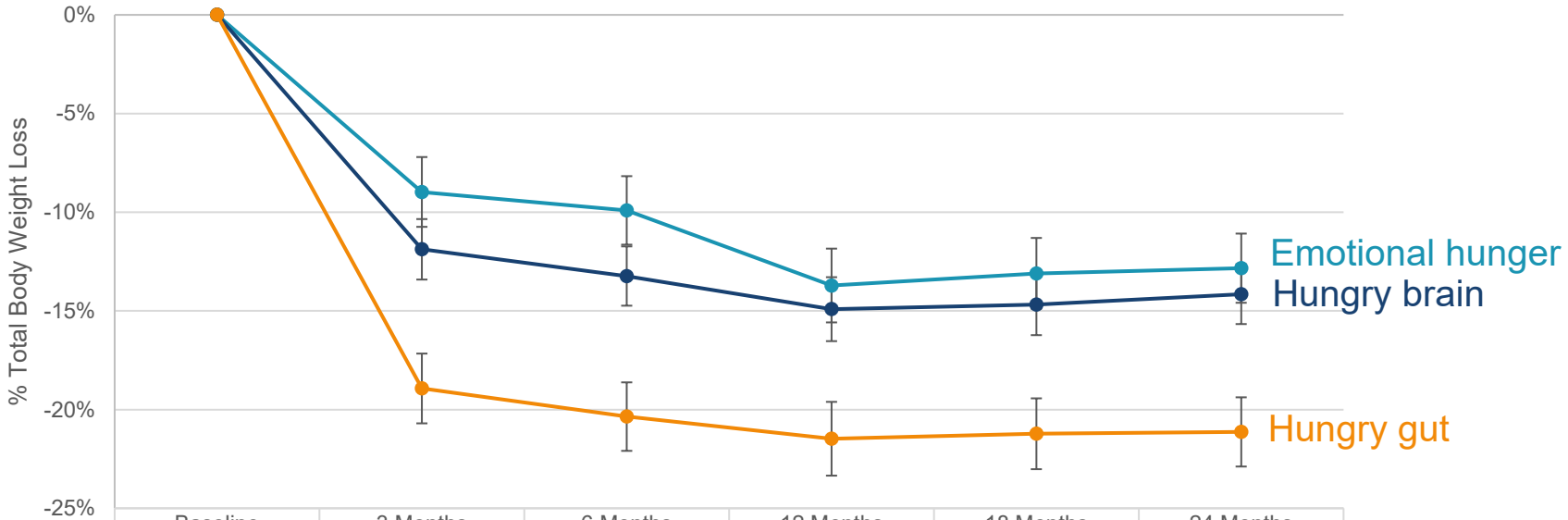
Participant demographics (n=49)

	Emotional hunger (n=14)	Hungry brain (n=19)	Hungry gut (n=16)
Female (n, %)	12 (85.7%)	15 (84.2%)	15 (93.8%)
Age at Procedure, years	50.5 (3.1)	48.1 (2.6)	44.5 (2.9)
BMI at Procedure, kg/m^2	38.6 (5.1)	37.3 (4.6)	38.3 (4.2)
Comorbidities			
Type 2 diabetes mellitus	3 (21.4%)	3 (15.8%)	0 (0.0%)
Anxiety	5 (35.7%)	7 (36.8%)	5 (31.3%)
Depression	5 (35.7%)	4 (21.1%)	8 (50.0%)
Hypertension	4 (28.6%)	4 (21.1%)	1 (6.3%)
Hyperlipidemia	4 (28.6%)	6 (31.6%)	6 (37.5%)
OSA	2 (14.3%)	5 (26.3%)	4 (25.0%)

BMI, body mass index; OSA, obstructive sleep apnea.
Fredrick et al., Acosta A. Presented at DDW 2025.

Obesity phenotypes and endoscopic sleeve gastroplasty

Endoscopic sleeve gastroplasty



	Baseline	3 Months	6 Months	12 Months	18 Months	24 Months
EH	0%	-9%	-10%	-14%	-13%	-13%
HB	0%	-12%	-13%	-15%	-15%	-14%
HG	0%	-19%	-20%	-21%	-21%	-21%

Hungry Gut Positive (Low CTS_{GRS} <0.50) are best responders to ESG.

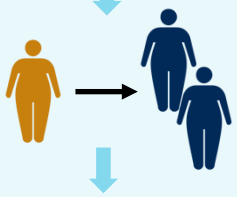
Fredrick Tet al.… Acosta A. Presented at DDW 2025.

RYGB & genetics: leptin-melanocortin pathway

Methods

50,000 participants of the Mayo Clinic Biobank were assessed for patients with history of RYGB

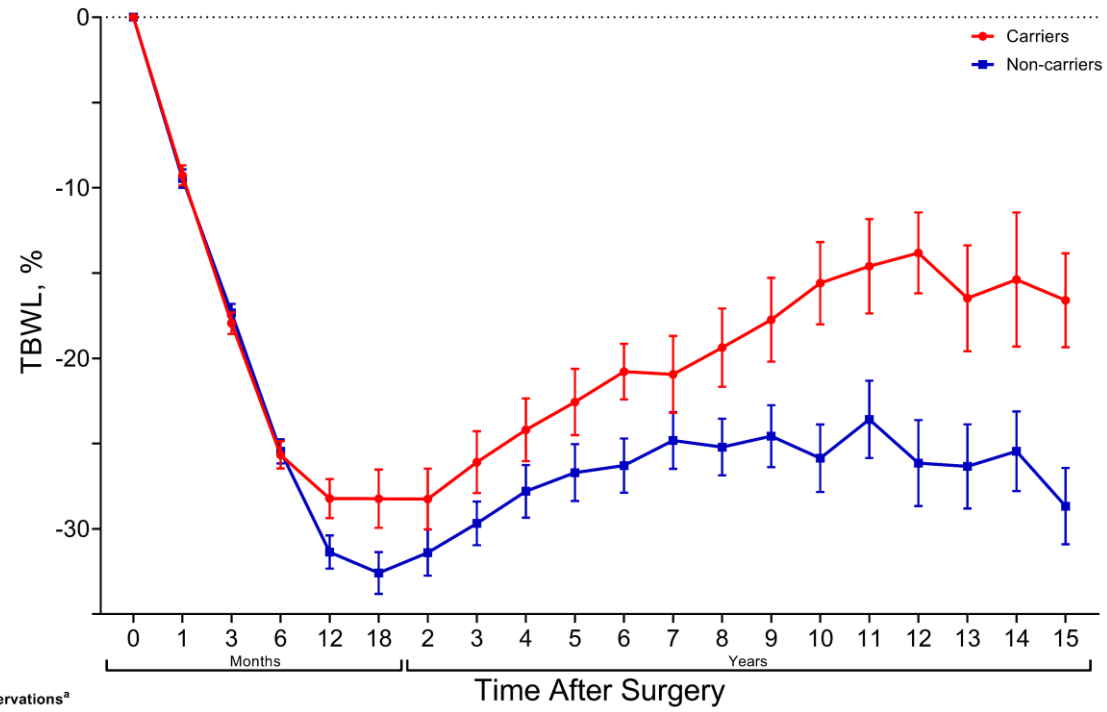
Eligible patients were genotyped for heterozygous variants in the leptin-melanocortin pathway



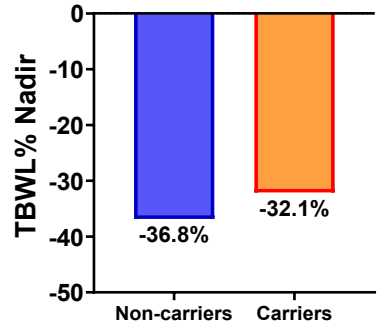
Each carrier of a heterozygous variant was randomly matched with 2 non-carrier controls based on: sex, age, BMI, & years since surgery.

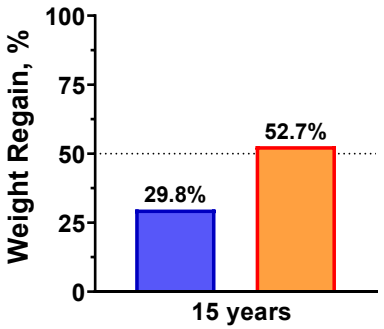
Data was abstracted from the electronic medical record for up to 15 years after surgery

RYGB and carriers of leptin-melanocortin mutations



Observations[a] / Possible Observations[b]																				
Carriers	50 / 50	43 / 50	44 / 50	46 / 50	48 / 50	37 / 49	39 / 48	39 / 46	36 / 46	34 / 45	37 / 40	25 / 35	25 / 32	21 / 27	23 / 26	18 / 23	18 / 22	15 / 19	14 / 18	15 / 16
Non-Carriers	100 / 100	78 / 100	88 / 100	94 / 100	93 / 100	80 / 99	83 / 99	86 / 97	82 / 94	73 / 90	68 / 88	66 / 86	65 / 77	59 / 72	50 / 68	49 / 59	40 / 51	39 / 50	36 / 45	33 / 43





RYGB, Roux-en-Y gastric bypass.

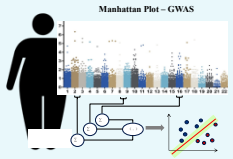
Campos A et al. *Obesity Surgery*. 2022;32(8):2632-2640.

Obesity phenotypes and bariatric surgery–RYGB

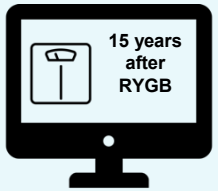
Methods

50,000 participants of the Mayo Clinic Biobank were assessed for patients with history of RYGB

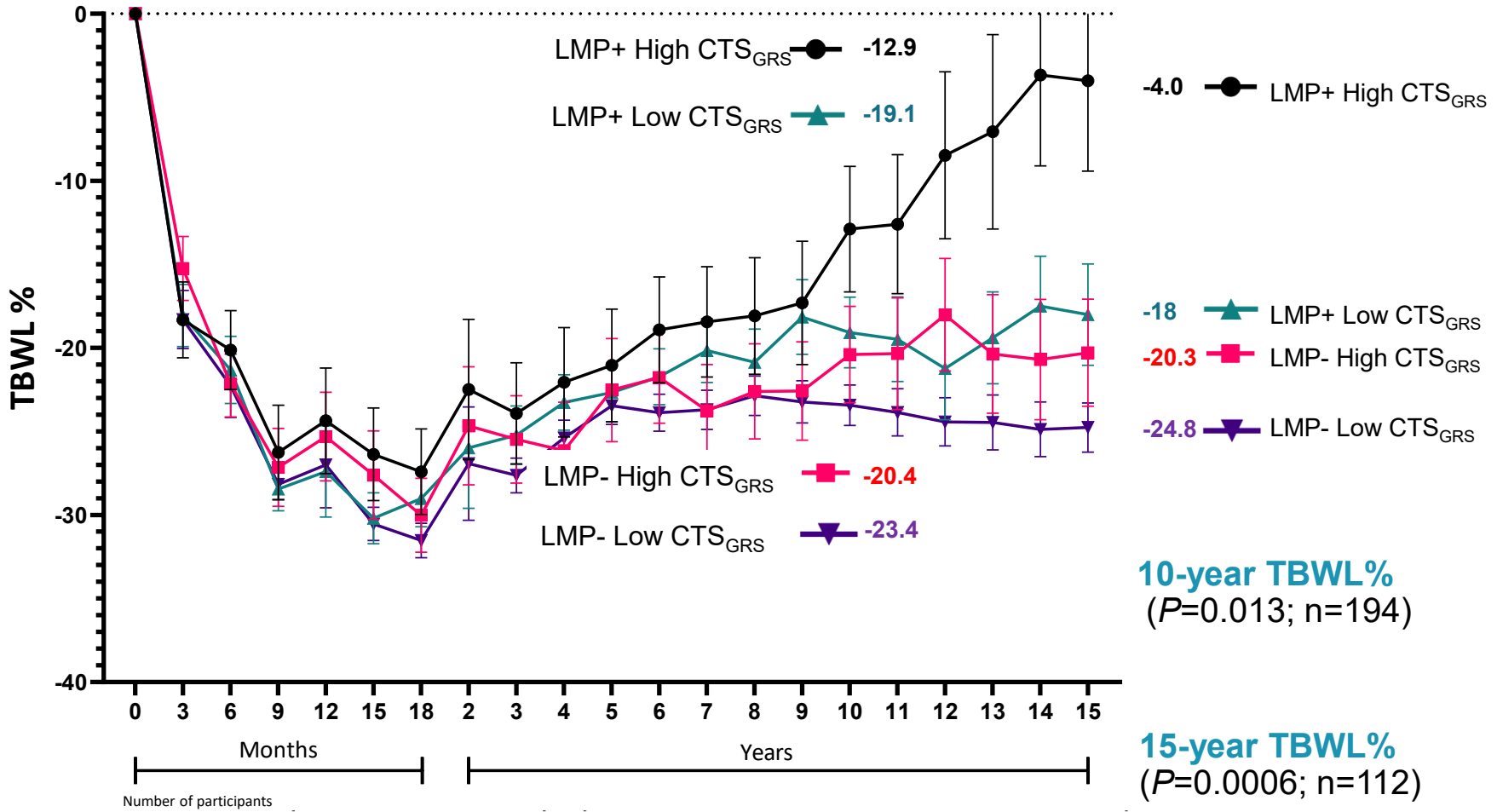
Eligible patients were genotyped for heterozygous variants in the leptin-melanocortin pathway (LMP+ or LMP-)



Calories to Satiation Gene Risk Score was calculated (CTS_{GRS} low or high)



Data was abstracted from the electronic medical record for up to 15 years after surgery



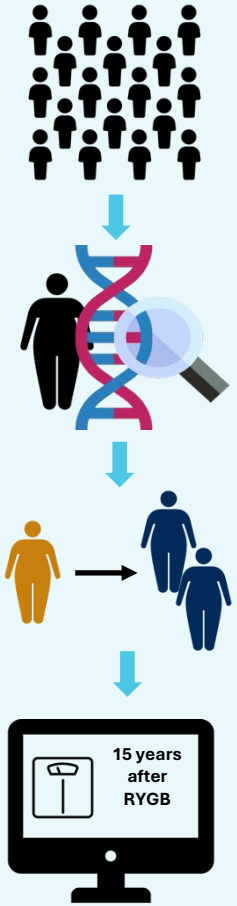
Number of participants

LMP+/CTS_{GRS}+	15	10	14	6	15	10	14	14	13	10	10	12	12	12	11	9	9	6	5	5	4
LMP+/CTS_{GRS}-	28	11	24	9	27	11	19	21	18	13	12	16	17	18	17	16	14	14	14	12	12
LMP-/CTS_{GRS}+	56	37	47	30	46	34	33	42	40	40	37	44	37	38	31	29	25	16	23	17	13
LMP-/CTS_{GRS}-	254	157	185	101	193	130	148	181	170	145	143	158	154	163	149	140	117	111	98	92	84

CTS, calories to satisfaction; LMP, leptin-melanocortin pathway; RYGB, Roux-en-Y gastric bypass; TBWL, total body weight loss.
Data are presented as LSM ± SEM.
Espinosa MA et al.… Acosta A. Presented at DDW 2025.

Sleeve & genetics: leptin-melanocortin pathway

Methods



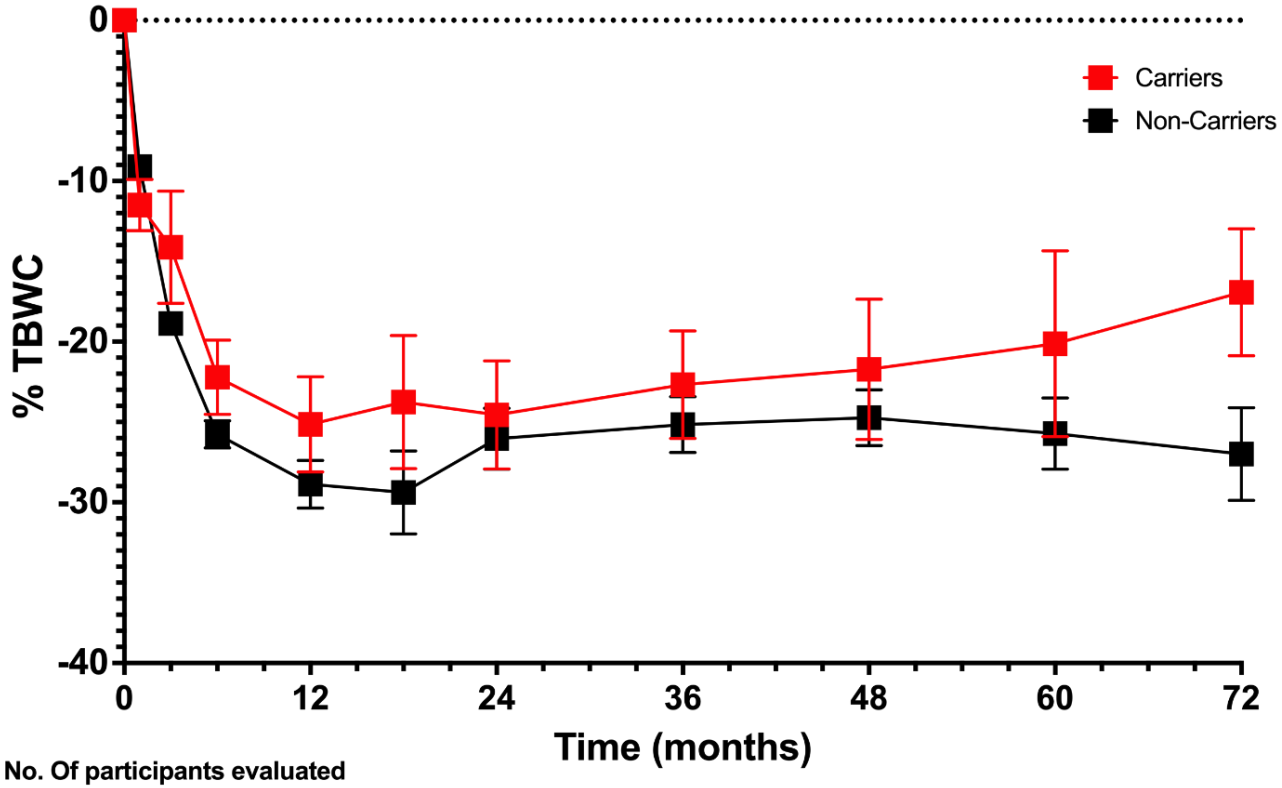
50,000 participants of the Mayo Clinic Biobank were assessed for patients with history of RYGB

Eligible patients were genotyped for heterozygous variants in the leptin-melanocortin pathway

Each carrier of a heterozygous variant was randomly matched with 2 non-carrier controls based on: sex, age, BMI, & years since surgery

Data was abstracted from the electronic medical record for up to 6 years after surgery

Sleeve and carriers of leptin-melanocortin mutations



No. Of participants evaluated

Carriers	17	18	18	15	18	18	15	12	14
Non-carriers	26	25	25	16	26	24	23	17	12

RYGB, Roux-en-Y gastric bypass.

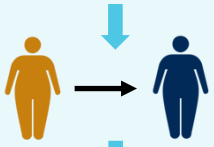
Feris F et al… Acosta A. *Obesity Surgery.* 2023;33(7):2246-2249.

TORe- RYGB & genetics: leptin-melanocortin pathway

Methods

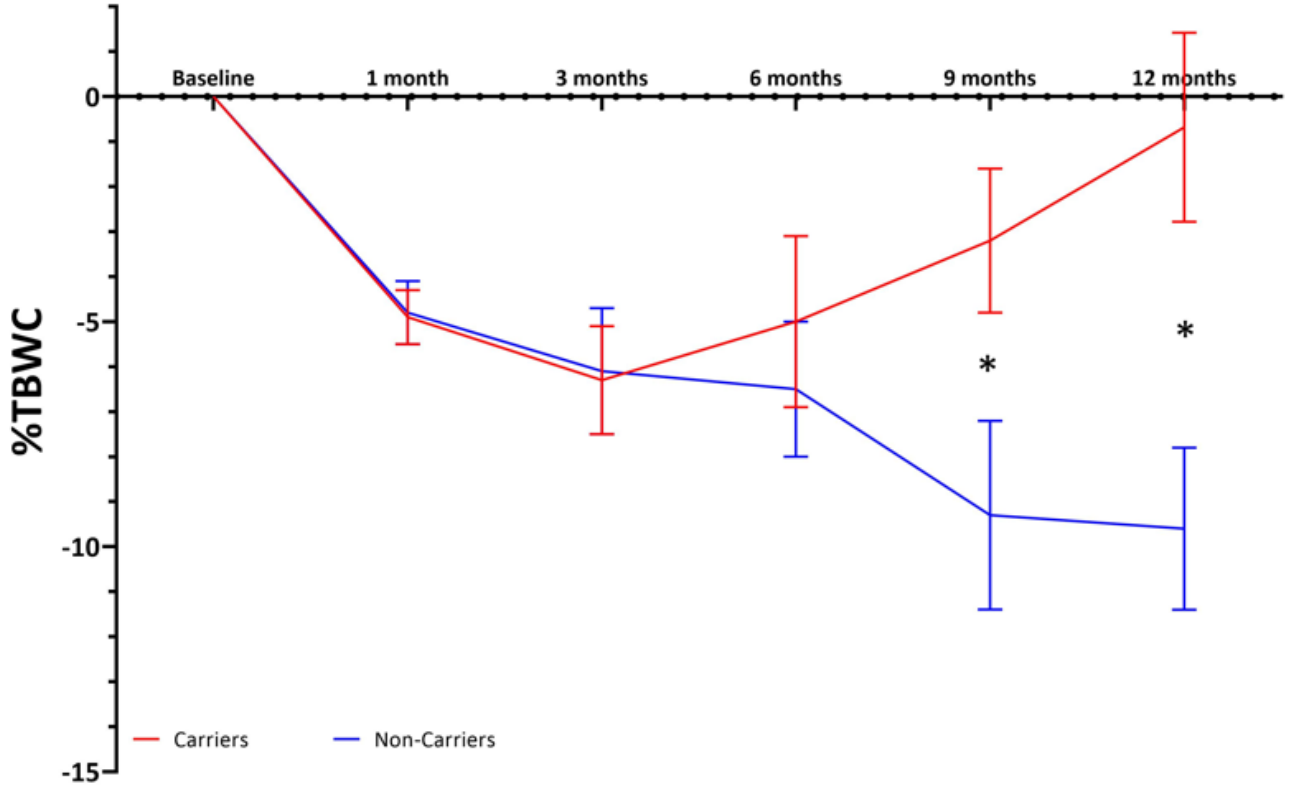
50,000 participants of the Mayo Clinic Biobank were assessed for patients with history of RYGB

Eligible patients were patients with RYGB plus TORe who genotyped for heterozygous variants in the leptin-melanocortin pathway



All participants including. No matching.

Data was abstracted from the electronic medical record for up to 1 years after procedure



Carriers (n)	19	14	14	11	13
Non-Carriers (n)	28	23	21	12	20

RYGB, Roux-en-Y gastric bypass.
Gala K et al. *Obesity Surgery*. 2024;34(11):4203-4211.

Precision Obesity: cost-effective-phenotype based obesity solution

	Hungry brain	Hungry gut	Emotional hunger	Slow Burn
LIFESTYLE INTERVENTION	Hungry brain diet	Hungry gut diet	Behavioral therapy Hungry feelings diet	• Intense exercise plan • Slow burn diet
MEDICATION[a]	Phentermine-topiramate ER	Liraglutide Semaglutide Tirzepatide	Naltrexone-bupropion ER	
ENDOSCOPY[a]	Vagal nerve block	Intragastric balloons Endoscopy sleeve gastroplasty		
SURGERY	Laparoscopic sleeve gastrectomy	Roux-en-Y gastric bypass		

[a]Validated in randomized clinical trials.

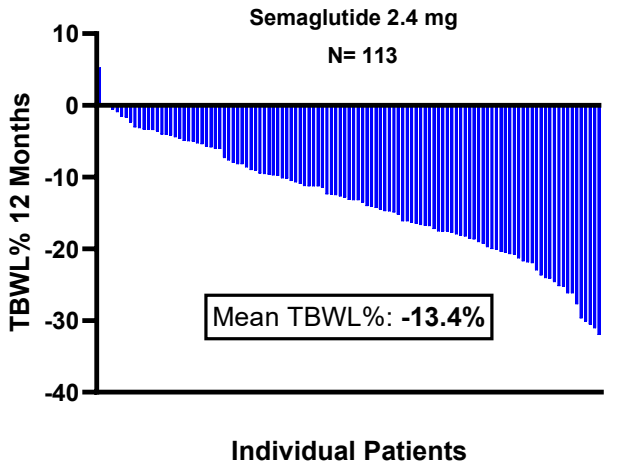
1. Acosta A et al. *Gastroenterology*. 2015;148:537-546. 2. Acosta A et al. *Physiol Rep*. 2015;3(11):e12610. **3.** Halawi H et al. *Lancet Gastroenterol Hepatol*. 2017;2(12):890-899. **4.** Gómez V et al. Obesity (Silver Spring). 2016;24(9):1849-1853. **5.** Abu Dayyeh BK et al. *Clin Gastroenterol Hepatol*. 2017;15(1):37-43.e1. **6.** Vargas EJ et al. *BMJ Open Gastroenterol*. 2019;6(1):e000273. **7.** Acosta A et al. *Obesity (Silver Spring)*. 2021;29(4):662-671. **8.** Campos A et al. *Obesity Surgery*. 2022;32(8):2632-2640. **9.** CIfuentes L et al. *EClinical Medicine*. 2023;58:101923. **10.** Vargas EJ et al. *Gut*. 2023;72(6):1073-1080. **11.** Gala K et al. *Obesity Surg*. 2023;33(4):1284-1288. **12.** Cifuentes L et al. *Cell Metab*. 2025;37(8):1655-1666.e5.

Key take-away points

- “One-treatment-fits-all” is not working
- Obesity is a complex and heterogenous disease with multiple phenotypes
- Phenotype-guided classification and interventions double weight loss
- Biomarker predicts phenotypes and identifies best responders to obesity interventions

Opportunities to tackle ~~Obstacles~~ In the obesity pandemic

HETEROGENEOUS OUTCOMES[1]



HIGH COST[2]

LIMITED PATIENT ACCESS[3]

Better outcomes with MyPhenome Test (CTS_{GRS}) → **Obesity Rx cost-effective?** → **Increase access and reduce stigma?**

1. Modified from Abu Dayyeh BK et al. Lancet. 2022;400(10350:441-451. **2.** Trujillo JM et al. *Ther Adv Endocrinol Metab*. 2021;12:2042018821997320. **3.** Ard J et al. *Adv Ther*. 2021;38(6):2821-2839.

Precision Medicine for Obesity Program

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- Wissam Ghusn

Daniela Hurtado & lab

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Daniela Hurtado

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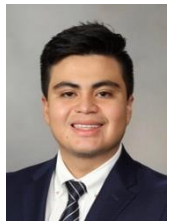

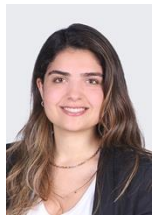

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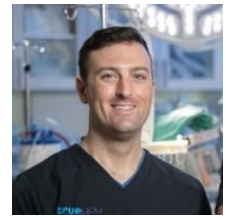

Case Study and Q&A

Currax™ pharmaceuticals LLC

Thank you!

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