Science vs Pseudoscience in Weight Management

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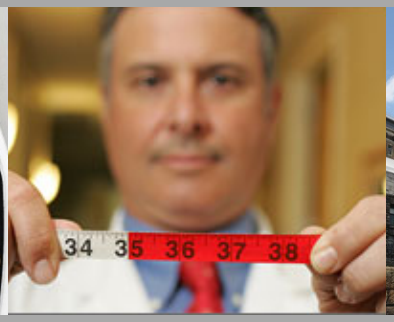
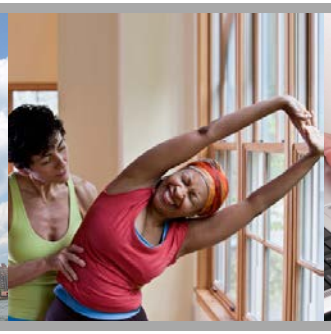
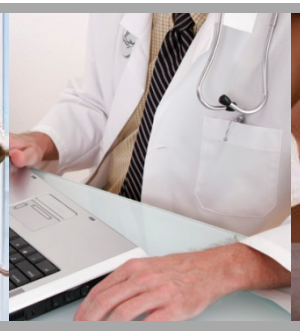
October 28, 2016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Obesity is Difficult to Treat

Weight Management is Inundated With Pseudoscience

As a Result Patients and Practitioners Are Confused About What is Real Science and What is Pseudoscience

pseu·do·sci·ence

soōdōˈsīəns/

noun

noun: **pseudoscience**; plural noun: **pseudosciences**; noun: **pseudo-science**; plural noun: **pseudo-sciences**

“A collection of beliefs or practices mistakenly regarded as being based on scientific method.”

Science vs. Pseudoscience

Science	Pseudoscience
Findings primarily expressed through rigorous, peer-reviewed scientific journals	Literature aimed at the general public. No review, no standards, no pre-publication verification, no demand for accuracy and precision.

http://www.quackwatch.com/01QuackeryRelatedTopics/pseudo.html

Science vs. Pseudoscience

Science	Pseudoscience
Reproducible results; experiments must be precisely described so that they can be duplicated exactly	Results cannot be reproduced or verified. Studies, if any, are always so vaguely described that one can't figure out what was done or how it was done.

http://www.quackwatch.com/01QuackeryRelatedTopics/pseudo.html

Science vs. Pseudoscience

Science	Pseudoscience
Failures are searched for and studied closely	Failures are ignored, excused, hidden, rationalized, forgotten, avoided at all costs.

http://www.quackwatch.com/01QuackeryRelatedTopics/pseudo.html

Science vs. Pseudoscience

Science	Pseudoscience
As time goes on, more and more is learned about the physical processes under study.	No physical phenomena or processes are ever found or studied. No progress is made.

http://www.quackwatch.com/01QuackeryRelatedTopics/pseudo.html

Science vs. Pseudoscience

Science	Pseudoscience
Convinces by appeal to the evidence, by making the best case the data permit. When new evidence contradicts old ideas, they are abandoned.	Convinces by appeal to faith and belief. You are to believe in spite of the facts, not because of them. Original idea is never abandoned, whatever the evidence.

http://www.quackwatch.com/01QuackeryRelatedTopics/pseudo.html

Science vs. Pseudoscience

Science	Pseudoscience
Does not advocate or market unproven practices or products.	Generally earns some or all of his living by selling questionable products or pseudoscientific services

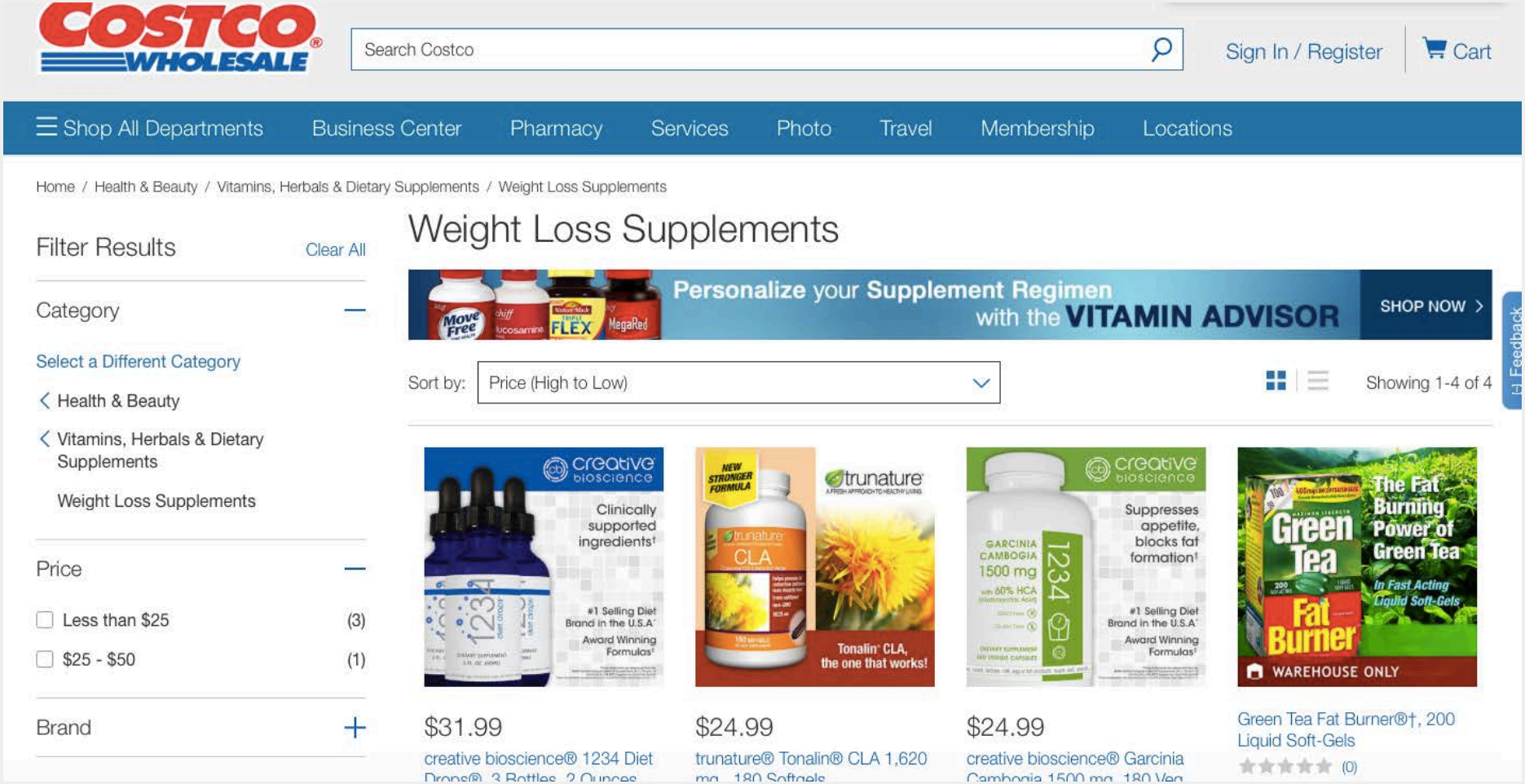
http://www.quackwatch.com/01QuackeryRelatedTopics/pseudo.html

Does this ever happen to you?
“Doctor, I can’t lose weight.”

Does this ever happen to you?
“Doctor, I can’t lose weight.”

Doctor, I can’t lose weight.
I’ve tried everything they have at Costco!

Doctor, I can't lose weight.
I've tried everything they have at Costco!



HCG Drops CLA Garcinia Cambogia Green Tea

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Genetic Testing – Not Ready for Prime Time

DNAFit
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You're not the same as everybody else, so why follow everybody else's diet?

Meet Gemma. Gemma is DNAFit. And feeling great.

Gemma cut the fad diets and started eating, exercising and thinking the right way for her body, and we helped her do it.

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Let’s Look at One Example
HCG – Does it Really Work?
Doctors Sell It

In Fact, There's Even a Directory of HCG Doctors

preventing automatic updates.

HCG Doctors Directory

LARGEST SELECTION OF HCG DIET DOCTORS

Locate HCG Doctors and HCG Clinics Nationwide! |

HCG DIET DOCTORS | WHAT IS HCG? | BENEFITS OF HCG | HCG INJECTIONS | HCG FAQ'S | HCG FOR WOMEN

HCG DIET DOCTORS

About HCG Doctors Directory

Have you been searching for an answer to your weight loss goals? Are you interested in learning more about doctors on the cutting edge of the medical weight loss field offering HCG diet plans?

The HCG Doctors Directory was created to make it easy for you to find trusted and experienced medical professionals offering personalized HCG diet plans in your area. We try our best to offer you a selection so that you can choose the best match for your specific needs.

HCG hormones should only be taken when administered by a qualified medical professional. We believe that any health decision should be made with your doctor. Information provided on this website is for information purposes only. We always recommend taking the time to speak with medical professionals.

Search for HCG diet doctors in your area and browse through doctor bio's to find the physician that is right for you. Find a doctor that is right for you on the HCG Doctors Directory to learn more about HCG and to find out if an HCG diet plan is right for you.

Contact one of our HCG Diet doctors today and discover the NEW YOU!

HCG Study “Revealed” on Dr Oz Show Hits 6/6 on the Pseudoscience Scale !

HCG injections + 500 calorie diet produce significant weight loss !

Using her “new” HCG Protocol

The HCG group lost an average of 13 pounds in a month, and the Placebo group lost an average of 15 pounds in a month.

Then concludes:

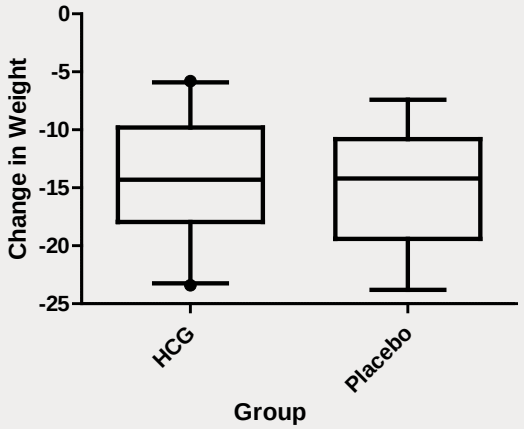
‘This is the first modern clinical trial to demonstrate how HCG may be working for lasting weight loss.’

?????????

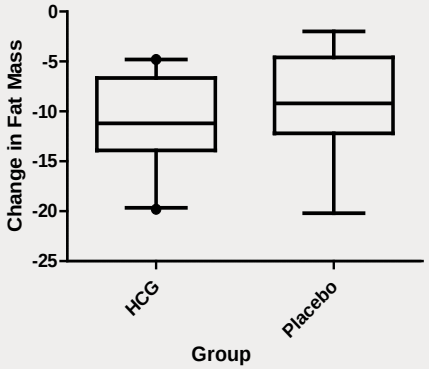
HCG Administration Produced No Greater Weight Loss or Preservation of Lean Muscle Mass

- N=59 females, ages 20 – 55
- 500 calorie diet (50% protein)
- Overall weight loss was similar between the two groups
- **CONCLUSION: HCG had no impact on overall weight loss**

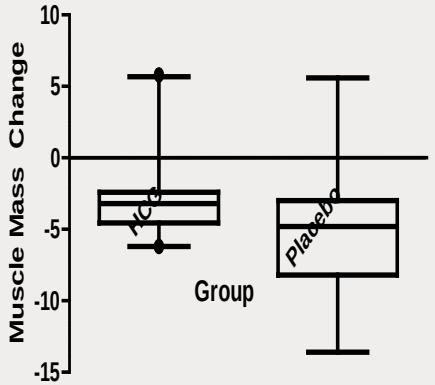
Change in Weight, 4 wks, Completers & lost at least 5 lbs



Change in Fat Mass, 4 wks, Completers who lost at least 5 lbs of overall Weight



Change in Muscle Mass, 4 wks, Completers who lost at least 5 lbs of overall weight



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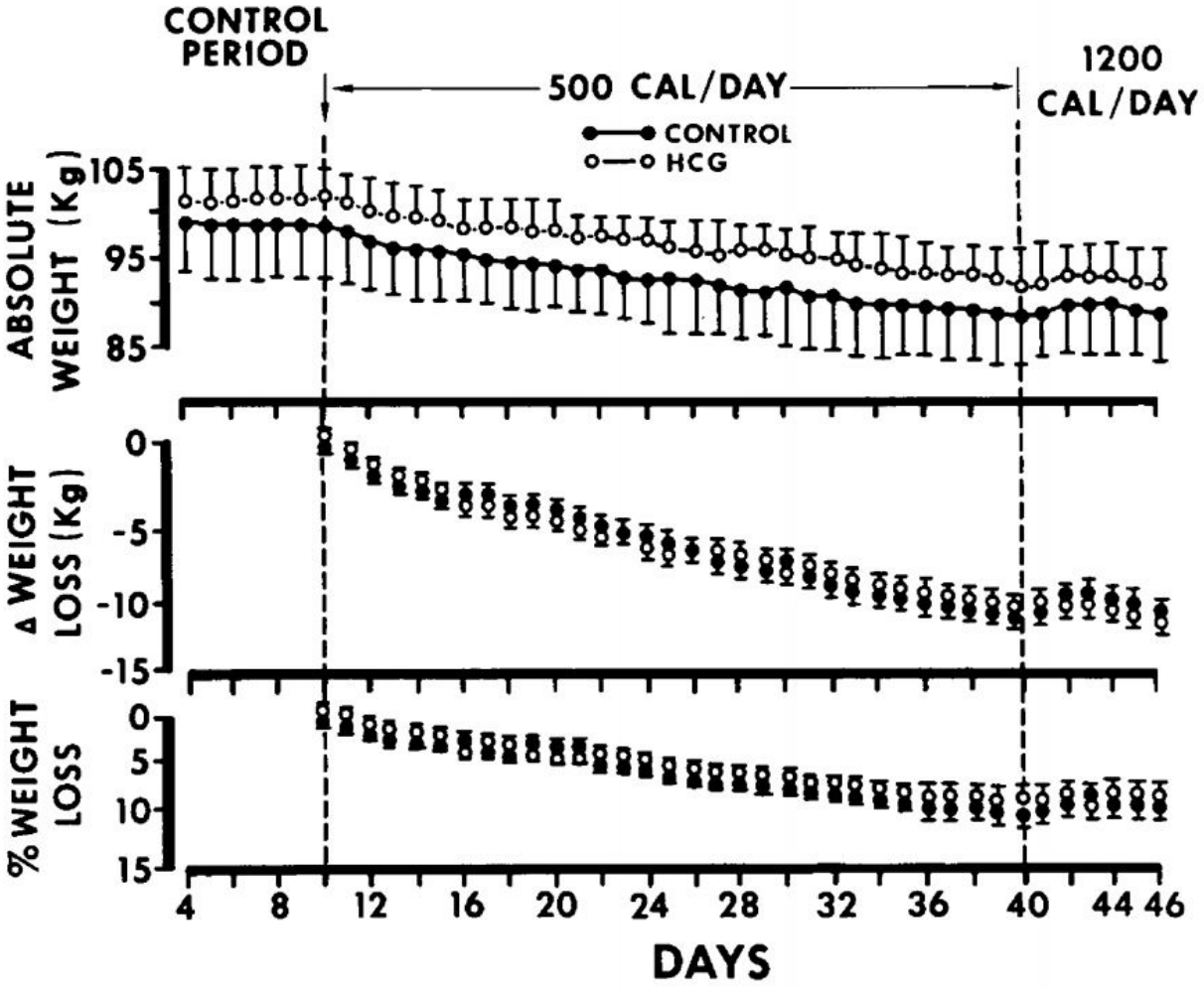
HCG Injections in a Randomized, Double-Blinded, Placebo-Controlled Trial
Sheri L. Emma, MD, Dr. Emma's Corporation, Brick, NJ

10 prior published trials disagree with that unpublished “study”

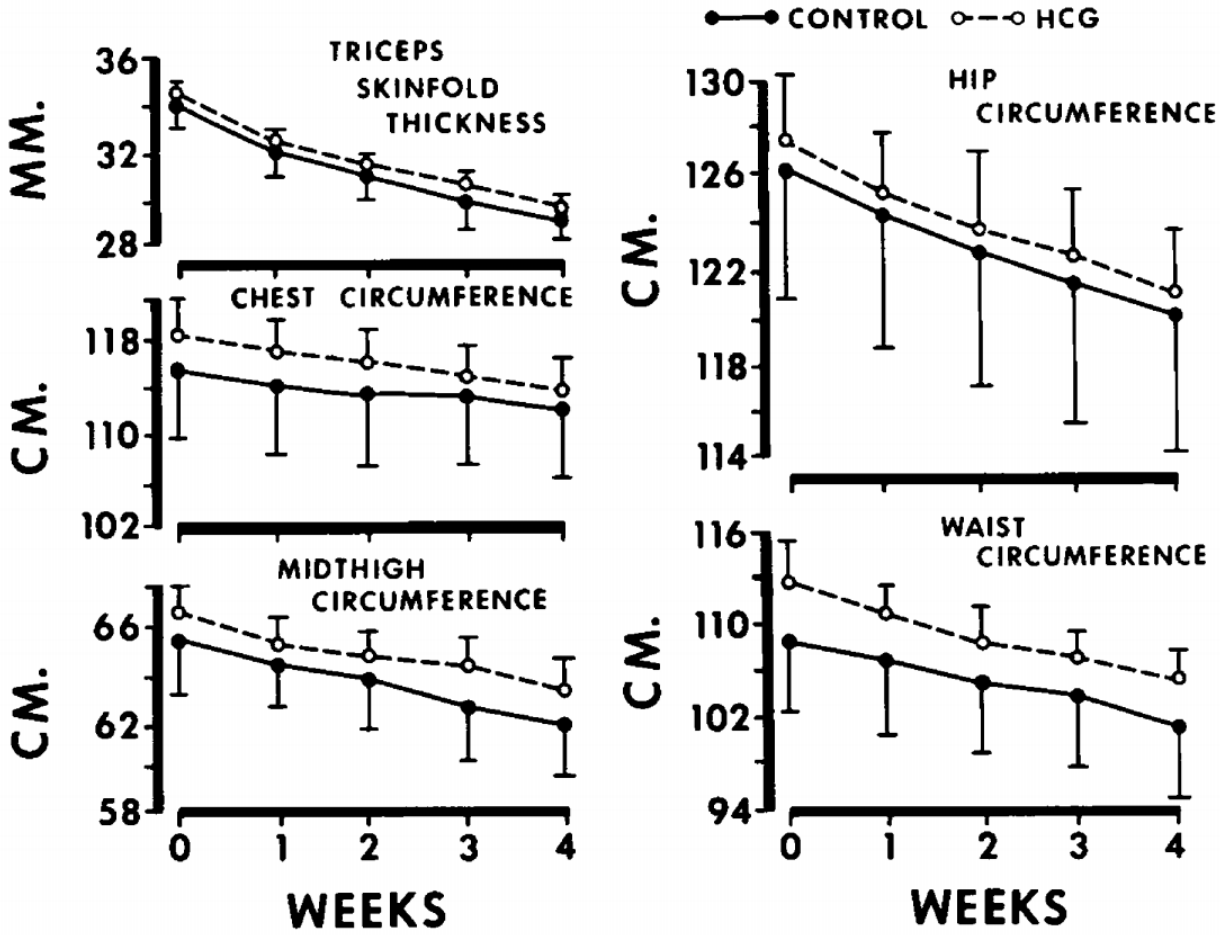


CONCLUSION:
HCG has no effects on chemical and hormonal parameters measured and offers no advantage over calorie restriction in promoting weight loss

Fig 1. Body weight parameters in control and HCG-treated groups during various study periods. Values in this and all subsequent figures are mean ± SEM.

Shetty KR, Kalkhoff RK. Arch Intern Med. 1977 Feb;137(2):151-5.

HCG vs. Control: No Difference in Skinfold Thickness and Body Measurements



Diet for all patients:
500-calorie/day
5-gm sodium diet/day
one multiple vitamin

Patients were
given 125 units HCG
intramuscularly/day

30 days

Fig 2.Triceps skin-fold thicknesses and circumferential body measurements in control and HCG-treated groups during the four-week. 500-calorie treatment period.

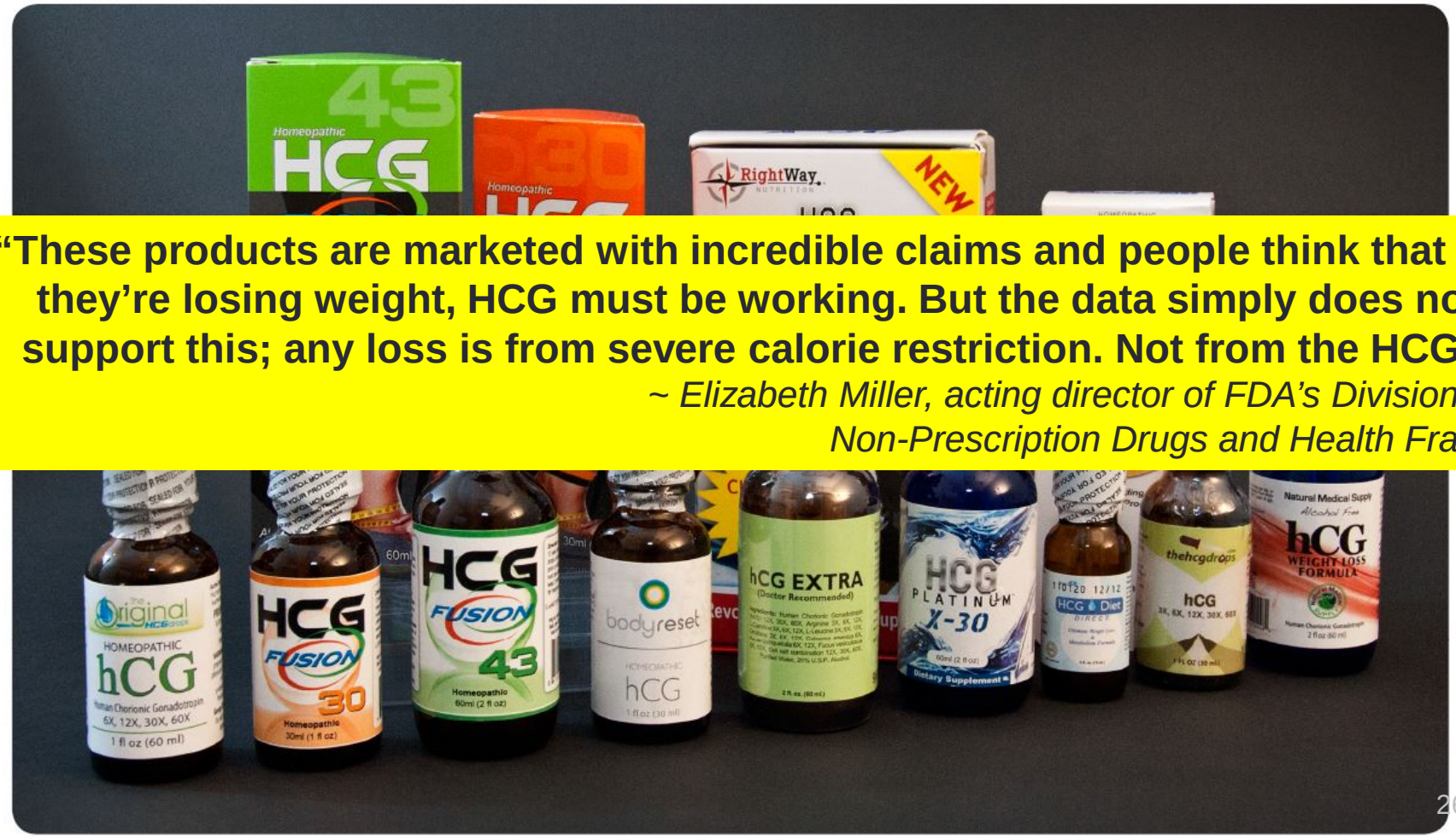
Shetty KR, Kalkhoff RK. Arch Intern Med. 1977 Feb;137(2):151-5.

FDA labeling for approved HCG drug products requires the following statement about the use of HCG for weight loss:

"**HCG has not been demonstrated to be effective adjunctive therapy in the treatment of obesity.** There is no substantial evidence that it increases weight loss beyond that resulting from caloric restriction, that it causes a more attractive or 'normal' distribution of fat, or that it decreases the hunger and discomfort associated with calorie-restricted diets."

www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/MedicationHealthFraud/ucm281834.htm

HCG Diet Products Are Illegal

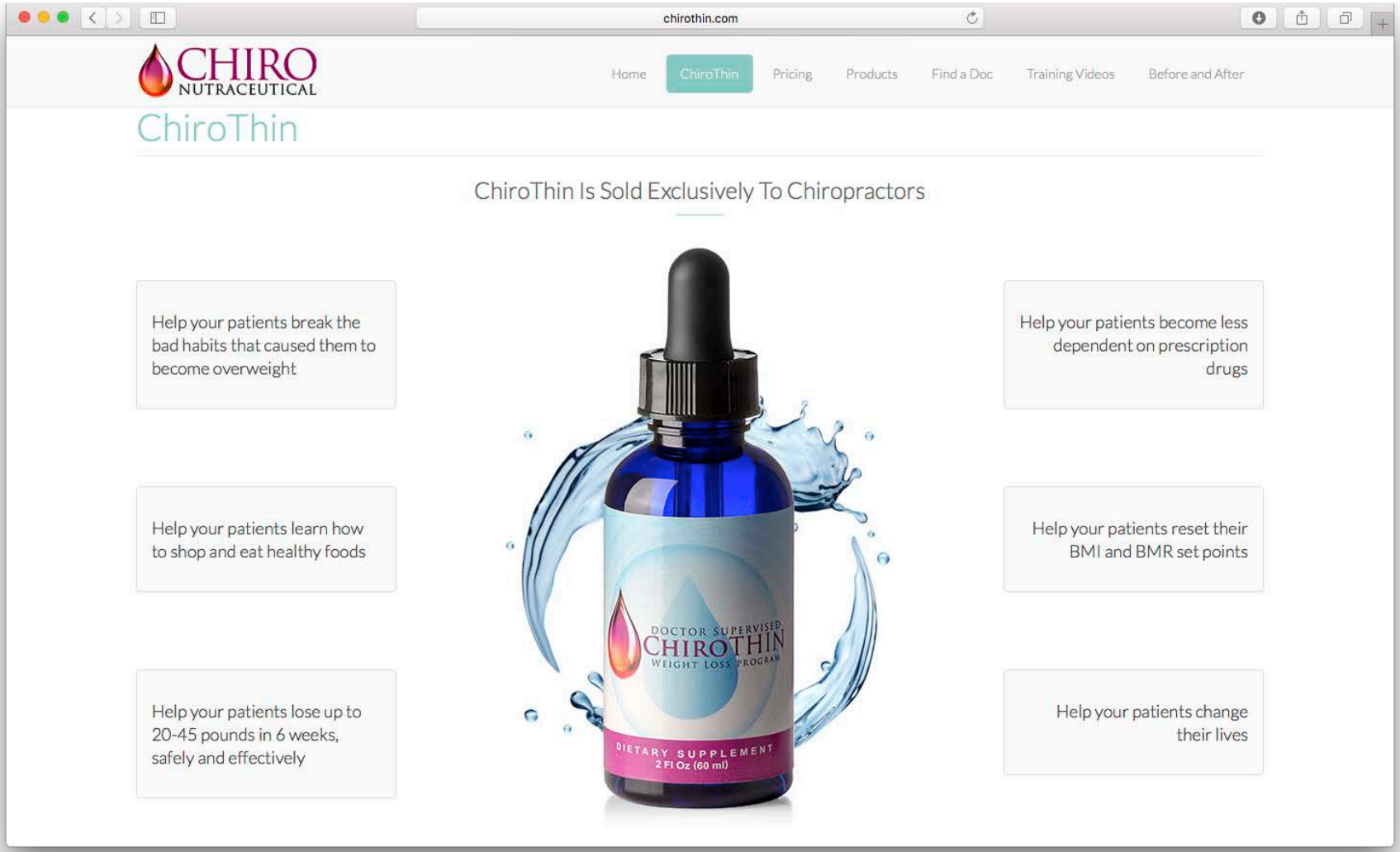


"These products are marketed with incredible claims and people think that if they're losing weight, HCG must be working. But the data simply does not support this; any loss is from severe calorie restriction. Not from the HCG."

~ Elizabeth Miller, acting director of FDA's Division of Non-Prescription Drugs and Health Fraud

HCG Fits the Definition of Pseudoscience, But It Won’t Seem to Go Away

A Patient Brought Me This Last Week



That's Not The Obesity Medicine I Know !

- Obesity Medicine is Evidence Based
- Rapidly Advancing Science
- Understanding Weight Regulation
- Dietary Prescription, and
- Medical, Device, and Surgical Treatments

2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults:

A Report of the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines and The Obesity Society

July 1, 2014

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2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults☆

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society

Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation, American Pharmacists Association, American Society for Nutrition, American Society for Parenteral and Enteral Nutrition, American Society for Preventive Cardiology, American Society of Hypertension, Association of Black Cardiologists, National Lipid Association, Preventive Cardiovascular Nurses Association, The Endocrine Society, and WomenHeart: The National Coalition for Women With Heart Disease

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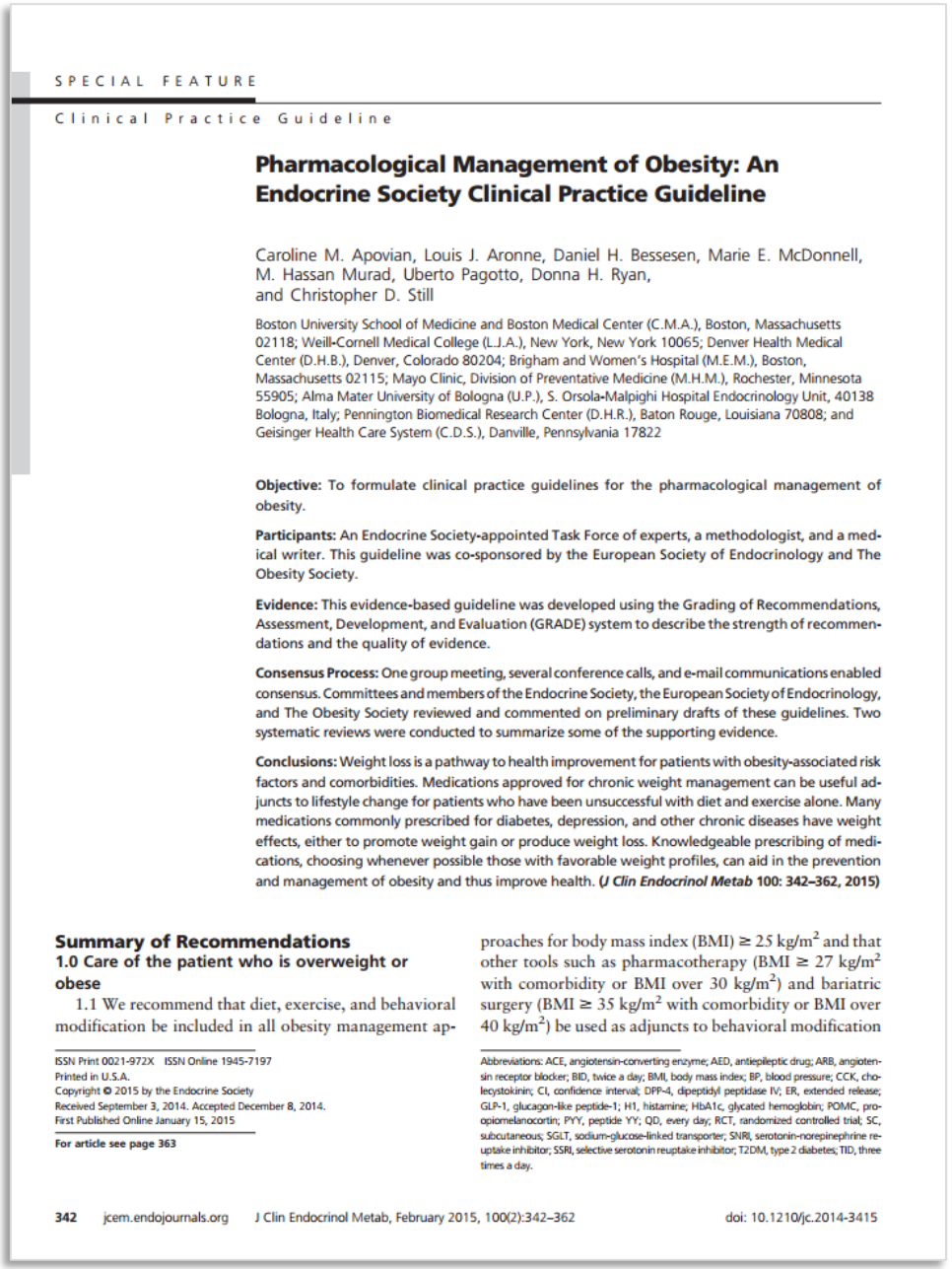
J Am Coll Cardiol. 2014 Jul 1;63(25 Pt B):2985-3023.

PHARMACOLOGICAL MANAGEMENT of OBESITY:

An Endocrine Society Clinical Practice Guideline

January 15, 2015



SPECIAL FEATURE

Clinical Practice Guideline

Pharmacological Management of Obesity: An Endocrine Society Clinical Practice Guideline

Caroline M. Apovian, Louis J. Aronne, Daniel H. Bessesen, Marie E. McDonnell, M. Hassan Murad, Uberto Pagotto, Donna H. Ryan, and Christopher D. Still

Boston University School of Medicine and Boston Medical Center (C.M.A.), Boston, Massachusetts 02118; Weill-Cornell Medical College (L.J.A.), New York, New York 10065; Denver Health Medical Center (D.H.B.), Denver, Colorado 80204; Brigham and Women's Hospital (M.E.M.), Boston, Massachusetts 02115; Mayo Clinic, Division of Preventative Medicine (M.H.M.), Rochester, Minnesota 55905; Alma Mater University of Bologna (U.P.), S. Orsola-Malpighi Hospital Endocrinology Unit, 40138 Bologna, Italy; Pennington Biomedical Research Center (D.H.R.), Baton Rouge, Louisiana 70808; and Geisinger Health Care System (C.D.S.), Danville, Pennsylvania 17822

Objective: To formulate clinical practice guidelines for the pharmacological management of obesity.

Participants: An Endocrine Society-appointed Task Force of experts, a methodologist, and a medical writer. This guideline was co-sponsored by the European Society of Endocrinology and The Obesity Society.

Evidence: This evidence-based guideline was developed using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system to describe the strength of recommendations and the quality of evidence.

Consensus Process: One group meeting, several conference calls, and e-mail communications enabled consensus. Committees and members of the Endocrine Society, the European Society of Endocrinology, and The Obesity Society reviewed and commented on preliminary drafts of these guidelines. Two systematic reviews were conducted to summarize some of the supporting evidence.

Conclusions: Weight loss is a pathway to health improvement for patients with obesity-associated risk factors and comorbidities. Medications approved for chronic weight management can be useful adjuncts to lifestyle change for patients who have been unsuccessful with diet and exercise alone. Many medications commonly prescribed for diabetes, depression, and other chronic diseases have weight effects, either to promote weight gain or produce weight loss. Knowledgeable prescribing of medications, choosing whenever possible those with favorable weight profiles, can aid in the prevention and management of obesity and thus improve health. (*J Clin Endocrinol Metab* 100: 342–362, 2015)

Summary of Recommendations

1.0 Care of the patient who is overweight or obese

1.1 We recommend that diet, exercise, and behavioral modification be included in all obesity management approaches for body mass index (BMI) ≥ 25 kg/m^2 and that other tools such as pharmacotherapy (BMI ≥ 27 kg/m^2 with comorbidity or BMI over 30 kg/m^2) and bariatric surgery (BMI ≥ 35 kg/m^2 with comorbidity or BMI over 40 kg/m^2) be used as adjuncts to behavioral modification

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For article see page 363

Abbreviations: ACE, angiotensin-converting enzyme; AED, antiepileptic drug; ARB, angiotensin receptor blocker; BID, twice a day; BMI, body mass index; BP, blood pressure; CCK, cholecystokinin; CI, confidence interval; DPP-4, dipeptidyl peptidase IV; ER, extended release; GLP-1, glucagon-like peptide-1; H1, histamine; HbA1c, glycated hemoglobin; POMC, proopiomelanocortin; PYY, peptide YY; QD, every day; RCT, randomized controlled trial; SC, subcutaneous; SGLT, sodium-glucose-linked transporter; SNRI, serotonin-norepinephrine reuptake inhibitor; SSRI, selective serotonin reuptake inhibitor; T2DM, type 2 diabetes; TID, three times a day.

Apovian CM, Aronne LJ, Bessesen D et al. J Clin Endocrinol Metab. 2015;100:342-362.

AMERICAN BOARD
of OBESITY MEDICINE

Obesity Medicine:
The Newest Specialty in Medicine

ABOM Partner Organizations

American Board of Medical Specialties (ABMS)

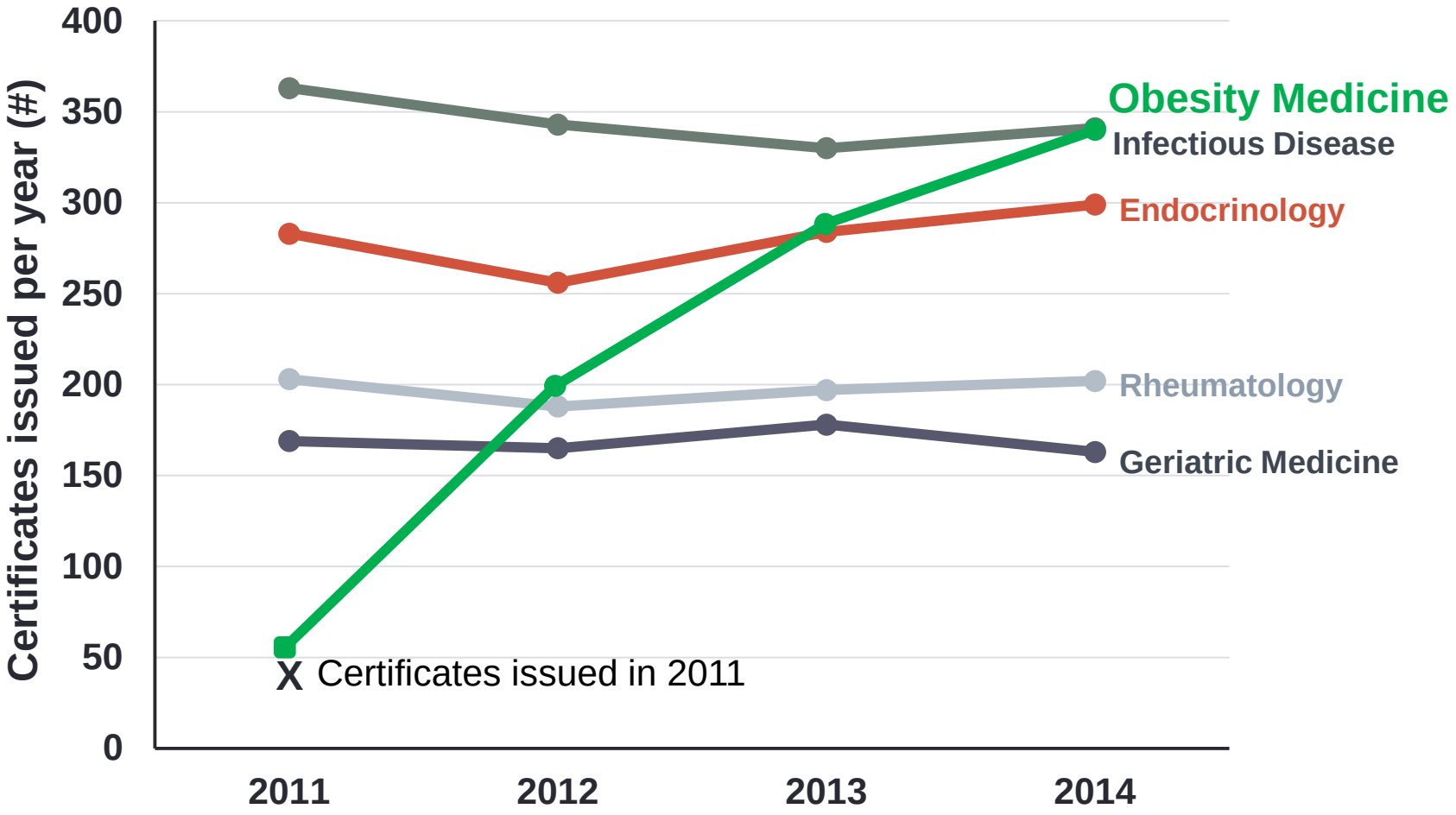
Fields of Medicine Partners

- American College of Physicians
- The Endocrine Society
- American Gastroenterological Association
- American Congress of Obstetricians and Gynecologists
- American College of Preventive Medicine

Partner Organizations

- The Obesity Society
- American Society of Bariatric Physicians
- American Society of Metabolic and Bariatric Surgery

Number of Certificates Issued in Various Medical Specialties



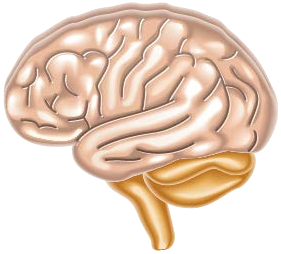
The Endocrine Society Guidelines Task Force agrees with the opinion of prominent medical societies that current scientific evidence supports the view that obesity is a disease

What is the disease?

Medical Complications of Obesity[1-3]

Almost every organ system is affected by obesity and may benefit from weight loss

Idiopathic intracranial hypertension



Stroke

Cataracts

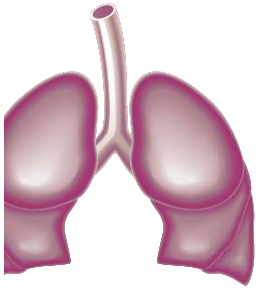
Hypertension

Dyslipidemia

Coronary heart disease

Pulmonary disease

- Asthma
- Obstructive sleep apnea
- Hypoventilation syndrome



Nonalcoholic fatty liver disease

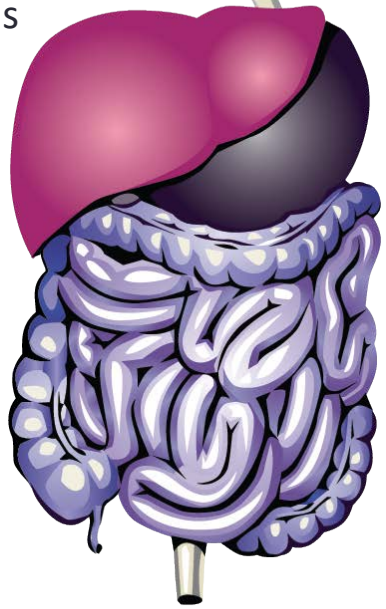
- Steatosis
- Steatohepatitis
- Cirrhosis

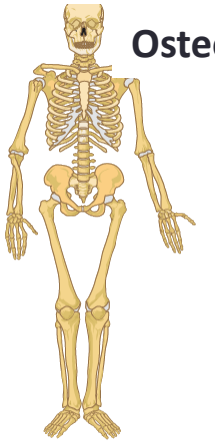
Diabetes

Cancer

- Breast, uterus, cervix
- Colon, esophagus
- Pancreas
- Kidney
- Prostate

Severe pancreatitis





Osteoarthritis

Gall bladder disease

Reproductive abnormalities

- Abnormal menses
- Infertility
- Polycystic ovarian syndrome

Skin

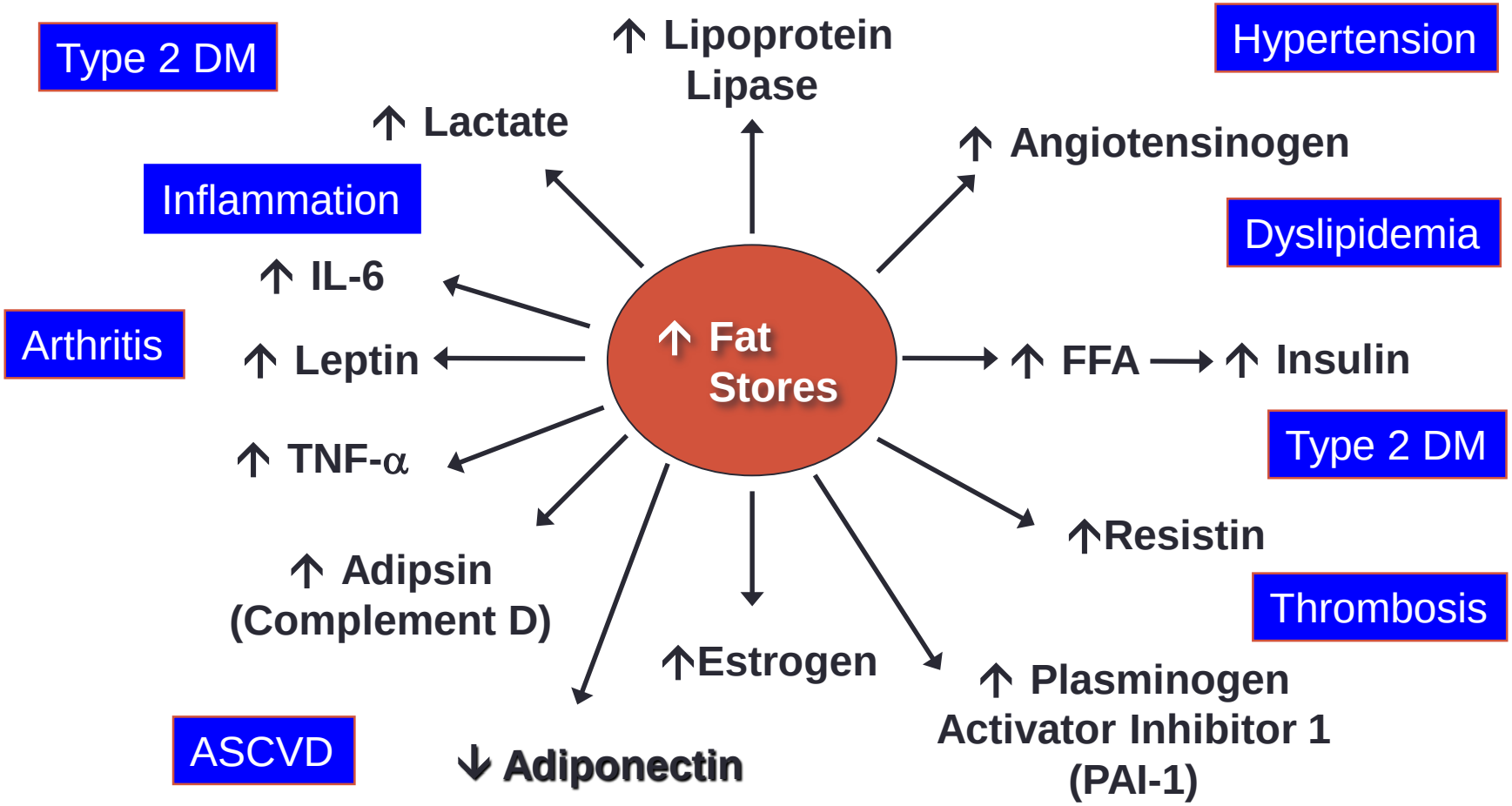
Phlebitis

- Venous stasis

Gout

1. Bays HE. *Am J Cardiol*. 2012;110:4B-12B. 2. Bays HE. *Expert Rev Cardiovasc Ther*. 2008;6:343-368. 3. Bays HE. *J Am Coll Cardiol*. 2011;57:2461-2473.

How Obesity Causes Disease: The Fat Cell - A Multiendocrine Organ



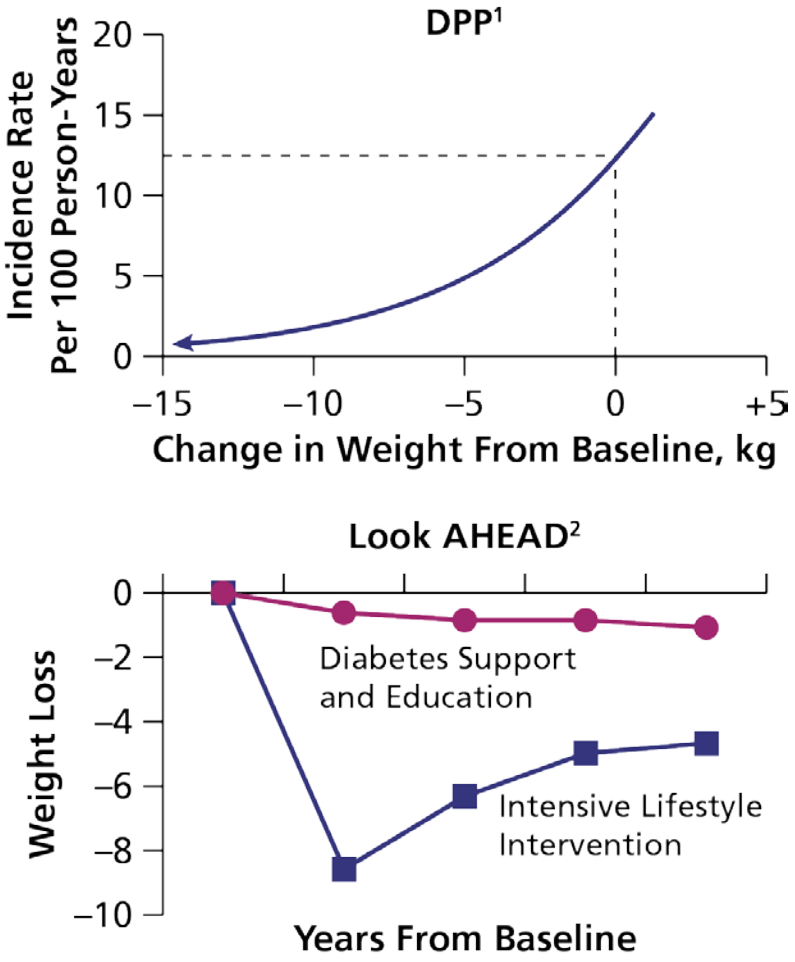
DM=diabetes mellitus; FFA=free fatty acid; PAI-1=plasminogen activator inhibitor-1; TNFα=tumor necrosis factor-alpha; IL-6=interleukin 6; ASCVD=atherosclerotic cardiovascular disease.

Lyon CJ, et al. *Endocrinology*. 2003;144:2195-2200. Trayhurn P, Wood IS. *Br J Nutr*. 2004;92:347-355.
Eckel RH, et al. Lancet. 2005;365:1415-1428.
After Dr. G. Bray.

Why Is 5%-10% Weight Loss the Goal of Treatment? Shrinking Fat Cells Produces Disproportionate Health Benefit!

Modest weight loss (5%-10%) can:

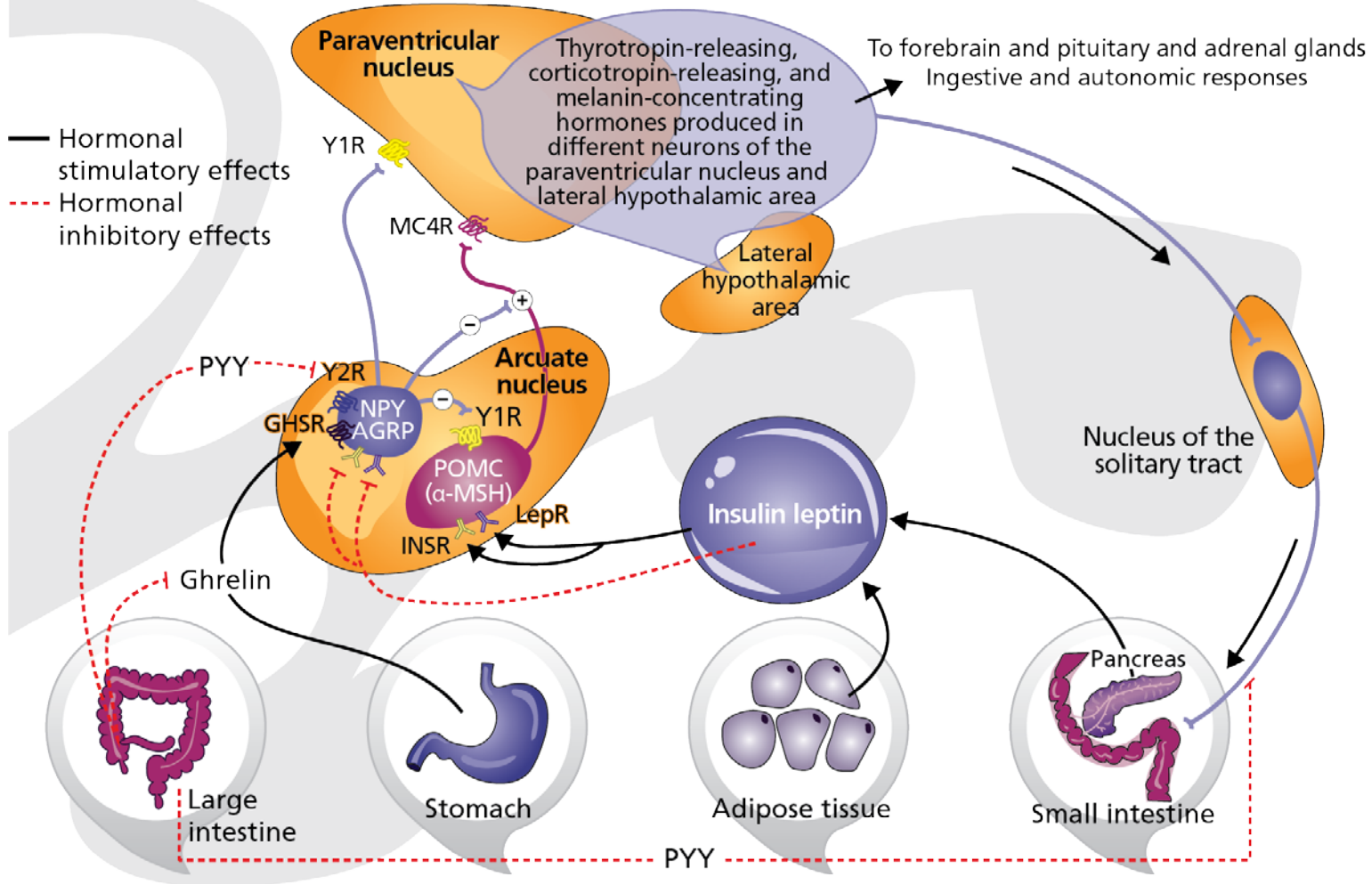
- Prevent T2DM[1]
- Improve glycemic control in T2DM
- Reduce need for antidiabetic agents
- Reduce blood pressure
- Reduce triglycerides
- Increase HDL-C
- Reduce CRP
- Improve symptoms of sleep apnea
- Improve markers of NAFLD



CRP: C-reactive protein; DPP: Diabetes Prevention Program; HDL-C: high-density lipoprotein cholesterol; NAFLD: nonalcoholic fatty liver disease.

1. Hamman RF et al. *Diabetes Care*. 2006;29:2102-2107.
2. http://www.lookaheadtrial.org/public/bibliography.pdf. Accessed September 17, 2014.

Body Weight is Regulated. Obesity is a Disorder of the Weight-Regulating Pathways.



AGRP: agouti-related peptide; α-MSH: α-melanocyte-stimulating hormone; GHSR: growth hormone secretagogue receptor; INSR: insulin receptor; LepR: leptin receptor; MC4R: melanocortin-4 receptor; NPY: neuropeptide Y; POMC: proopiomelanocortin; PYY: peptide YY; Y1R; neuropeptide Y1 receptor; Y2R: neuropeptide Y2 receptor.

Apovian CM, Aronne LJ, Bessesen D et al. *J Clin Endocrinol Metab*. 2015;100:342-362.

Related Commentary, page 22 Research article

Obesity is associated with hypothalamic injury in rodents and humans

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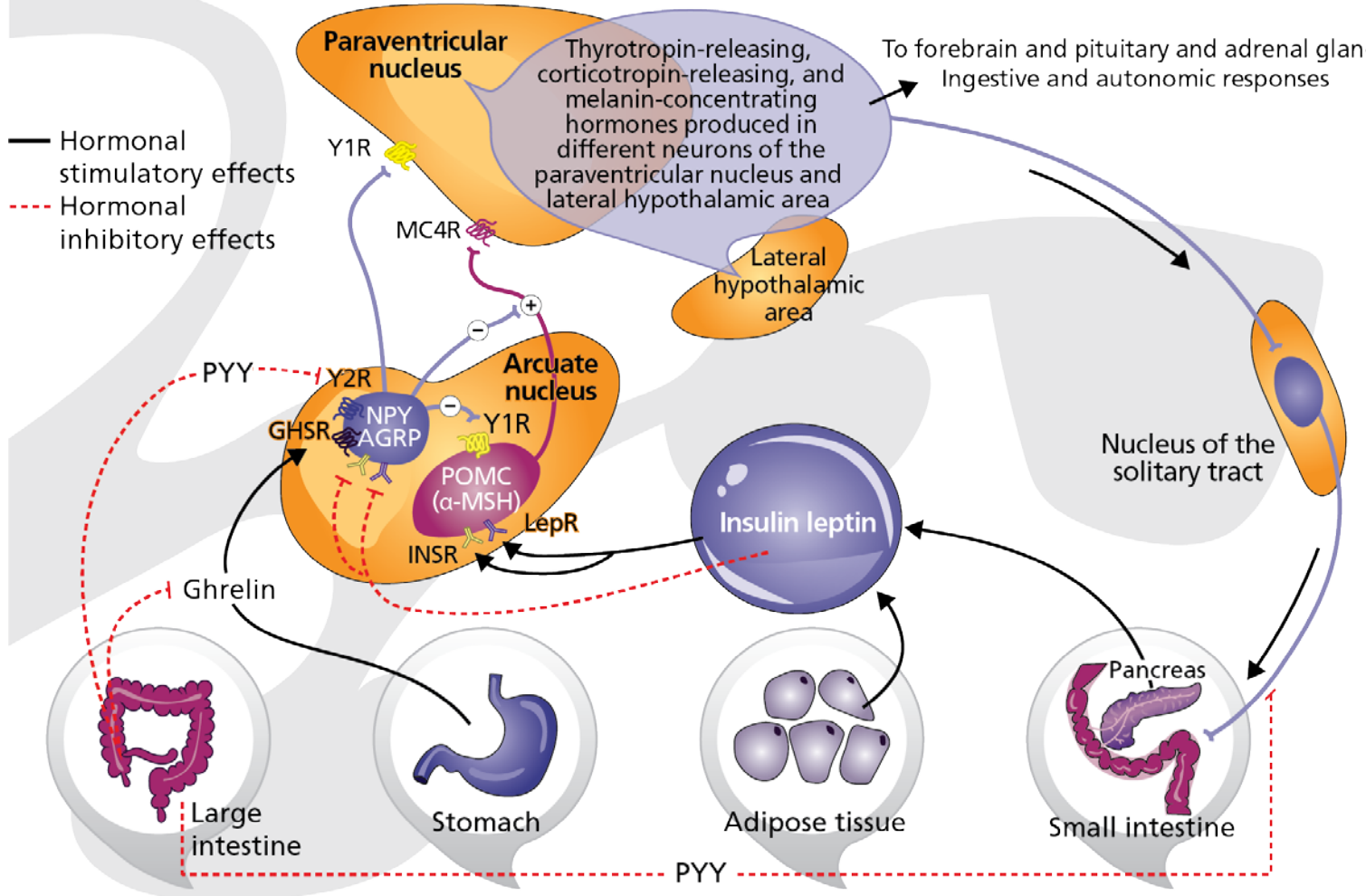
Rodent models of obesity induced by consuming high-fat diet (HFD) are characterized by inflammation both in peripheral tissues and in hypothalamic areas critical for energy homeostasis. Here we report that unlike inflammation in peripheral tissues, which develops as a consequence of obesity, hypothalamic inflammatory signaling was evident in both rats and mice within 1 to 3 days of HFD onset, prior to substantial weight gain. Furthermore, both reactive gliosis and markers suggestive of neuron injury were evident in the hypothalamic arcuate nucleus of rats and mice within the first week of HFD feeding. Although these responses temporarily subsided, suggesting that neuroprotective mechanisms may initially limit the damage, with continued HFD feeding, inflammation and gliosis returned permanently to the mediobasal hypothalamus. Consistent with these data in rodents, we found evidence of increased gliosis in the mediobasal hypothalamus of obese humans, as assessed by MRI. These findings collectively suggest that, in both humans and rodent models, obesity is associated with neuronal injury in a brain area crucial for body weight control.

Thaler PT, et al. *J Clin Invest*. 2012 Jan 3;122(1):153-62. doi: 10.1172/JCI59660. Epub 2011

Hypothalamic Injury Diminishes Signaling to Cortex and NTS, Leading to Greater Weight Gain



AGRP: agouti-related peptide; α-MSH: α-melanocyte-stimulating hormone; GHSR: growth hormone secretagogue receptor; INSR: insulin receptor; LepR: leptin receptor; MC4R: melanocortin-4 receptor; NPY: neuropeptide Y; POMC: proopiomelanocortin; PYY: peptide YY; Y1R; neuropeptide Y1 receptor; Y2R: neuropeptide Y2 receptor.

Apovian CM, Aronne LJ, Bessesen D et al. *J Clin Endocrinol Metab*. 2015;100:342-362.

Hypothetical "Feed-forward" Mechanism

Positive Feedback Mechanism to Drive Weight Up

High Fat/High Carb Food

Hypothalamic injury - CNS insulin and leptin resistance

"Brain can't tell how much fat is stored, how much food is eaten"

1.Reduced sense of satiety

2. Craving

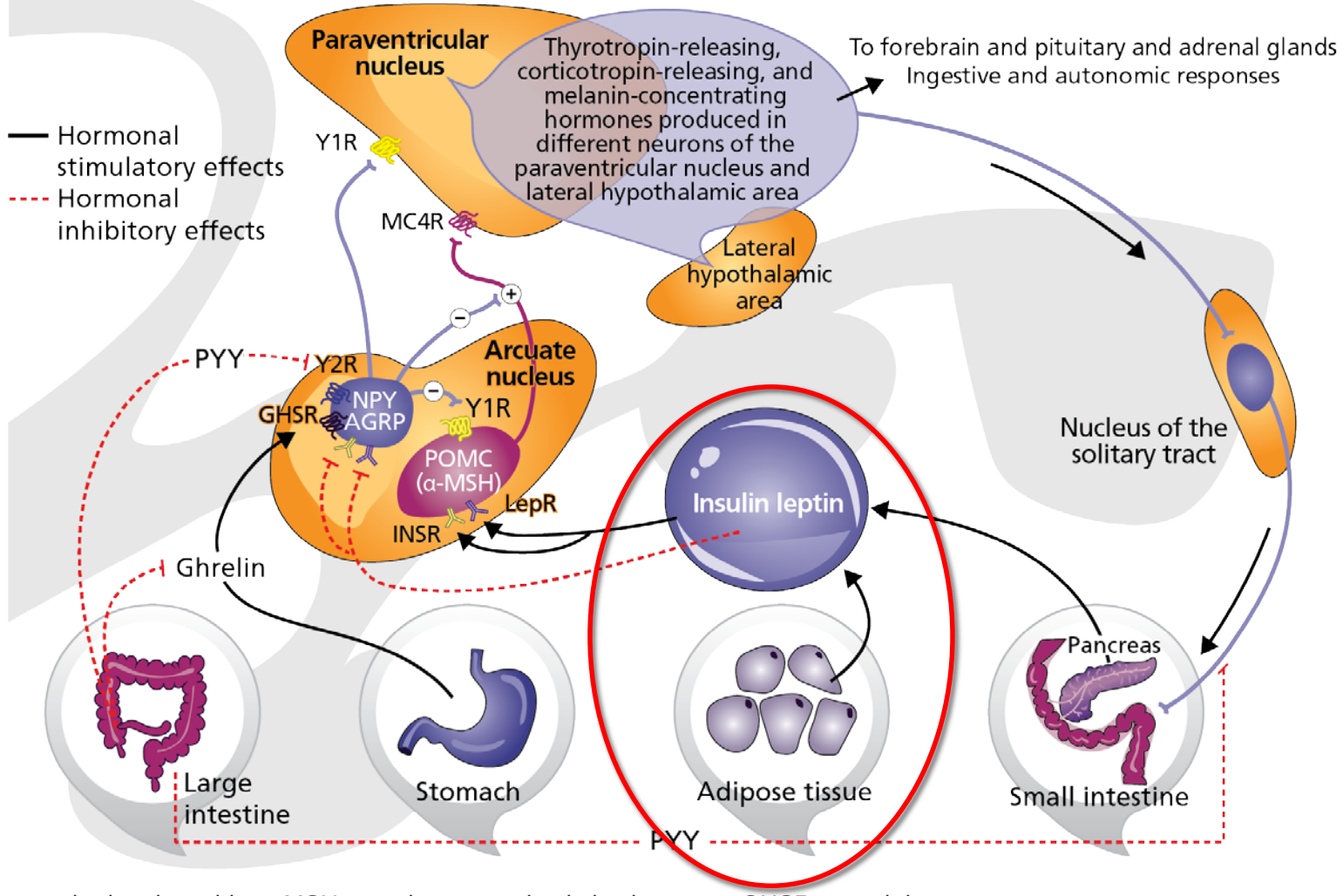
1. Increased food intake

2. Weight gain

Increased endocannabinoids and resistance to leptin and insulin

Wang J, Diabetes, 2001
DiMarzo V pers comm
Ozcan L, et al, Cell Metabolism; 2009

Bad Habits Damage Hypothalamic Pathways
if Hypothalamus is Damaged, Leptin Resistance is a Result



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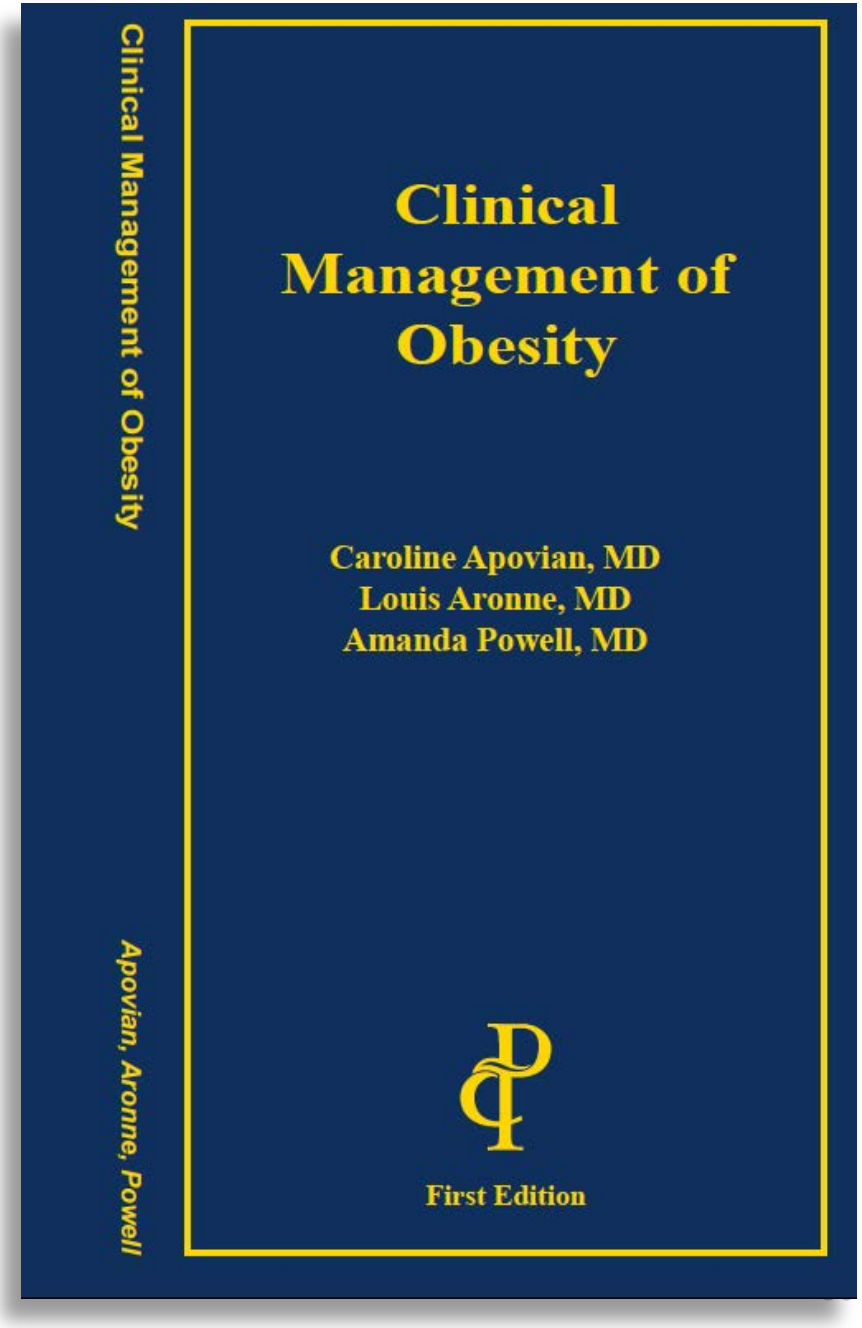
Apovian CM, Aronne LJ, Bessesen D et al. *J Clin Endocrinol Metab*. 2015;100:342-362.

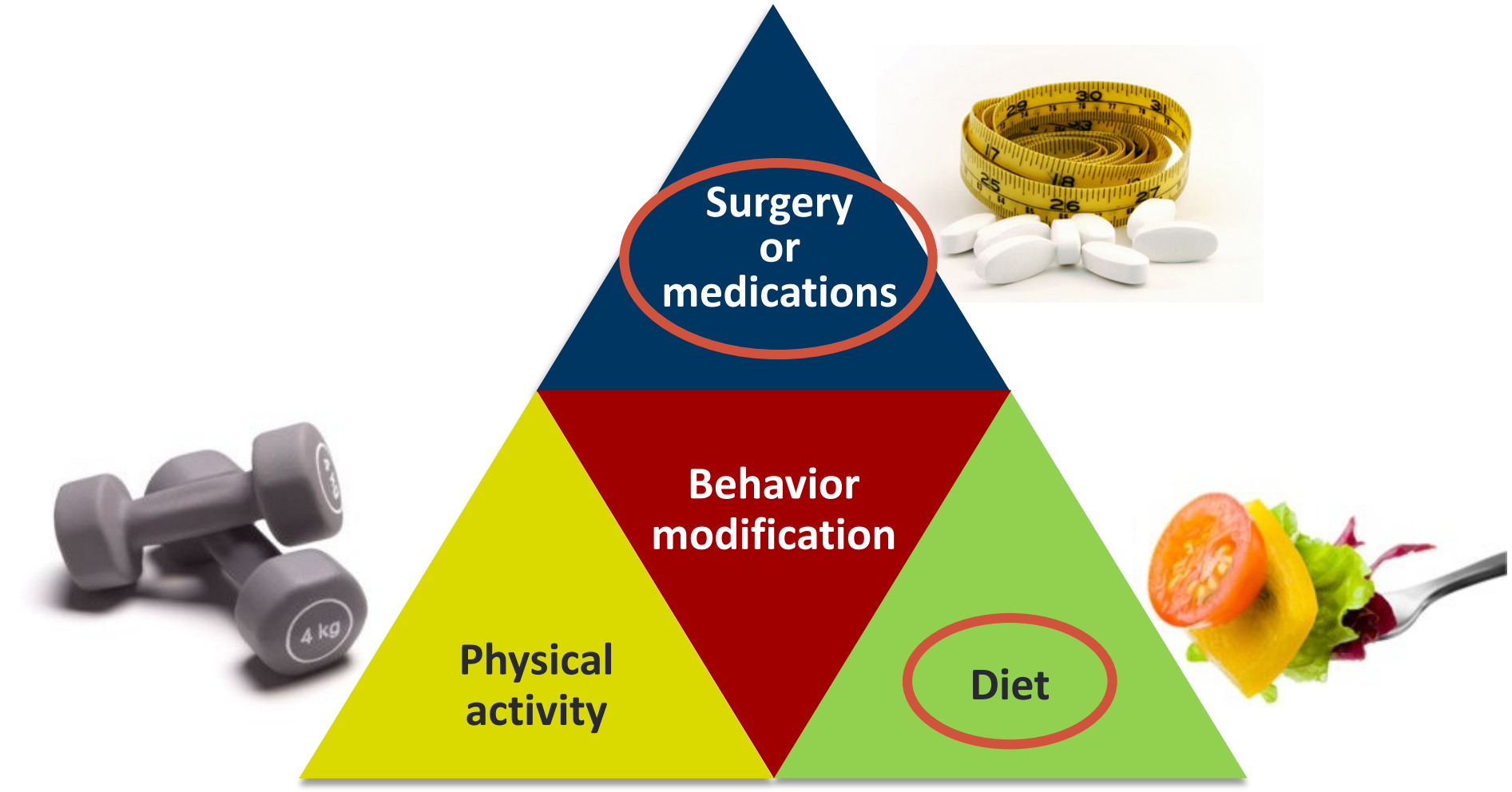
OK, Great, Now What?

- What do I do for my patients until we have better treatments!

RESOURCES
Everything
you need
is in here



Components of an Effective Obesity Management Program[1,2]



1. Wadden TA, Foster GD. *Med Clin North Am*. 2000;84:441-461.
2. Stumbo PH et al. *Surg Clin N Am*. 2005;85703-85723.

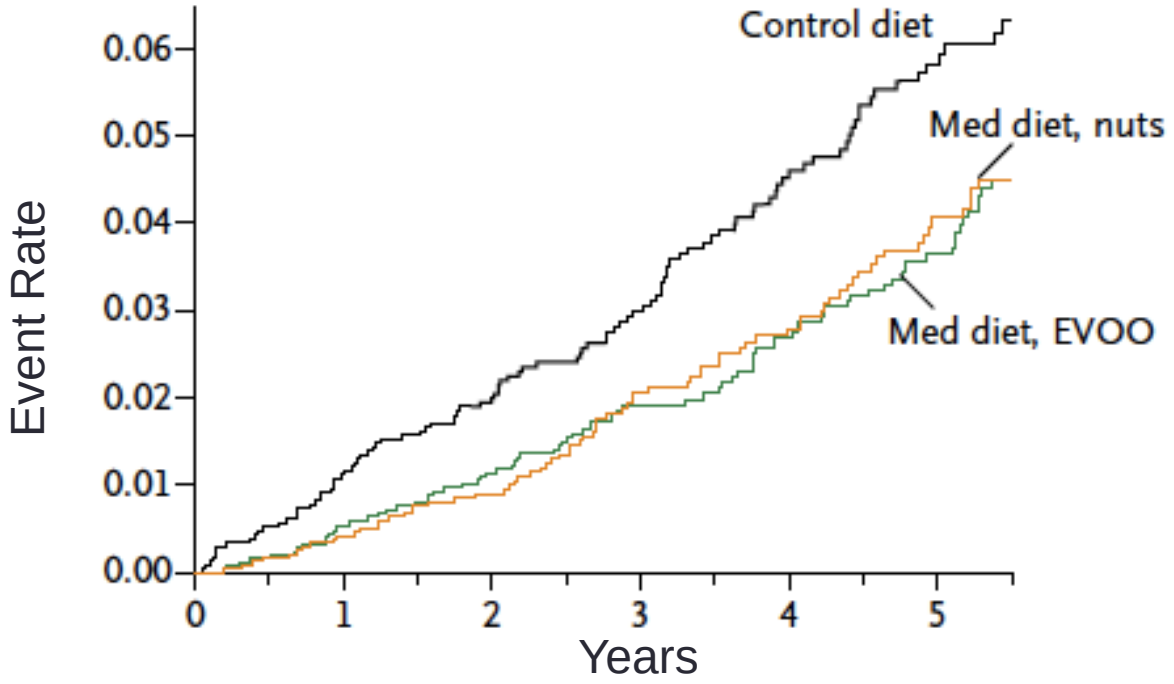
What's the best diet for my patients?

- No diet is "The Best"

- We favor low glycemic, Mediterranean diet
  - Appears to improve compliance
  - Reduces CV risk

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

- 7447 persons were enrolled (55-80 years); 57% were women.
- Med Diet /Extra Virgin Olive oil – I L/week
- Med Diet /Nuts – 1 oz/day
- Control Diet - Low Fat



Among persons at high cardiovascular risk, a Mediterranean diet supplemented with extra-virgin olive oil or nuts reduced the incidence of major cardiovascular events.

Estruch R, et al, N Engl J Med. 2013 Apr 4;368(14):1279-90.

The American Journal of Clinical Nutrition

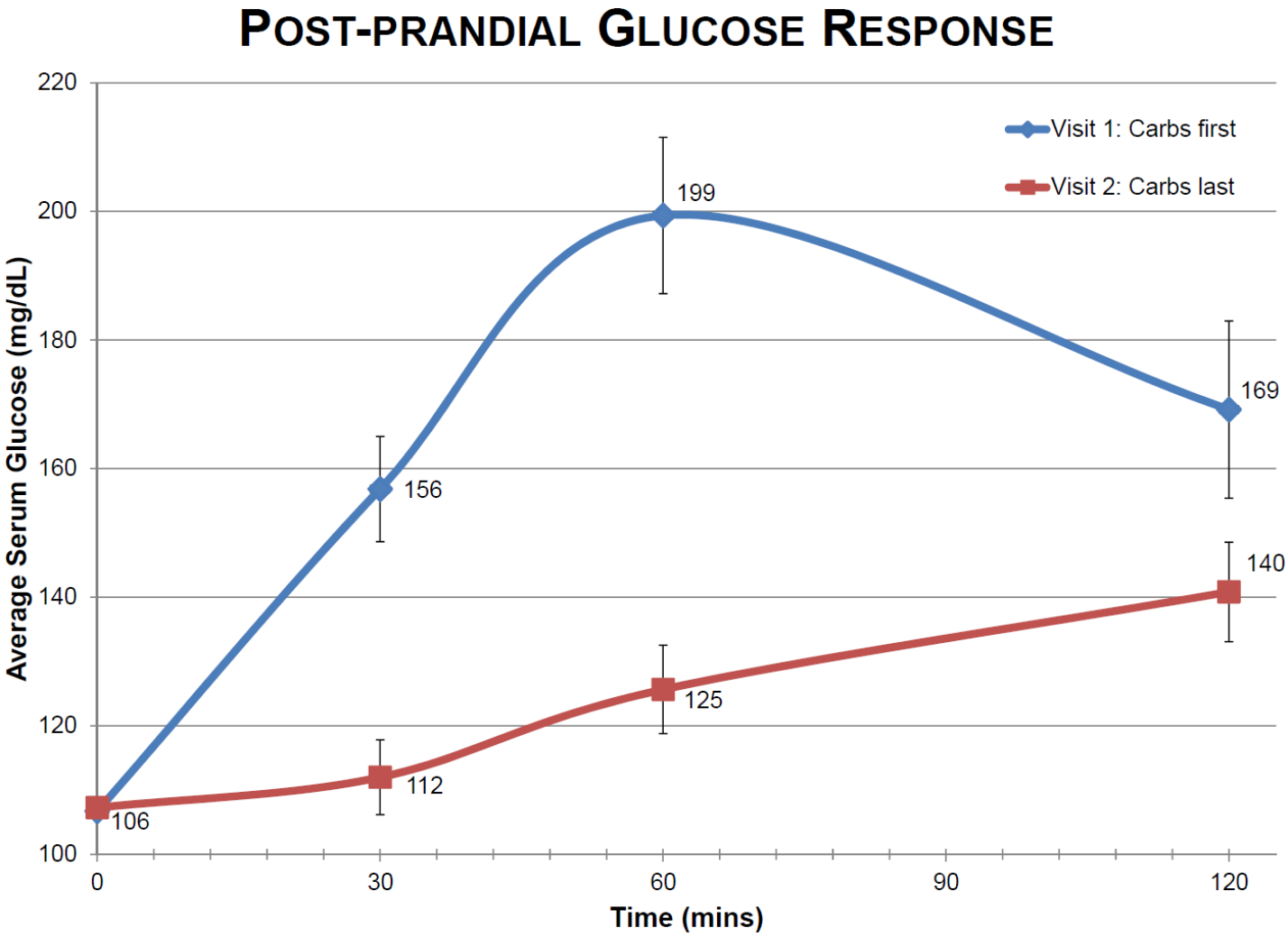
Effects of dietary glycemic index on brain regions related to reward and craving in men[1–4]

Belinda S Lennerz, David C Alsop, Laura M Holsen, Emily Stern, Rafael Rojas, Cara B Ebbeling, Jill M Goldstein, and David S Ludwig

Conclusions: Compared with an isocaloric low-GI meal, a high-GI meal decreased plasma glucose, increased hunger, and selectively stimulated brain regions associated with reward and craving in the late postprandial period, which is a time with special significance to eating behavior at the next meal. This trial was registered at clinicaltrials.gov as NCT01064778. *Am J Clin Nutr* 2013;98:641–7.

This finding and many others fit with our clinical experience. A low glycemic diet reduces food intake in many people by reducing the urge to eat later in the day. A high glycemic breakfast may make some people hungrier.

Eat Vegetables and Protein Before Carbs The Order in Which Food is Consumed Impacts Post-prandial Glycemia



Bread first

Vegs and chicken 15 min later

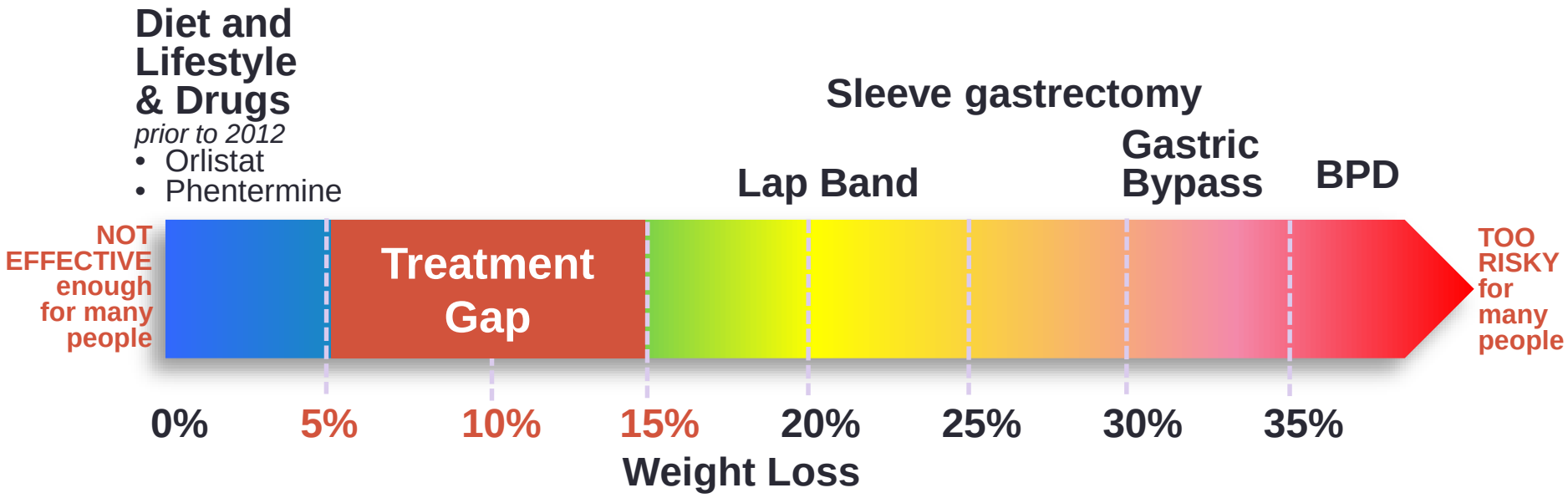
Vegs and chicken first

Bread 15 min later

Shukla AP, Iliescu RG, Thomas CE, Aronne LJ. Diabetes Care. 2015 Jul;38(7):e98-9.

Treatment Gap in Mid-BMI Range

New drugs and devices can reduce weight and weight-related comorbidities



After Aronne L. FDA VI-0521 EMDAC 2010.

Medications Can Cause Weight Gain

Before You Prescribe:

- Psychotropic medications
  - Tricyclic antidepressants
  - Monoamine oxidase inhibitors
  - Specific SSRIs
  - Lithium
- Atypical antipsychotics
- Specific anticonvulsants
- Highly active antiretroviral therapy
- Antihistamines
- Diabetes medications
  - Insulin
  - Sulfonylureas
  - Thiazolidinediones
- β-adrenergic receptor blockers
- Metabolic syndrome meds
- Steroid Hormones
  - Glucocorticoids
  - Progestational steroids

Case Study

Patient AC
Weight Regain
s/p Lap Band

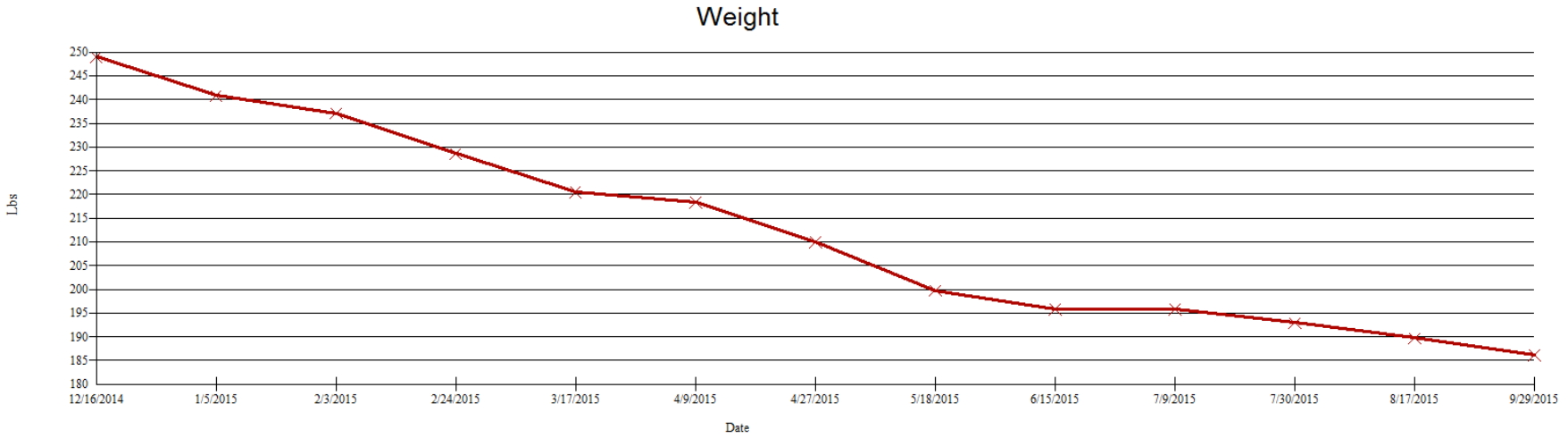
- 69-year-old M with:
  - Obesity (BMI 35.7 kg/m^2)
  - DM2 (HA1c 6.2)
  - HTN
- S/p lap band 10 years ago
  - Regained all weight
  - Poor dietary compliance
- Medications:
  - Pioglitazone 45 mg daily
  - Metformin 500 mg daily
  - Lisinopril 40 mg daily
  - Tricor 145 mg daily
  - Vytorin 10-10 mg daily

Case Study

Patient AC
Weight Regain
s/p Lap Band

- Low glycemic index diet
- D/c'd Pioglitazone
- Increased metformin
  - 500 mg BID
  - Titrated up to 1000 mg BID
- Added liraglutide
  - 0.6 mg daily
  - Titrated up to 1.8 mg daily

Patient AC



12/2014
249 lbs

Pioglitazone 45 mg
Metformin 500 mg

9/2015
186 lbs

Metformin 2000 mg
Liraglutide1.8 mg

63 lb wt loss
over 9 months

Pharmacotherapy for Obesity: ENDO Society Guidelines[1]

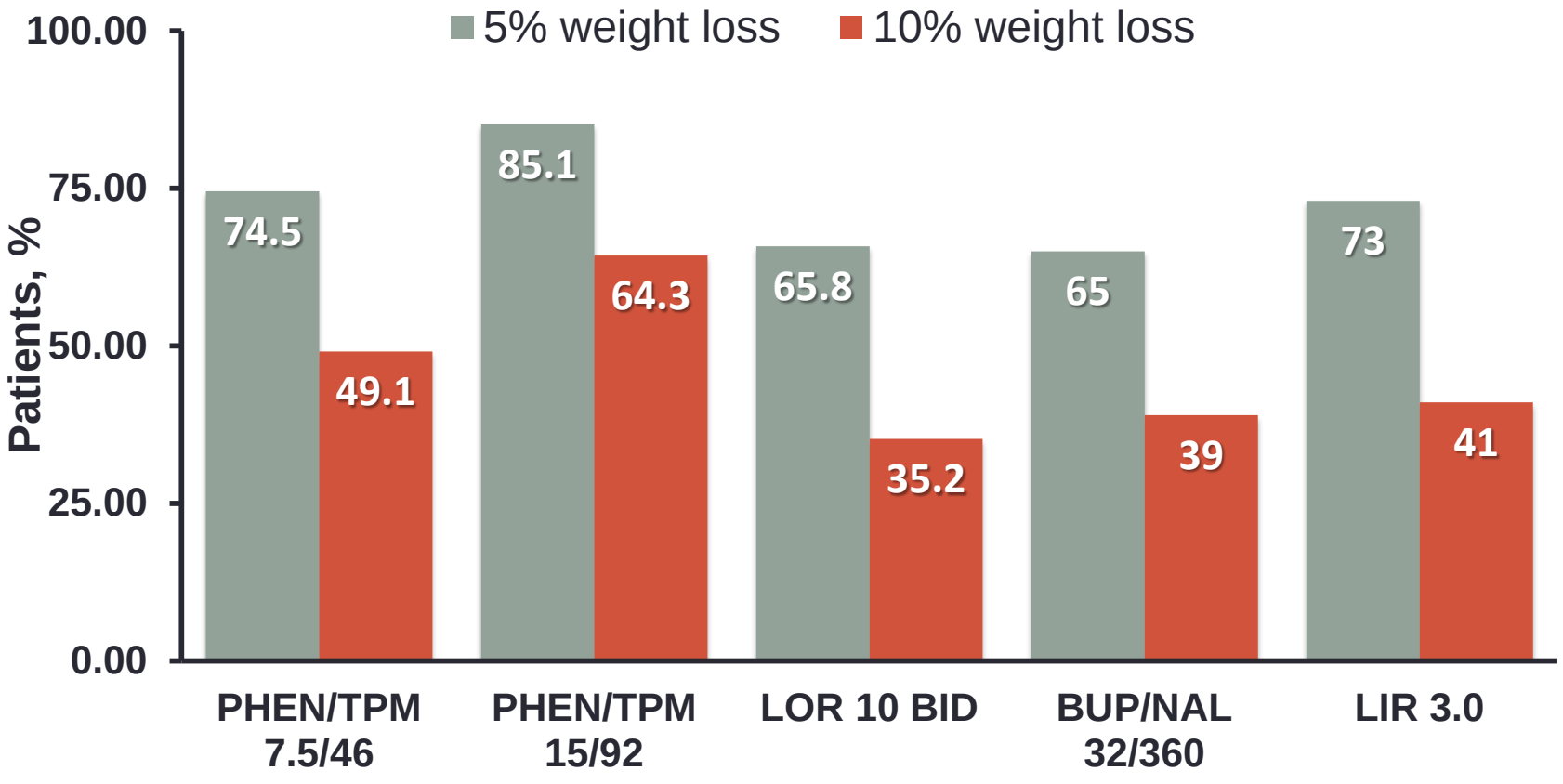
Drug	Mechanism of Action	Mean Weight Loss[a]	Study Duration
Phentermine	Norepinephrine-releasing agent	3.6 kg	2 to 24 weeks
Diethylpropion	Norepinephrine-releasing agents	3.0 kg	6 to 52 weeks
Orlistat	Pancreatic and gastric lipase inhibitor	2.9 to 3.4 kg, 2.9% to 3.4%	1 year
Lorcaserin	$5HT_{2C}$ receptor agonist	3.6 kg, 3.6%	1 year
Phentermine/ topiramate	GABA receptor modulation (topiramate) plus norepinephrine-releasing agent (phentermine)	6.6 kg *(recommended dose)* 6.6%; 8.6 kg *(high dose)*, 8.6%	1 year
Naltrexone bupropion	Reuptake inhibitor of dopamine and norepinephrine (bupropion) and opioid antagonist (naltrexone)	4.8%	1 year
Liraglutide	GLP-1 agonist	5.8 kg	1 year

[a] Mean weight loss in excess of placebo as percentage of initial body weight or mean kg weight loss over placebo.
GABA: gamma-aminobutyric acid; GLP-1: glucagon-like peptide-1.

Apovian CM, Aronne LJ, Bessesen D et al. *J Clin Endocrinol Metab*. 2015;100:342-362.

Odds of Reducing Body Weight by % Categories at 1 Year With Adjunctive Medication Among Those Who Complete Treatment

Combined with lifestyle modification



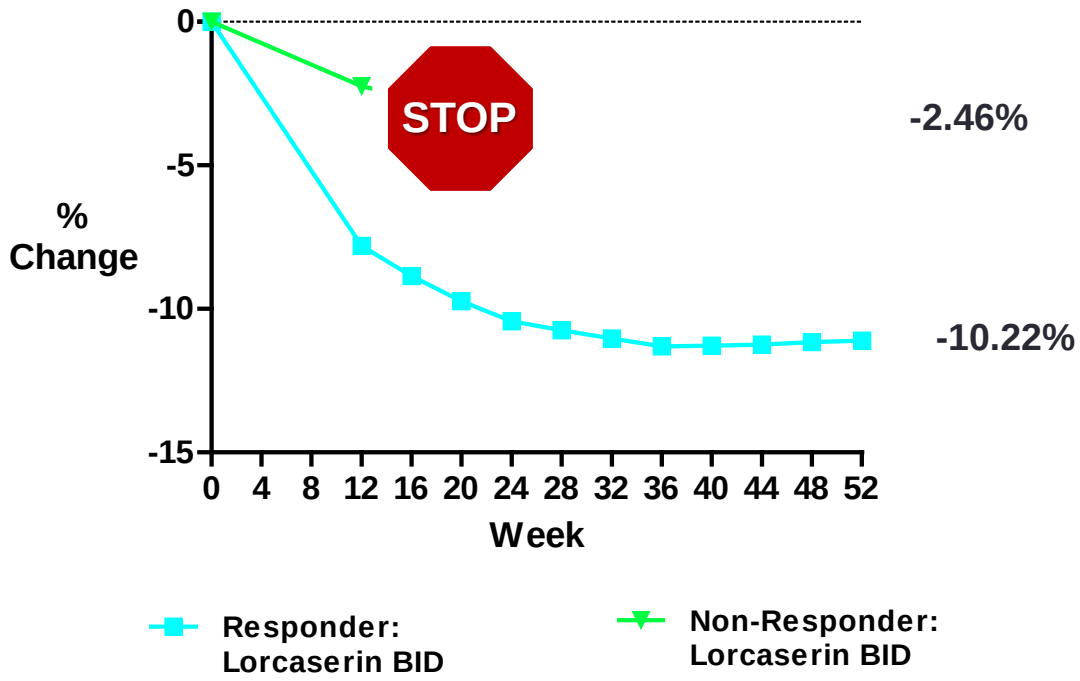
PHEN: phentermine
TPM: topiramate

LOR: lorcaserin

BUP: bupropion
NAL: naltrexone

LIR: liraglutide

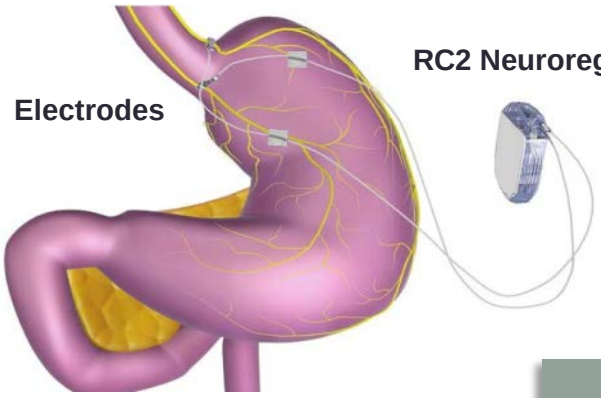
If It Does Work, Don't Bother! Those Who Lost ≥ 4.5% Total Body Weight by Week 12 Lost 10.2% at 1 year Lorcaserin



MITT Lorcaserin BID	Week 12	Completed Week 12	Completed Week 52
N = 3097	≥4.5% wt loss	1369/3097 (44.2%)	1083/1369 (79.1%)
	<4.5% wt loss	1168/3097 (37.7%)	680/1168 (58.2%)

Devices

Vagal Blocking Therapy

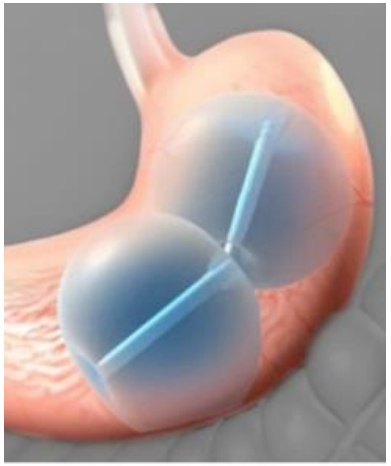


- Pacemaker-like device designed to control hunger and fullness by blocking the vagus nerve to affect the perception of hunger and fullness
- Satiation by delaying food processing and gastric emptying

%EWL achieved	VBLOC	
	12 months (N=147)	24 months (N=103)
≥5.0%	67%	58%
≥7.5%	56%	45%
≥10.0%	39%	34%
≥12.5%	32%	27%
≥15.0%	22%	21%

Ikramuddin S, et al. *JAMA* 2014;312(9):915-922

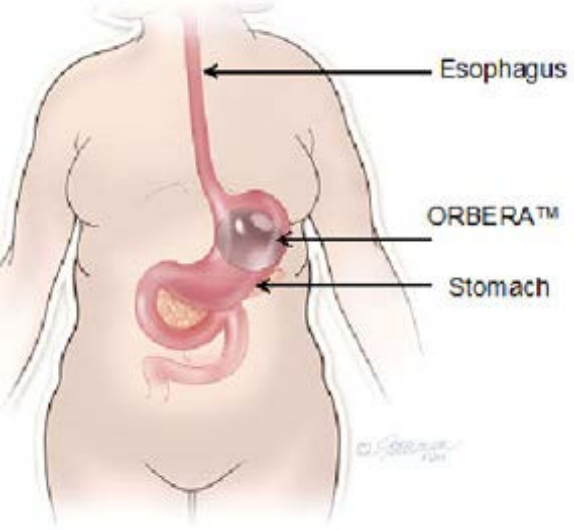
Two Balloon Devices Approved in 2015



ReShape Dual Balloon

ReShape™ Integrated Dual Balloon System

- 25.44% EWL and 11.27% TBWL at 12 months (n=1683)[1]
- Two attached balloons placed into stomach through mouth
- Filled with ~2 cups of saline and a blue dye (methylene blue)
- If a balloon breaks, blue dye will appear in the patient's urine
- Balloons are deflated at removal in 6 months
- FDA approved July 28, 2015
- BMI of 30-40 kg/m^2



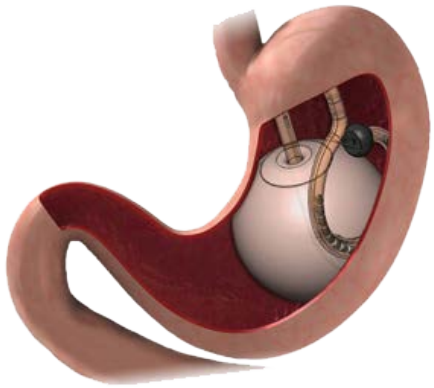
ORBERA™ Intragastric Balloon System

- Lost 10.2% of body weight at 6 months
- Placed endoscopically in the stomach through mouth
- Filled with varying amounts of saline (400-700 ml) to best match the patient's body structure
- Maximum use of 6 months before removal
- FDA approved August 6, 2015
- BMI of 30-40 kg/m^2

1. ASGE Bariatric Endoscopy Task Force, et al. Gastrointest Endosc. 2015 Sep;82(3):425-38.e5.
2. www.fda.gov/MedicalDevices

New Balloon Devices

Name	Procedure	Time	Weight Loss
Obalon Balloon Pill Obalon	Attached to lightweight catheter; swallow with water; dissolves in stomach	3 mos	**50.2% Excess Weight Loss** 8.3% Total Body Weight Loss and 2.8 point reduction in BMI in 3 months (n=110)
The Elipse Allurion Technologies	**“Procedure-less”** Swallowed and excreted without surgery, endoscopy, or anesthesia	3 mos	**13% Excess Weight Loss** at 6 weeks 3.0 kg total body weight loss 6 weeks



http://www.obalon.com/hcp/en/
http://allurion.com/the-elipse-gastric-balloon/

Treatment Gap in Mid-BMI Range

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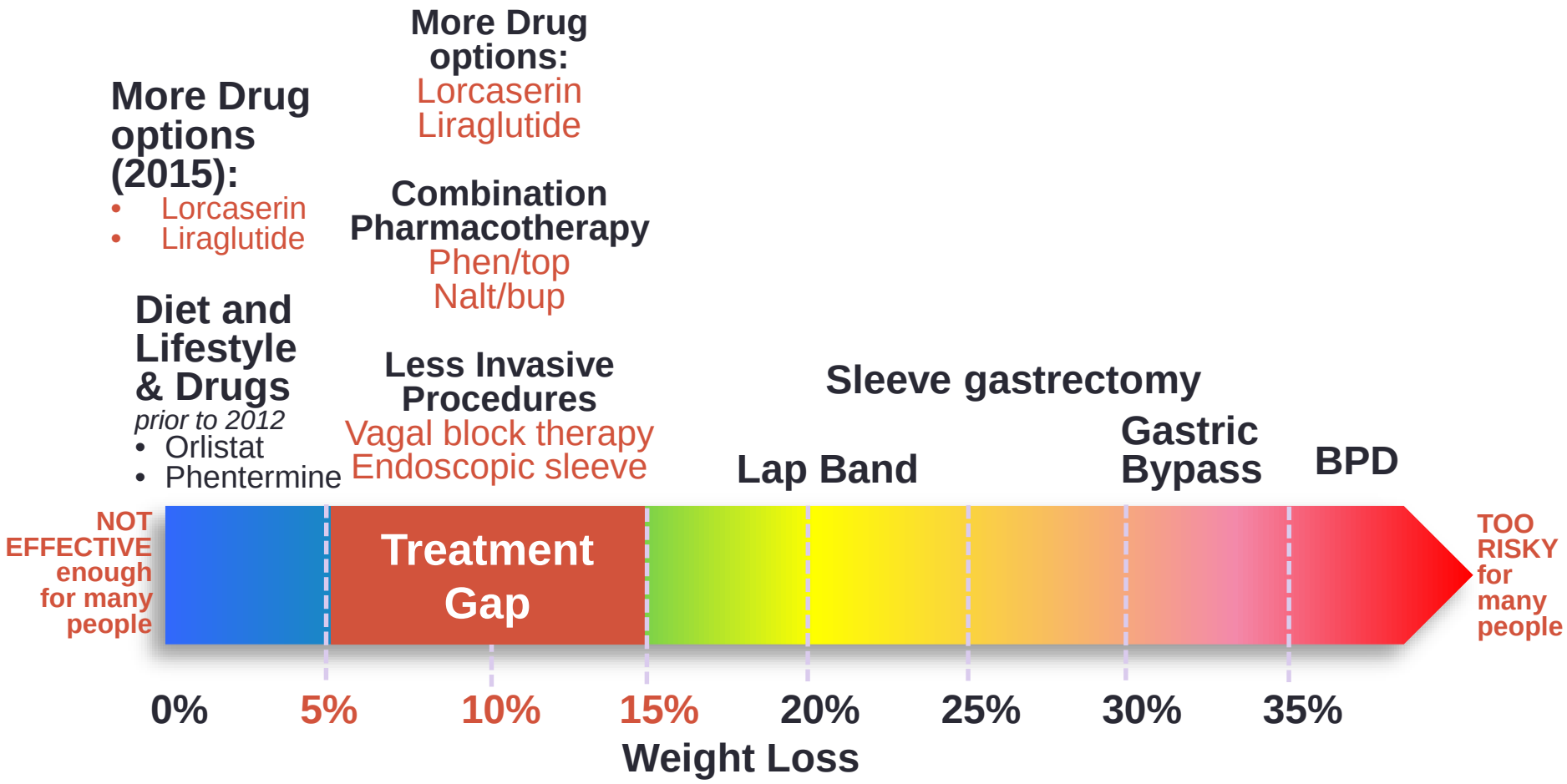

The gap is being filled

After Aronne L. FDA VI-0521 EMDAC 2010.