Cardiovascular Benefits after Weight Loss Surgery

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Co-Director, Weight Management Institute
Co-Director, Fellowship in Advanced Minimally Invasive and Bariatric Surgery
Summa Health, Akron, Ohio

Disclosure

- None

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Objectives

- Epidemiology of obesity
- Indications for Metabolic and Bariatric Surgery (MBS)
  - Updated 2022
- Review Currently Endorsed MBS Procedures
- Cardiovascular Benefits after Surgical Weight Loss

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Epidemiology of Obesity

Obesity by the Numbers

	USA	Ohio
Total Population	331 million	11.6 million
Adults	217 million	8.7 million
Percentage of adults	31%	33.5%
Adults (BMI > 30 kg/m^2)	67 million	2.8 million
Adults (BMI > 40 kg/m^2)	10.2 million	410,000
Adults (BMI > 50 kg/m^2)	1 million	40,000

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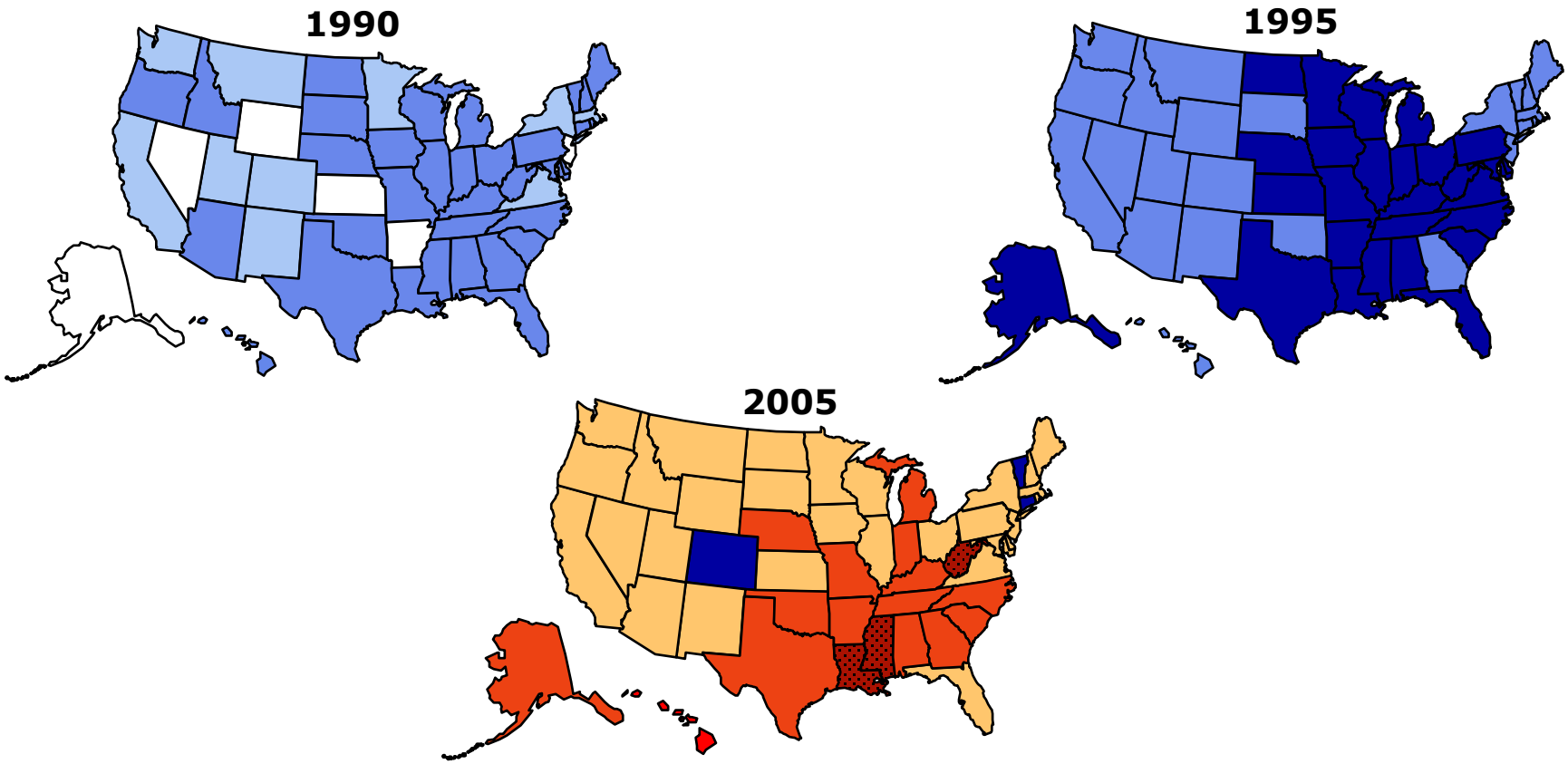
Obesity Trends Among U.S. Adults

(*BMI ≥30, or about 30 lbs overweight for 5'4" person)



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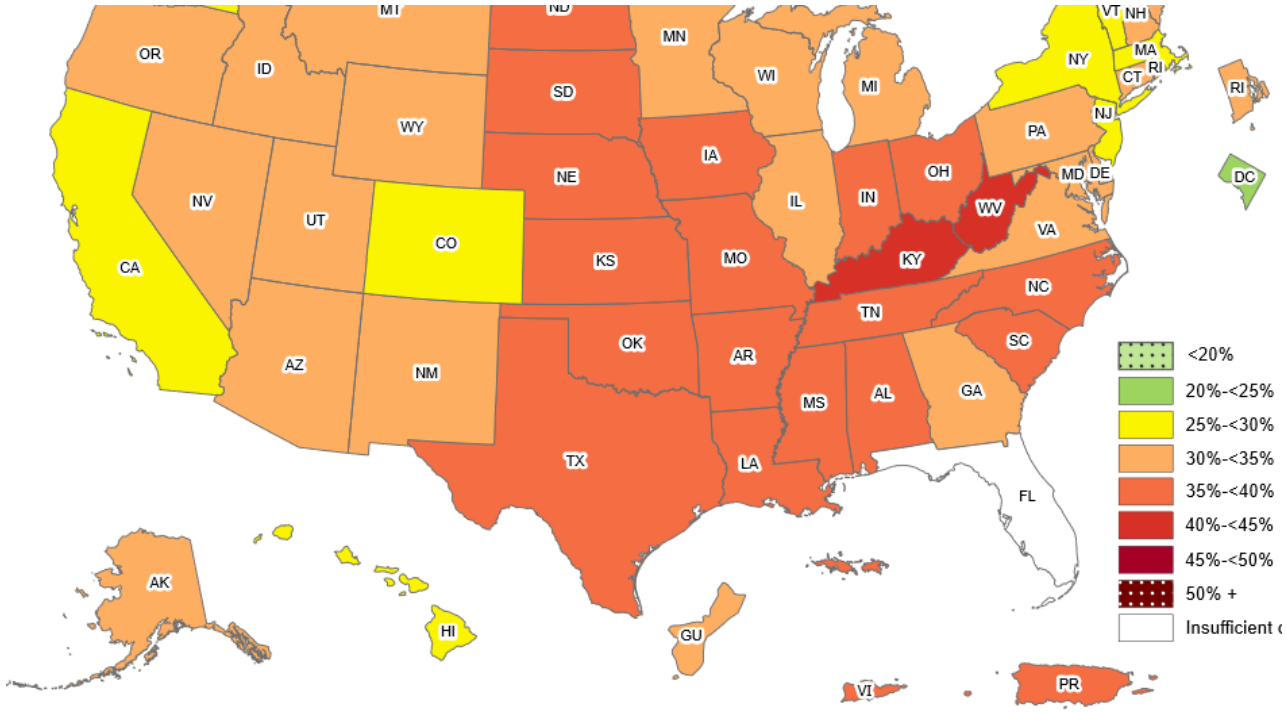
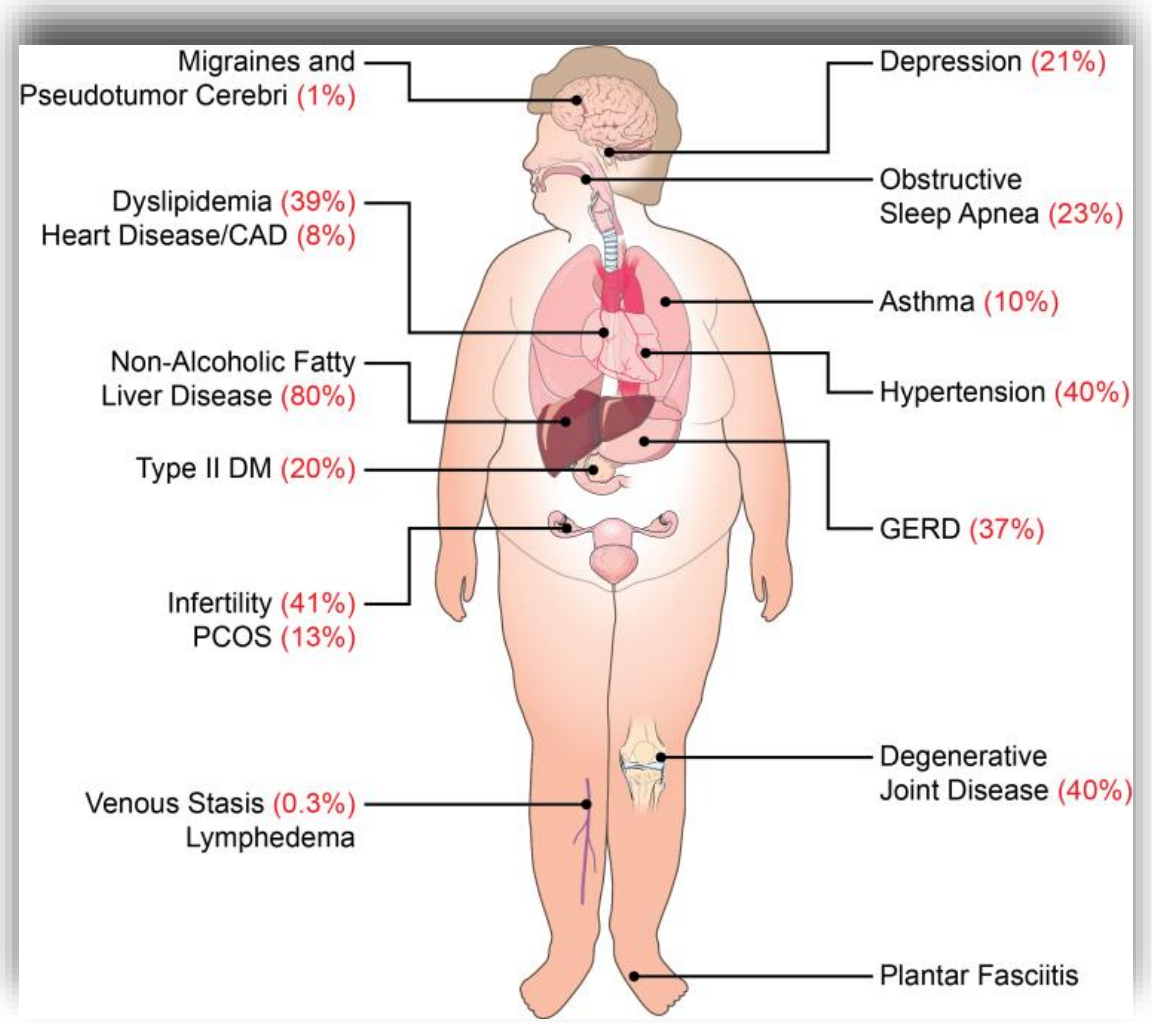
Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2021



***Sample size <50, the relative standard error (dividing the standard error by the prevalence) ≥30%, or no data in a specific year.**

Medical Co-Morbidities



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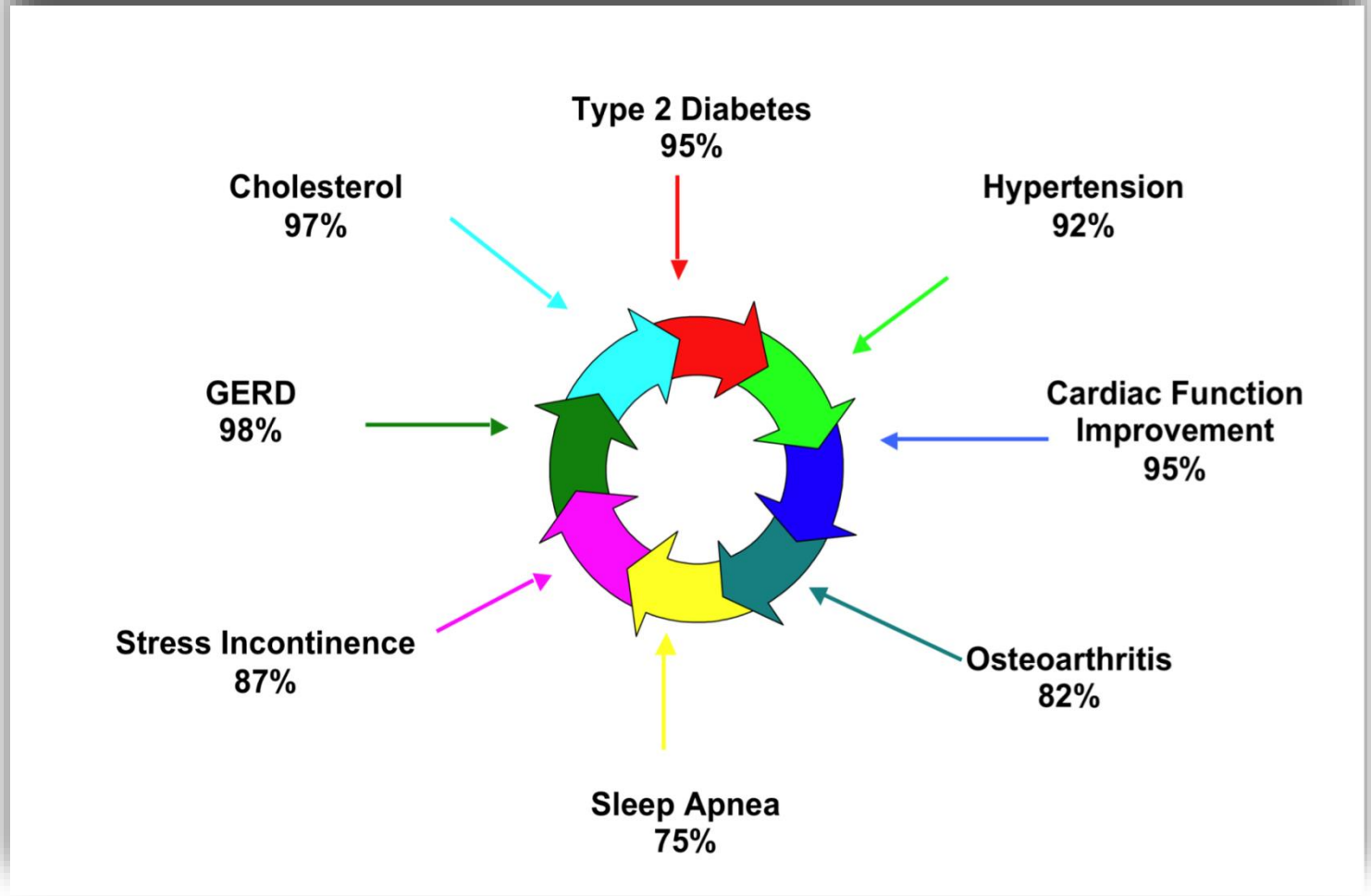
Medical Co-Morbidities Resolved



Wittgrove AC,Clark GW. Laparoscopic Gastric bypass roux-n-y-500 patients. Obes Surg 2000.

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Indications for Metabolic and Bariatric Surgery (MBS)

Body Mass Index (BMI)

$$BMI = \frac{\text{weight (kg)}}{\text{height (m) x height (m)}}$$

WHO Classification	BMI
• Ideal weight	20–24.9
• Overweight	25–29.9
• Moderate obesity (class I)	30–34.9
• Severe obesity (class II)	35–39.9
• Morbid obesity (class III)	40–49.9
• Super obese	50 +

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Body Mass Index (BMI)

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• Super obese	50 +

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NIH Consensus Conference 1991

- **Surgery is the only way to obtain *consistent, permanent* weight loss for obese patients**
- **Surgery indicated in patients with:**
  - BMI of 40 kg/m^2 or over
  - BMI of 35-40 kg/m^2 with significant medical co-morbidity
    - Diabetes
    - HTN
    - OSA
  - Documented dietary attempts ineffective

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2022 ASMBS/IFSO Updated Guidelines

Obes Surg. 2023; 33(1): 3–14. PMCID: PMC9834364
Published online 2022 Nov 7. doi: 10.1007/s11695-022-06332-1 PMID: 36336720

2022 American Society of Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) Indications for Metabolic and Bariatric Surgery

Dan Eisenberg,[✉1] Scott A. Shikora,[2] Edo Aarts,[3] Ali Aminian,[4] Luigi Angrisani,[5] Ricardo V. Cohen,[6] Maurizio de Luca,[7] Silvia L. Faria,[8] Kasey P.S. Goodpaster,[4] Ashraf Haddad,[9] Jacques M. Himpens,[10] Lilian Kow,[11] Marina Kurian,[12] Ken Loi,[13] Kamal Mahawar,[14] Abdelrahman Nimeri,[15] Mary O'Kane,[16] Pavlos K. Papasavas,[17] Jaime Ponce,[18] Janey S. A. Pratt,[1,19] Ann M. Rogers,[20] Kimberley E. Steele,[21] Michel Suter,[22,23] and Shanu N. Kothari[24]

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2022 ASMBS/IFSO Updated Guidelines

Metabolic and Bariatric surgery (MBS) recommended for

- Individuals with BMI >35 kg/m2
  - Regardless of presence, absence or severity of co-morbidities
- BMI 30-34.9 kg/m2 with metabolic disease (T2DM)
- BMI adjusted for Asian population suggests that BMI > 25 kg/m2 suggests clinical obesity
  - BMI > 27.5 kg/m2 should be offered MBS

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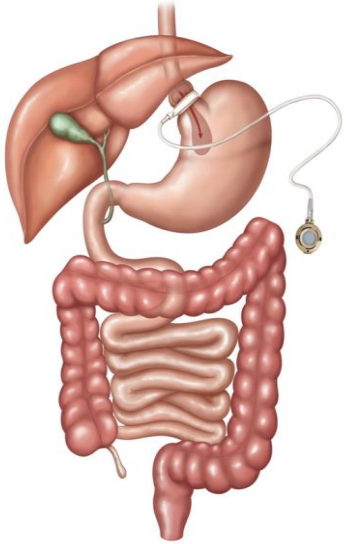
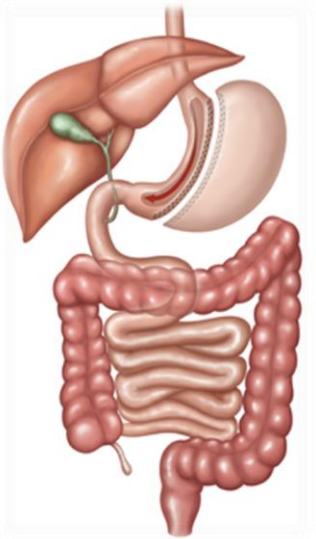
Surgical Procedures

Restrictive Stapling Procedures



Adjustable
Gastric Band



Vertical Sleeve
Gastrectomy

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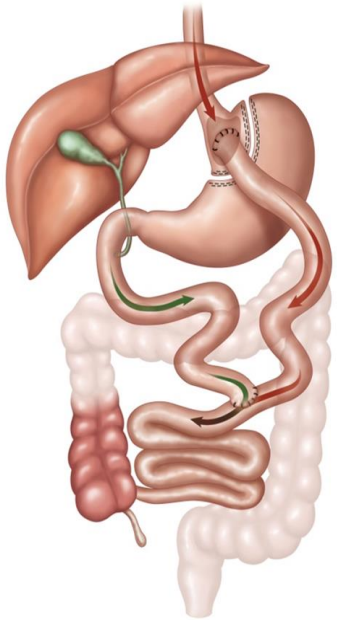
Anastomotic Stapling Procedures



Roux-en-Y
Gastric Bypass

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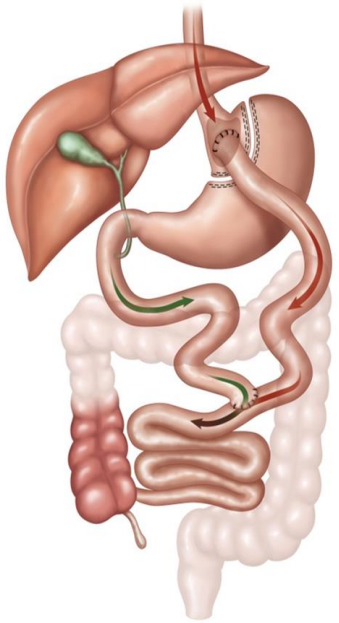
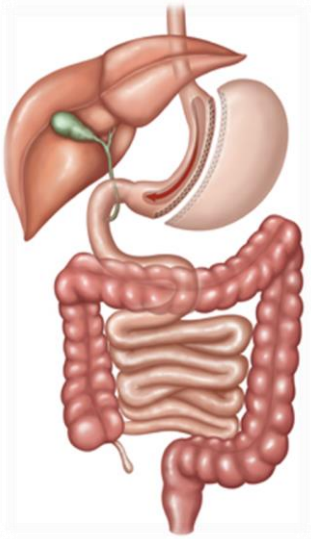
Anastomotic Stapling Procedures



Roux-en-Y
Gastric Bypass



Vertical Sleeve
Gastrectomy (LSG)

LRYGB and LSG make up over 90% of all MBS performed

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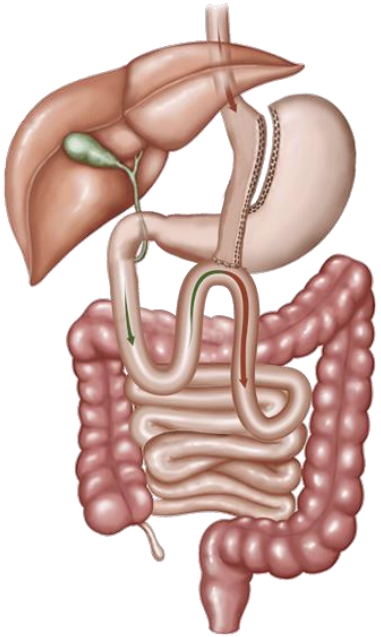
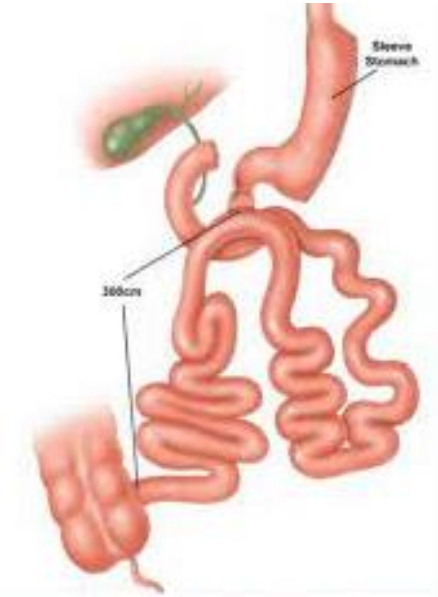
Anastomotic Stapling Procedures

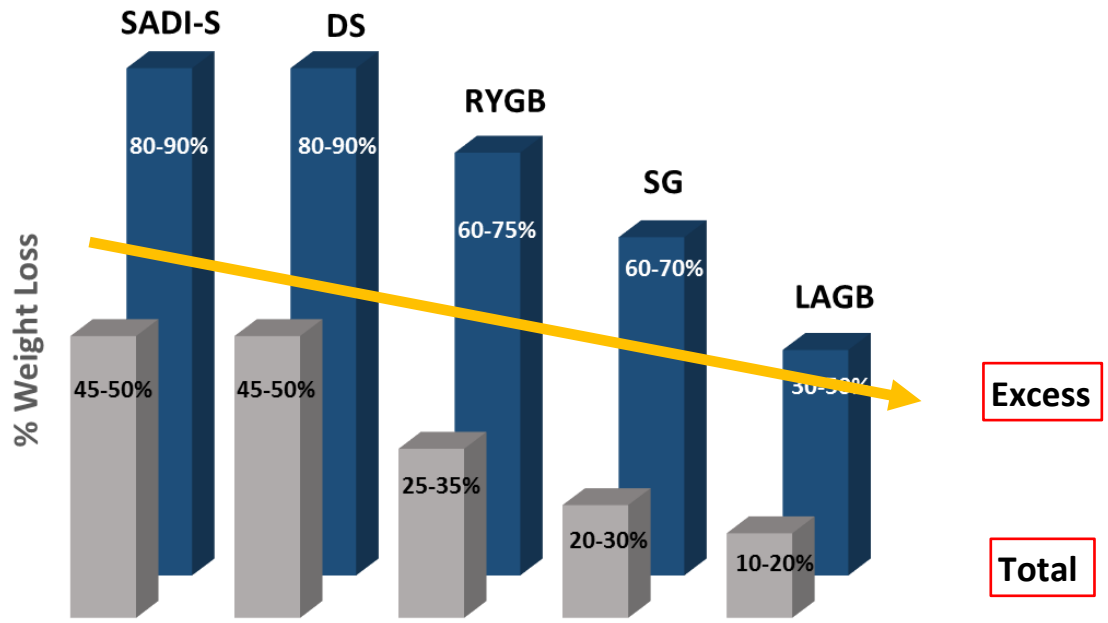


One Anastomosis
Gastric Bypass



Single Anastomosis
Duodeno-ileostomy
SADI-S

Weight Loss after Surgery



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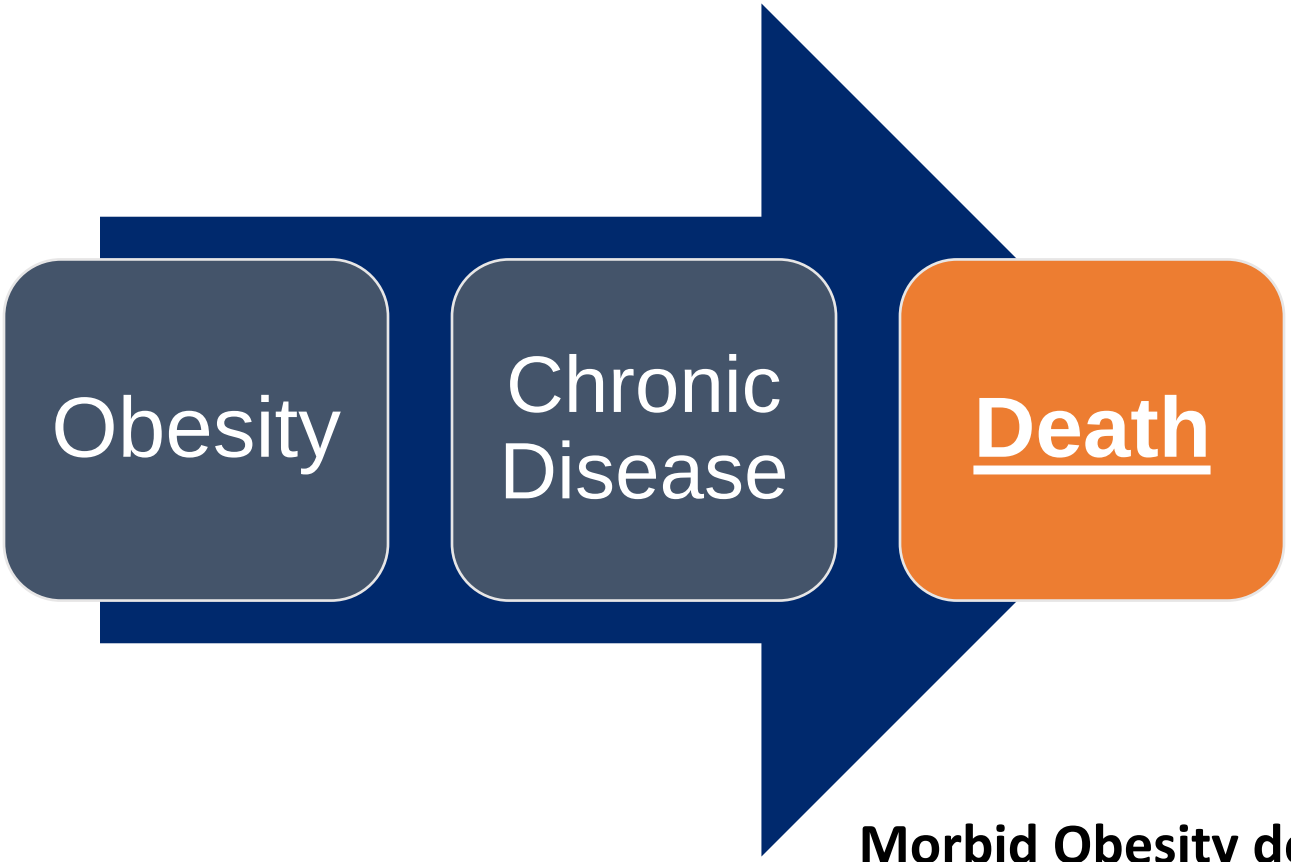
Why Do We Care?



Morbid Obesity decreases life span 5-15 years

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Cardiovascular Benefits

Started with HTN

- Obesity is major cause for HTN
  - Three out of four patients with HTN have obesity
- Increases risk of other diseases
  - CHF, stroke, atrial fibrillation and renal disease

1. Landsberg, Lewis, et al. "Obesity-related hypertension: Pathogenesis, cardiovascular risk, and treatment—A position paper of the The Obesity Society and the American Society of Hypertension." Obesity 21.1 (2013): 8-24.

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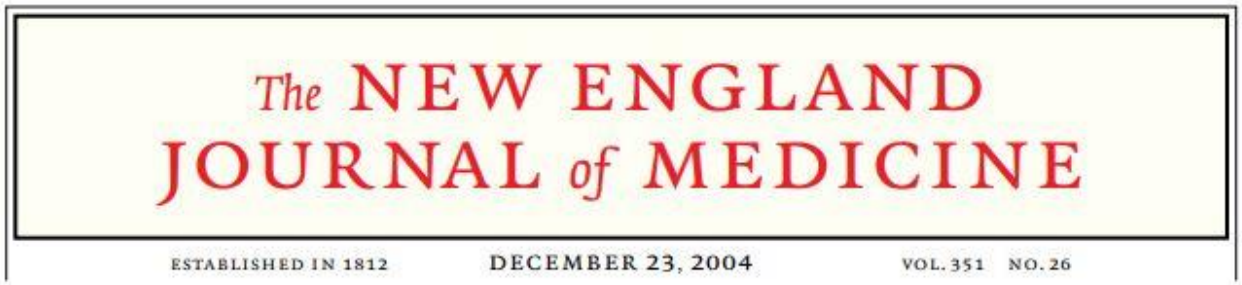
Swedish Obesity Study



The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 DECEMBER 23, 2004 VOL. 351 NO. 26

Lifestyle, Diabetes, and Cardiovascular Risk Factors 10 Years after Bariatric Surgery

Lars Sjöström, M.D., Ph.D., Anna-Karin Lindroos, Ph.D., Markku Peltonen, Ph.D., Jarl Torgerson, M.D., Ph.D., Claude Bouchard, Ph.D., Björn Carlsson, M.D., Ph.D., Sven Dahlgren, M.D., Ph.D., Bo Larsson, M.D., Ph.D., Kristina Narbro, Ph.D., Carl David Sjöström, M.D., Ph.D., Marianne Sullivan, Ph.D., and Hans Wedel, Ph.D., for the Swedish Obese Subjects Study Scientific Group*

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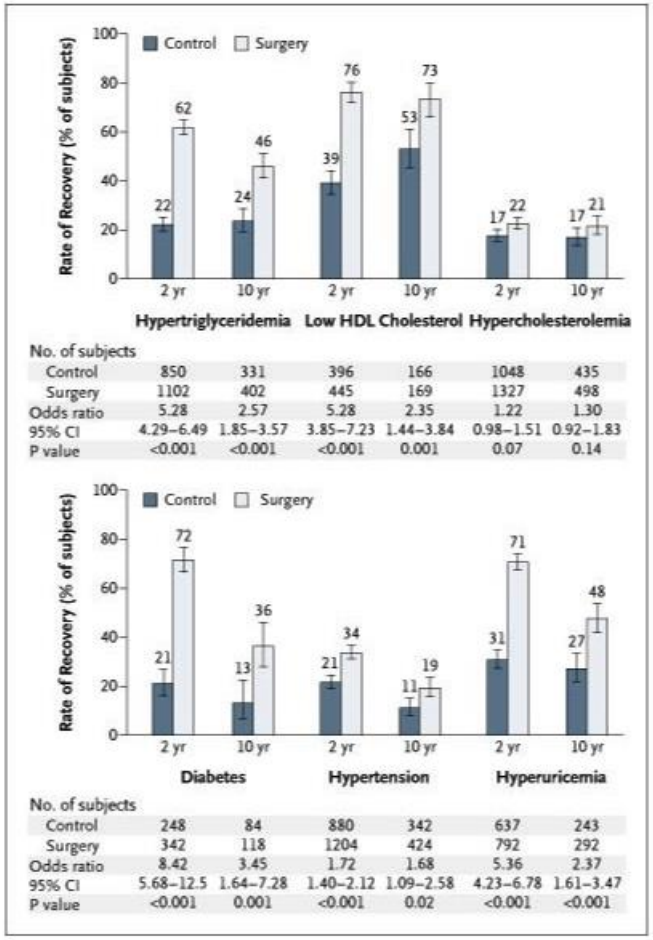
Swedish Obesity Study



No. of subjects						
Control	850	331	396	166	1048	435
Surgery	1102	402	445	169	1327	498
Odds ratio	5.28	2.57	5.28	2.35	1.22	1.30
95% CI	4.29–6.49	1.85–3.57	3.85–7.23	1.44–3.84	0.98–1.51	0.92–1.83
P value	<0.001	<0.001	<0.001	0.001	0.07	0.14

No. of subjects						
Control	248	84	880	342	637	243
Surgery	342	118	1204	424	792	292
Odds ratio	8.42	3.45	1.72	1.68	5.36	2.37
95% CI	5.68–12.5	1.64–7.28	1.40–2.12	1.09–2.58	4.23–6.78	1.61–3.47
P value	<0.001	0.001	<0.001	0.02	<0.001	<0.001

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Improvement in HF

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Bariatric Surgery and Incident Heart Failure: a Propensity Score Matched Nationwide Cohort Study

Luke Kostanjsek [a,1,2], Maddalena Ardissino [a,1,2], Osama Moussa [b,2], Bilal Rayes [c,2], Ravi Amin [a,2], Peter Collins [a,d,*,2], Sanjay Purkayastha [a,b,e,2]

Improvement in HF

- Patients that underwent MBS had significantly lower incidence of new HF in patients
  - 95% CI, p = 0.0011

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Reduction of MACE

How Much Weight Loss is Required for Cardiovascular Benefits? Insights From a Metabolic Surgery Matched-cohort Study

Aminian, Ali MD[*]; Zajichek, Alexander MS[†]; Tu, Chao MS[†]; Wolski, Kathy E. MPH[‡]; Brethauer, Stacy A. MD[§]; Schauer, Philip R. MD[¶]; Kattan, Michael W. PhD[†]; Nissen, Steven E. MD[‡]

Author Information

Annals of Surgery 272(4):p 639-645, October 2020. | ***DOI:*** 10.1097/SLA.0000000000004369

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Reduction of MACE

Results:

A total of 7201 patients (1223 surgical and 5978 nonsurgical) with a median follow-up time of 4.9 years (interquartile range, 3.5–7) were included. The positive effect of metabolic surgery was still present after adjusting for weight loss amounts, suggesting that there are weight loss-independent factors contributing to a reduction in risk of MACE and all-cause mortality in the surgical cohort. After considering the weighted estimates from a diverse set of models, the risk of MACE decreases after approximately 10% of weight is lost in the surgical group and approximately 20% in the nonsurgical group. For all-cause mortality, the threshold for benefit appeared to be approximately 5% weight loss after metabolic surgery and 20% in the nonsurgical group.

Conclusions:

This large matched-cohort study identified the minimum weight loss thresholds for reduction in risk of MACE and all-cause mortality in patients with obesity and diabetes. Furthermore, in our analysis, the effect of surgery was still present after accounting for weight loss, which may suggest the presence of weight-independent beneficial effects of metabolic surgery on MACE and survival.

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CV Improvement After MBS

ELSEVIER

Journal of the American College of Cardiology

Volume 79, Issue 15, 19 April 2022, Pages 1429-1437

Original Investigation

Long-Term Cardiovascular Outcomes After Bariatric Surgery in the Medicare Population

Amgad Mentias MD, MS [a], Ali Aminian MD [b], Dalia Youssef MD [c], Ambarish Pandey MD [d], Venu Menon MD [a], Leslie Cho MD [a], Steven E. Nissen MD [a], Milind Y. Desai MD, MBA [a]

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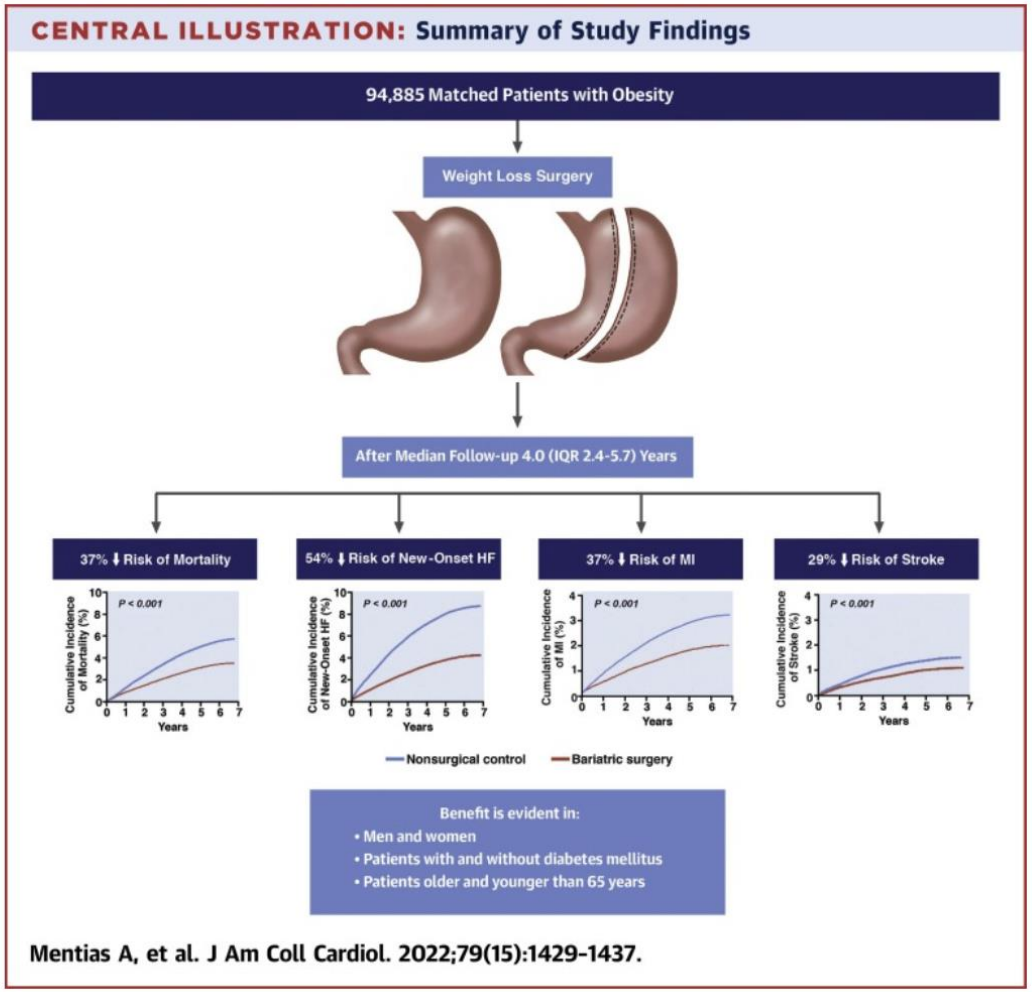
CV Improvement After MBS



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Reduction of HF Mortality

J Am Heart Assoc. 2021 Apr 6; 10(7): e019323.
Published online 2021 Mar 23. doi: 10.1161/JAHA.120.019323

PMCID: PMC8174344
PMID: 33754795

Potential Effects of Bariatric Surgery on the Incidence of Heart Failure and Atrial Fibrillation in Patients With Type 2 Diabetes Mellitus and Obesity and on Mortality in Patients With Preexisting Heart Failure: A Nationwide, Matched, Observational Cohort Study

Gudrún Höskuldsdóttir, MD,[1,2] Naveed Sattar, PhD,[3] Mervete Miftaraj, MSc,[4] Ingmar Näslund, PhD,[6] Johan Ottosson, PhD,[6] Stefan Franzén, PhD,[4,5] Ann-Marie Svensson, PhD,[1,4] and Björn Eliasson, PhD[1,2]

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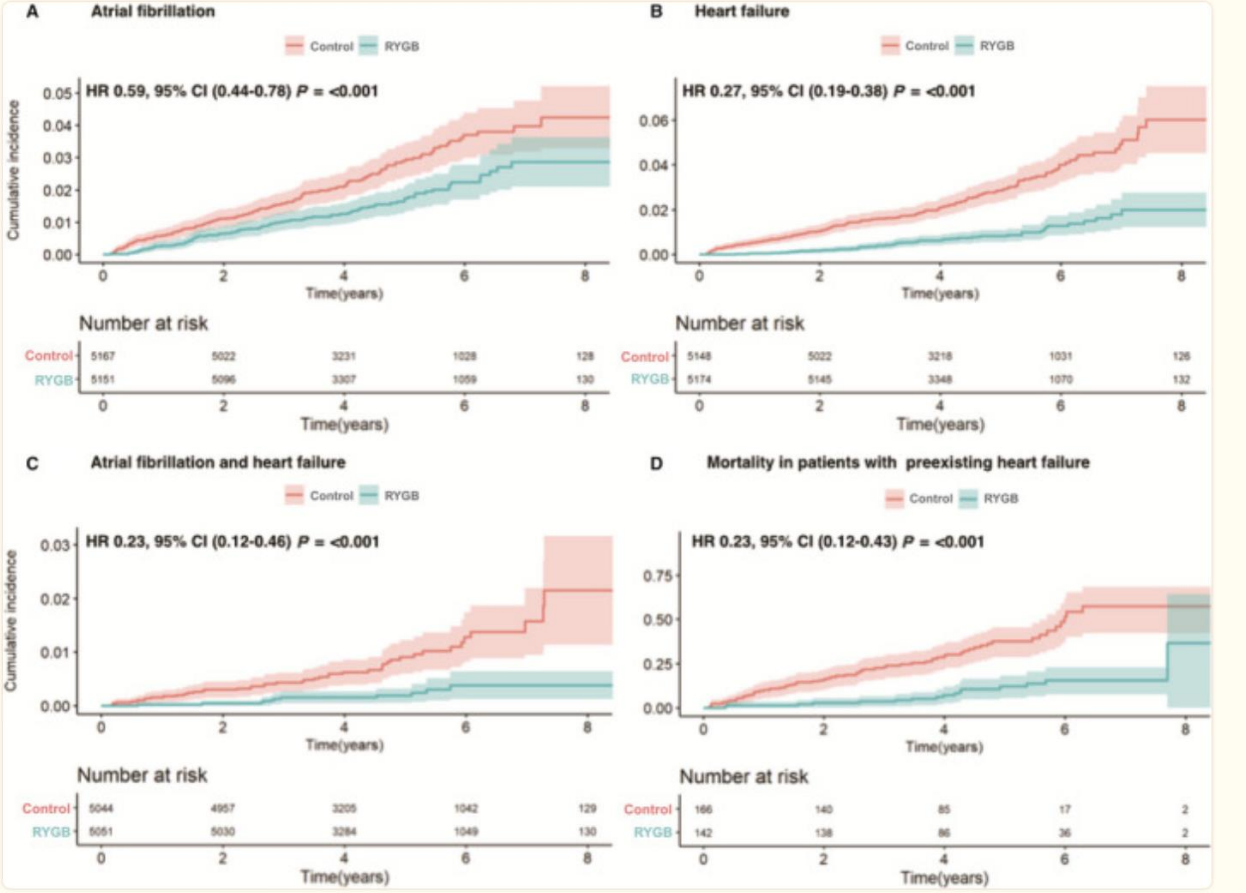
Reduction of HF Mortality



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Reduction of HF Mortality

- Bariatric Surgery associated with lower risk of HF and AF in patients with T2DM and obesity
- Surgical treatment of obesity may be safe and reduce mortality in patients with T2DM and preexisting HF

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Cardiovascular Benefits after Weight Loss Surgery

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