

Cost-Effectiveness of Bariatric Surgery

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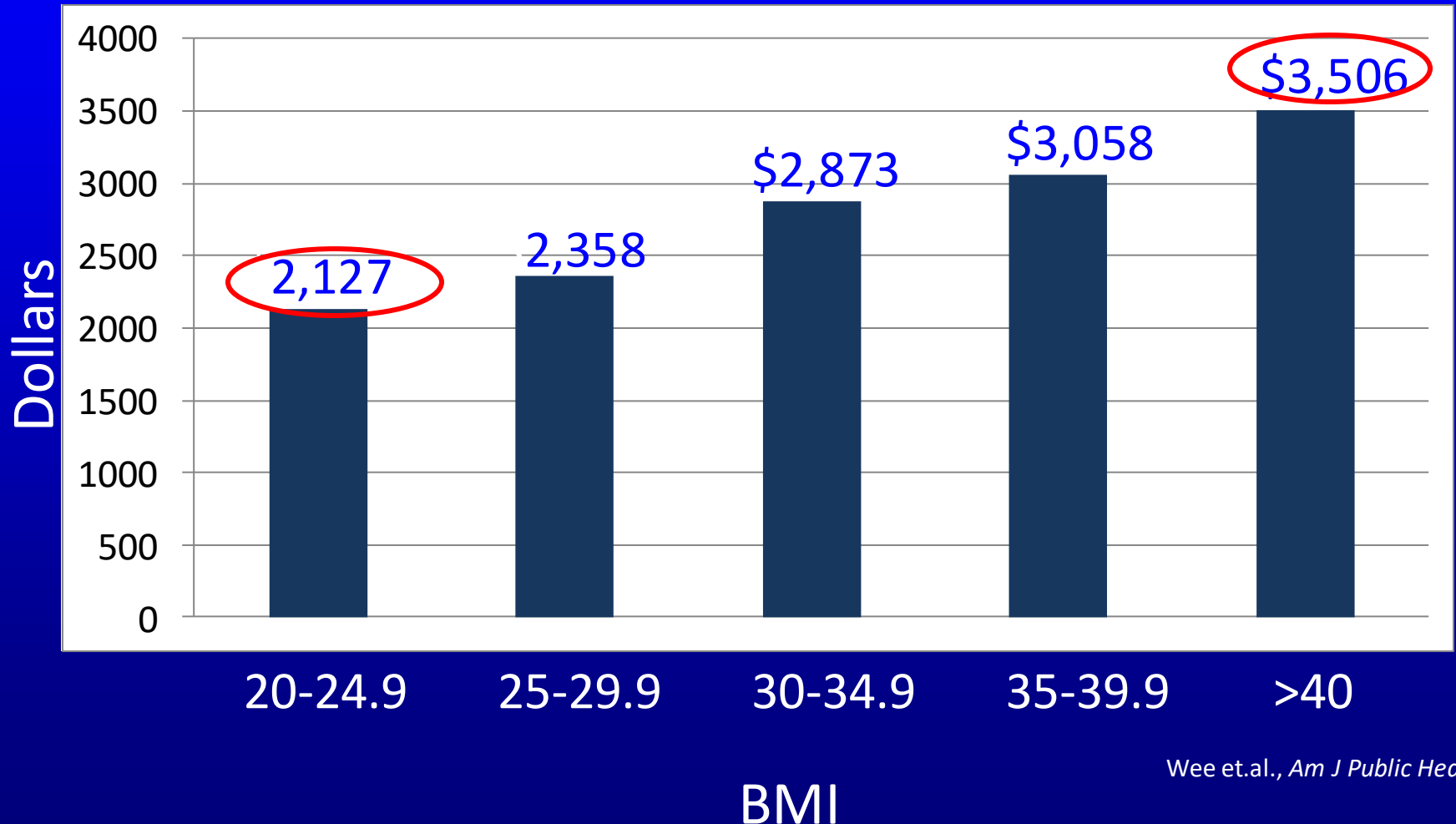
Board of Directors, American Board of Obesity Medicine

Background

- **Obesity affects more than 30% of adults in the U.S. and contributing to more than ~\$300 billion in obesity-related healthcare costs annually**
 - Ogden JAMA 2014;311:806–14.
 - Cawley J, Journal of Health Econ.31(1):219-230. 2012.
- **Prevalence of obesity has caused an increased risk of obesity-related comorbidities with >2/3s of severely obese patients having at least one co-morbid condition such as T2DM, HTN, OSA, dyslipidemia, and osteoarthritis. CDC**
- **Complications Following Surgery attributed to Obesity estimated to be 10-30% @ 40 billion USD- Surgery 2026**

Obesity – Economic Burden

- National Expenditures for Obesity: 18%- \$300B



Metabolic and Bariatric Surgery: Cost-Effectiveness

- Bariatric surgery is cost-effective compared with nonsurgical management with ICERs of \$18,000–\$46,000 per QALY gained and is cost-saving over a lifetime horizon
- Compared with GLP-1 receptor agonists at current prices, bariatric surgery is more effective and less costly, saving approximately \$11,689 over 2 years in direct healthcare costs
- Cost-effectiveness improves with higher baseline BMI, more severe diabetes, and longer time

Wolff Sagy Y, Winter EE, Abu Ahmad W, et al. Long-Term Health Care Utilization Costs of GLP-1RA Use vs Bariatric Metabolic Surgery. JAMA Netw Open. 2026;9(7):e2621305. doi:10.1001/jamanetworkopen.2026.21305

Xia Q, Campbell JA, Ahmad H, Si L, de Graaff B, Palmer AJ. Bariatric surgery is a cost-saving treatment for obesity-A comprehensive meta-analysis and updated systematic review of health economic evaluations of bariatric surgery. Obes Rev. 2020 Jan;21(1):e12932. doi: 10.1111/obr.12932. Epub 2019 Nov 16. PMID: 31733033.

Barrett TS, Hafermann JO, Richards S, LeJeune K, Eid GM. Obesity Treatment With Bariatric Surgery vs GLP-1 Receptor Agonists. JAMA Surg. 2025;160(11):1232–1239. doi:10.1001/jamasurg.2025.3590

Lauren BN, Lim F, Krikhely A, et al. Estimated Cost-effectiveness of Medical Therapy, Sleeve Gastrectomy, and Gastric Bypass in Patients With Severe Obesity and Type 2 Diabetes. JAMA Netw Open. 2022;5(2):e2148317. doi:10.1001/jamanetworkopen.2021.48317

Return on Investment

VOL. 14, NO. 9

■ THE AMERICAN JOURNAL OF MANAGED CARE ■

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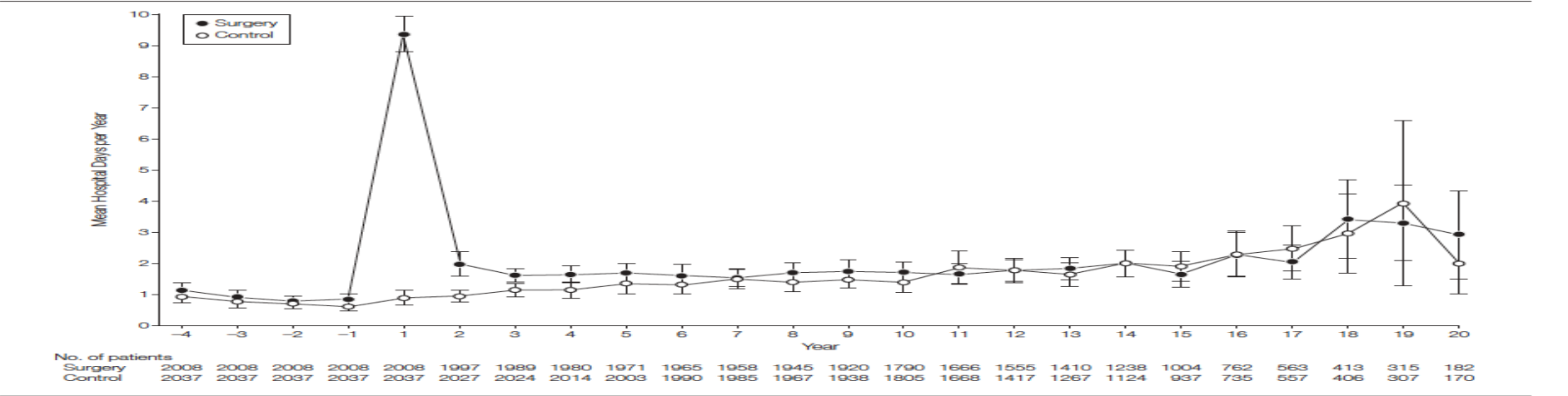
A Study on the Economic Impact of Bariatric Surgery

Pierre-Yves Crémieux, PhD; Henry Buchwald, MD, PhD; Scott A. Shikora, MD; Arindam Ghosh, PhD;
Haixia Elaine Yang, PhD; and Marric Buessing, BA

Results: The mean bariatric surgery investment ranged from approximately \$17,000 to \$26,000. After controlling for observable patient characteristics, we estimated all costs to have been recouped within 2 years for laparoscopic surgery patients and within 4 years for open surgery patients.

Health Care Use During 20 Years Following Bariatric Surgery

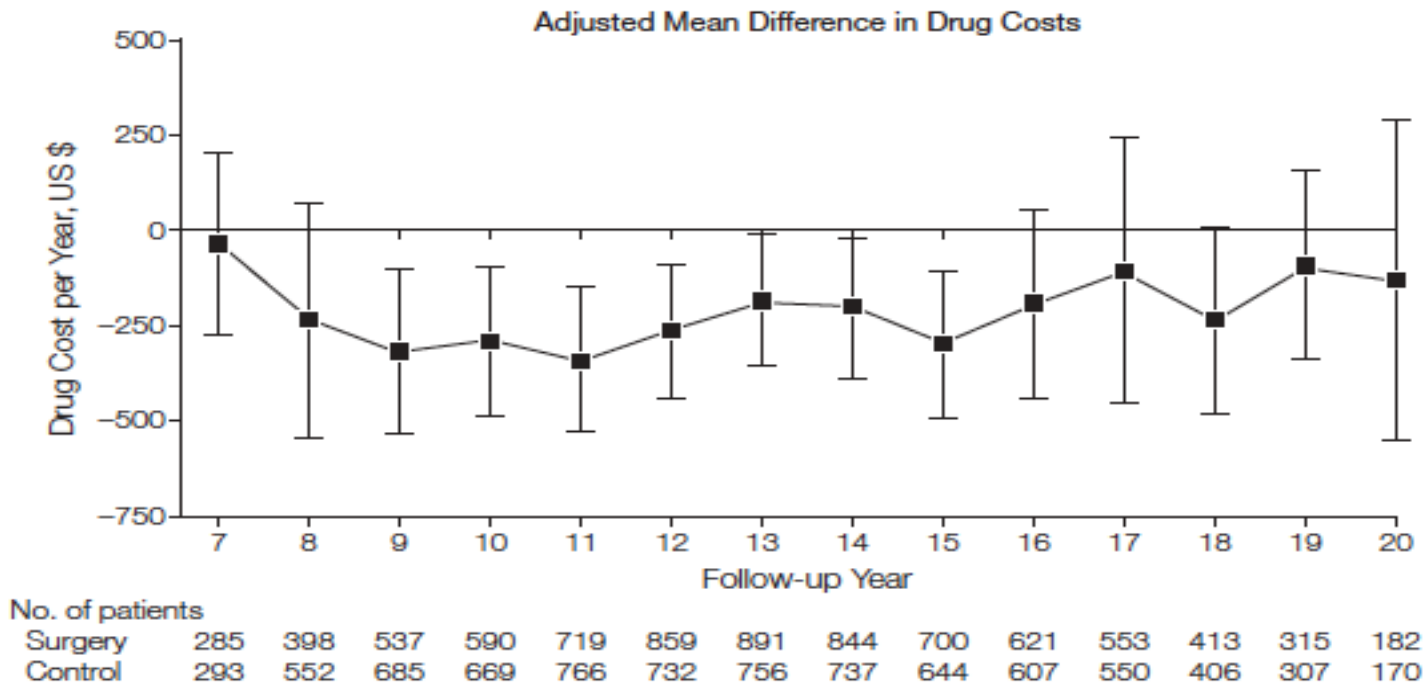
Figure 2. Mean Annual Hospital Days From 4 Years Before to 20 Years After the Index Date



Drug cost, US \$, 2005-2011
 7-20 y

Surgery	1889	5.9 (5.2 to 5.9)	529 (177 to 1171)	930 (860 to 1001)	-228 (-335 to -121) <.001
Controls	1893	5.9 (5.2 to 5.9)	626 (225 to 1435)	1123 (1040 to 1206)	

Health Care Use During 20 Years Following Bariatric Surgery



Adjusted for baseline age, sex, smoking, diabetes status, body mass index, and inclusion period (before 1995 and 1995 and beyond). Error bars indicate 95% CIs.

JAMA 2012;308:1132–41.

Weiner JP, et al. Impact of bariatric surgery on health care costs of obese persons: a 6-year follow-up of surgical and comparison cohorts using health plan data. JAMA Surg 2013;148:555–62.

- Costs were greater in the bariatric surgery group during the second and third years following surgery but were similar in the later years.
- However, the bariatric group's prescription and office visit costs were lower and their inpatient costs were higher.
- Those undergoing laparoscopic surgery had lower costs in the first few years after surgery, but these differences did not persist.
- Bariatric surgery does not reduce overall health care costs in the long term.

Cost-Effectiveness of Bariatric Surgery for Severely Obese Adults With Diabetes

RESULTS — In all analyses, bariatric surgery increased QALYs and increased costs. Bypass surgery had cost-effectiveness ratios of \$7,000/QALY and \$12,000/QALY for severely obese patients with newly diagnosed and established diabetes, respectively. Banding surgery had cost-effectiveness ratios of \$11,000/QALY and \$13,000/QALY for the respective groups. In sensitivity analyses, the cost-effectiveness ratios were most affected by assumptions about the direct gain in QoL from BMI loss following surgery.

Cost-effective Benchmark: 50,000/QALY

Diabetes Care 33:1933–1939, 2010

Association of Bariatric Surgery and National Medication Use

John M Morton, MD, MPH, FACS, Jaime Ponce, MD, FACS, Elisabetta Malangone-Monaco, MS, Ninh Nguyen, MD, FACS

To examine the long-term (4 year) differences in the pharmacy cost and utilization for a cohort of severely obese patients who underwent laparoscopic bariatric surgery compared to those who had not undergone surgery

Methods

- **An administrative claims-based retrospective cohort study using the Truven Health MarketScan[®] Research databases for the period from January 1, 2007 - December 31, 2012**
- **Patients had a diagnosis of obesity between January 1, 2007 and December 31, 2008**
 - **Obesity defined as a diagnosis indicating BMI ≥ 40 , BMI 35-40 with an obesity-related comorbidity, or morbid obesity with an obesity-related comorbidity**
- **Cases were required to have a claim with a procedure code for Lap Band or Laparoscopic Roux en-Y surgery in 2008 (index date)**
- **Non-surgical controls had no evidence of any bariatric surgery procedure anytime during the study period**

Patient characteristics

2700 surgery cases: 2700 non-surgical controls

	Surgery cases	Laparoscopic RYGB	Lap band	Non-surgical controls
	N = 2,700	N = 1,833	N = 867	N = 2,700
Age, ¹ Mean (SD)	47.1 (9.6)	47.0 (9.5)	47.2 (9.8)	47.1 (10.0)
Sex, %				
Male	22.8	22.6	23.2	22.8
Female	77.2	77.4	76.8	77.2
Geographic region, %				
Northeast	10.7	10.2	11.8	10.8
North Central	27.7	26.6	30.2	28.8
South	31.6	30.1	34.7	30.7
West	29.4	32.4	23.1	29.4
Unknown	0.6	0.8	0.2	0.3
Health plan type, ¹ %				
FFS	4.1	4.3	3.7	5.1
EPO / PPO	47.7	45.0	53.5	41.5
POS / POS with capitation	16.5	16.4	16.7	13.3
HMO	28.5	31.2	22.7	36.5
HDHP / CDHP	2.5	2.4	2.7	2.9
Other	0.7	0.8	0.7	0.7

¹ Comparison of all surgery cases to non-surgical controls; statistically significant at p<0.05

CDHP = consumer driven health plan; EPO = Exclusive service provider; FFS = fee-for-service; HDHP = high deductible health plan; HMO = health maintenance organization; POS = point-of-service; PPO = preferred provider organization.

Baseline clinical characteristics

- Similar over-all except that surgery cases had a significantly higher CVD, HTN, GERD and OSA

	Surgery cases	Laparoscopic Roux en-Y	Lap band	Non-surgical controls
	N = 2,700	N = 1,833	N = 867	N = 2,700
Deyo CCI, Mean (SD)	0.7 (1.0)	0.8 (1.1)	0.7 (1.0)	0.7 (1.2)
Comorbid conditions during pre-index period, %				
Type 2 diabetes	35.0	36.0	33.0	34.4
Sleep apnea ¹	39.6	39.3	40.1	18.7
Hypertension ¹	55.0	54.8	55.4	47.4
GERD ¹	24.7	24.7	24.8	11.1
Cardiovascular disease ¹	65.9	65.6	66.4	56.7
Hyperlipidemia ¹	28.8	28.8	28.7	24.0

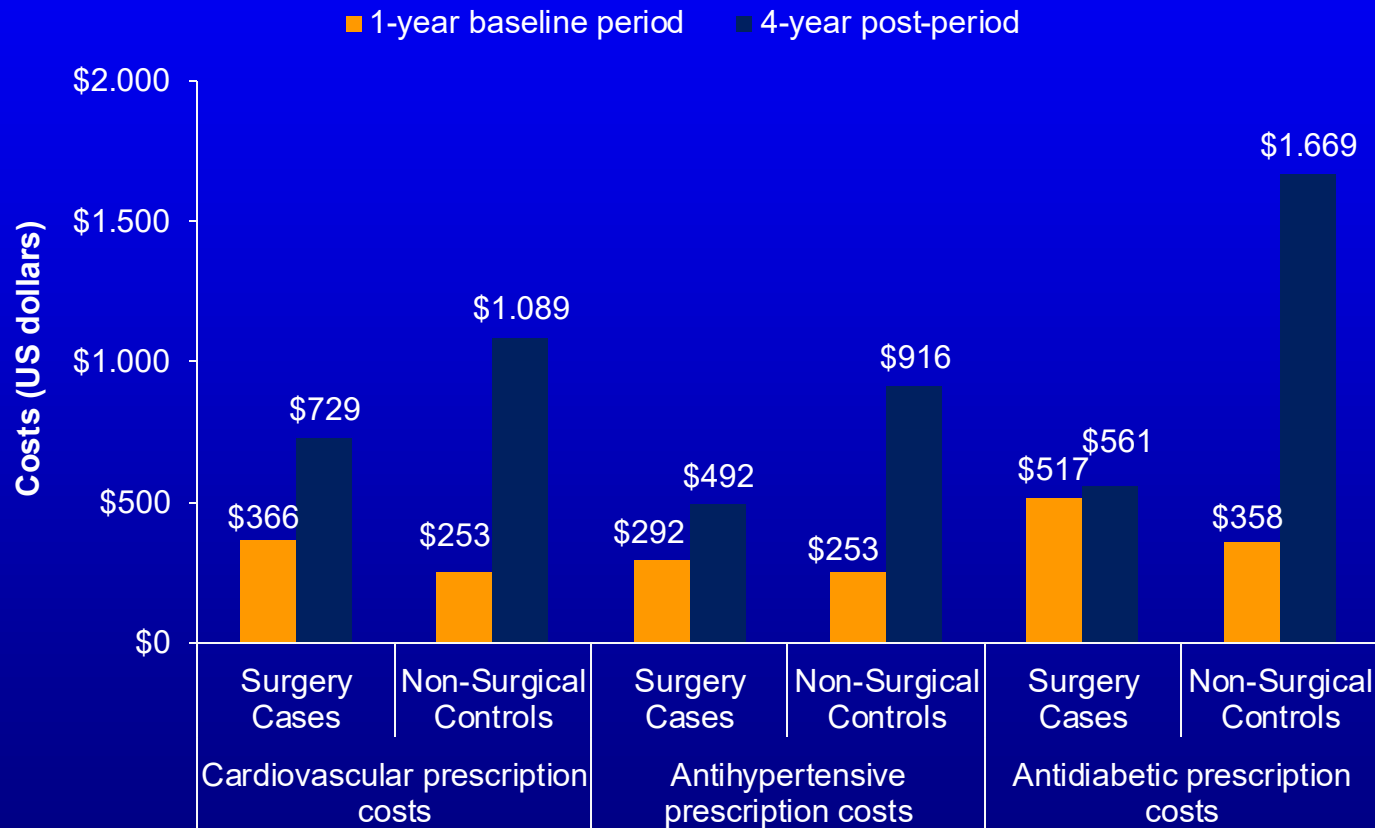
¹ Comparison of all surgery cases to non-surgical controls; statistically significant difference at p<0.05

Adjusted pharmacy costs in 4-year post-index period

After adjusting for pre-index period pharmacy costs and comorbidities, the 4-year pharmacy costs were 23% lower among surgery cases compared to non-surgical controls

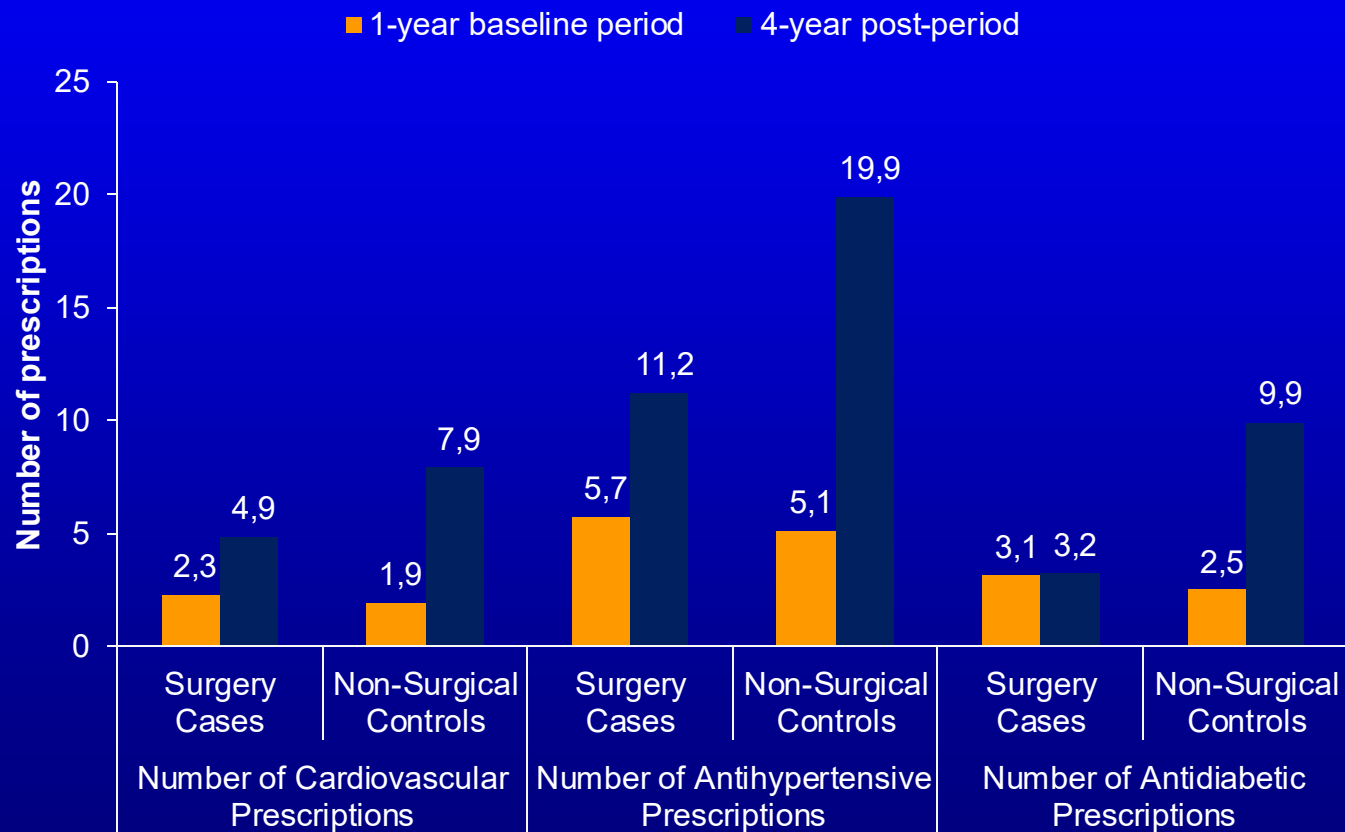
Outcome	%	Cost	95%		P-Value
	Change	ratio	Confidence	limits	
Total prescription costs	- 22.6%	0.774	0.728	0.821	<0.0001

Pharmacy costs components in 1-year baseline period and 4-year post-index period



Reductions driven by lower antidiabetic, antihypertensive, and cardiovascular prescription costs

Prescriptions 1-year baseline vs. 4-year post-index period



Antidiabetic prescriptions was 68% lower in surgery pts in 4-year post-index period

Adjusted count of prescriptions in 4-year post-index period

Outcome	% Change	Incid rate ratio	95% Confidence limits		P-Value
Number of antidiabetic prescriptions	- 73.7%	0.2627	0.2560	0.2696	<0.0001
Number of antihypertensive prescriptions	- 48.3%	0.5172	0.5096	0.5250	<0.0001
Number of cardiovascular prescriptions (excluding antihypertensives)	- 48.9%	0.5111	0.4995	0.5230	<0.0001

After multivariate adjustments, the number of antidiabetic prescriptions were 74% lower among surgery cases compared to non-surgical controls

Conclusions

- **Significant and sustained long-term medication cost savings are achieved 4-years post-surgery in obese patients undergoing bariatric surgery in comparison to a propensity-matched control group**

Cost-effectiveness of Bariatric Surgery vs. Anti-Obesity Medications

John M. Morton¹, MD, MPH, MHA, FACS, FASMBS, DABOM;
Grace Chao¹, MD, MSc; Genevieve Gill-Wiehl¹, MD;
Lee Ying¹, MD, PhD; Noushyar Eslami², MPH;
Ira Leeds¹, MD, MBA, ScM, FACS, FASCRS

¹Department of Surgery, Yale School of Medicine

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Yale SCHOOL OF MEDICINE

Background

- **Bariatric Surgery has demonstrated long-term safety and efficacy with Level 1 Evidence for treatment of obesity**
- **Tremendous interest in recent FDA-Approved Glucagon-like peptide-1 (GLP-1) Class of Anti-Obesity Medications Offers Additional Therapeutic Approach**
- **Given the high prevalence of obesity and current cost of GLP-1s, concern has been raised about the most rational approach to treating obesity**
- **Hypothesis: Through Cost-Effectiveness Analysis, Bariatric Surgery will be the most dominant (cost-effective) therapy in comparison with anti-obesity medications for treatment of obesity**

Cost-Effectiveness Primer

- **Base Case & Perspective**: sample patient with a time horizon
- **Decision Tree**: framework for decision making with uncertainty
- **Nodes**
 - Square (Decision)
 - Circle (Chance)
 - Triangle (Endpoint)
- **Textbook Outcome**: composite quality measure that encompasses multiple postoperative endpoints
- **Monte Carlo Simulation**: model used to predict the probability of a variety of outcomes when the potential for random variables is present and requires assigning multiple values to an uncertain variable to achieve multiple results and then averaging the results to obtain an estimate.
- **(ICER)** Incremental cost-effectiveness ratio is a summary measure representing the economic value of an intervention, compared with an alternative
- **Sensitivity Analyses**: Examining model outputs while conditioning on specific inputs provides insight about model behavior

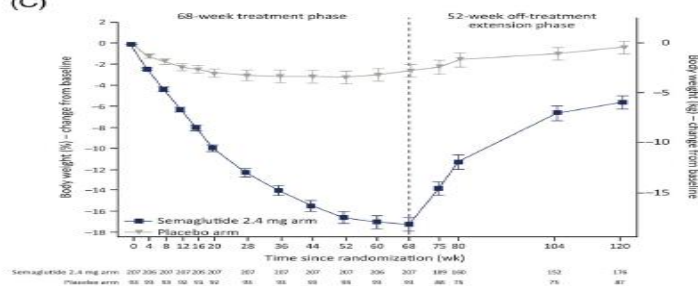
GLP-1 Special Considerations

ORIGINAL ARTICLE

WILEY

Weight regain and cardiometabolic effects after withdrawal of semaglutide: The STEP 1 trial extension

(C)



Diabetes Obes Metab. 2022;24:1553-1564.

Risk of Gastrointestinal Adverse Events Associated With Glucagon-Like Peptide-1 Receptor Agonists for Weight Loss

Table 2. Risks of Biliary Disease, Pancreatitis, Bowel Obstruction, and Gastroparesis Among Users of GLP-1 Agonists vs Bupropion-Naltrexone

	GLP-1 agonists, HR (95% CI) ^a		Bupropion-naltrexone
Outcomes	Crude	Adjusted ^b	
Primary analysis			
Biliary disease	1.48 (0.88-2.47)	1.50 (0.89-2.53)	1 [Reference]
Pancreatitis	10.33 (1.44-74.40)	9.09 (1.25-66.00)	1 [Reference]
Bowel obstruction	5.16 (1.27-21.00)	4.22 (1.02-17.40)	1 [Reference]
Gastroparesis	3.31 (1.04-10.50)	3.67 (1.15-11.90)	1 [Reference]

JAMA. November 14, 2023. Volume 330, Number 18

Medicare Part D Coverage of Antiobesity Medications — Challenges and Uncertainty Ahead

Khryta Baig, M.S.P.H., Stacie B. Dusetzina, Ph.D., David D. Kim, Ph.D., and Ashley A. Leech, Ph.D.

Potential Range of Medicare Costs for the Use of Antiobesity Medications.*

Obesity Prevalence		Medication Users		Phentermine and Topiramate Cost		Semaglutide Cost	
Identification Method	People with Obesity (%)	People with Obesity Treated (%)	No. of Beneficiaries	Estimated Annual Total Cost (\$)	Percentage of Part D Net Spending	Estimated Annual Total Cost (\$)	Percentage of Part D Net Spending
Diagnosis in Medicare claims	21	1	99,568	66,710,261	0.05	1,355,910,952	0.94
		5	497,838	333,551,306	0.23	6,779,554,759	4.68
		10	995,676	667,102,612	0.46	13,559,109,517	9.35
		100	9,956,755	6,671,026,125	4.60	135,591,095,173	93.51
CDC estimate of adults 60 years of age or older	41.5	1	196,764	131,832,183	0.09	2,679,538,309	1.85
		5	983,822	659,160,915	0.45	13,397,691,547	9.24
		10	1,967,645	1,318,321,829	0.91	26,795,383,094	18.48
		100	19,676,445	13,183,218,294	9.09	267,953,830,938	184.80



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Conclusions: Among GLP-1a new initiators without DM and with obesity, prediabetes, and/or BMI ≥ 30, there was no health care cost reduction in the first year. Instead, costs went up \$7,727 per GLP-1a treated member compared to the matched control group. GLP-1a treatment persistency was poor with only one-third on therapy at one year. Among GLP-1a adherent individuals, the increase in costs was even higher, double the prior year. These real-world findings are important to aid in the development of an evidence-based GLP-1a weight loss management program, pharmaceutical manufacturer value-based contracts, and health insurance benefit designs.

Real World Adherence: GLP-1s

Diabetes Ther (2023) 14:723–736
<https://doi.org/10.1007/s13300-023-01382-9>

ORIGINAL RESEARCH

Real-World Evaluation of GLP-1 Receptor Agonist Therapy Persistence, Adherence and Therapeutic Inertia Among Obese Adults with Type 2 Diabetes

Ana Palanca · F. Javier Ampudia-Blasco  · José Miguel Calderón ·

Under real-life conditions, persistence at 2 years with GLP-1RA was low compared to other glucose-lowering agents (48.4% versus 72.7%, $p < 0.0001$). Among HbA1c-tested GLP-1RA users, a greater proportion of 2-year-persistent individuals showed improved glycaemic control (40.5% versus 18.6%, respectively, $p < 0.0001$); however, no differences in cardiovascular outcomes or all-cause death were found between 2-year-persistent and non-persistent individuals. Therapeutic inertia was found in 38.0% of the whole study population.

Diabetes Ther (2023) 14:723–736

Real-World Adherence and Discontinuation of Glucagon-Like Peptide-I Receptor Agonists Therapy in Type 2 Diabetes Mellitus Patients in the United States

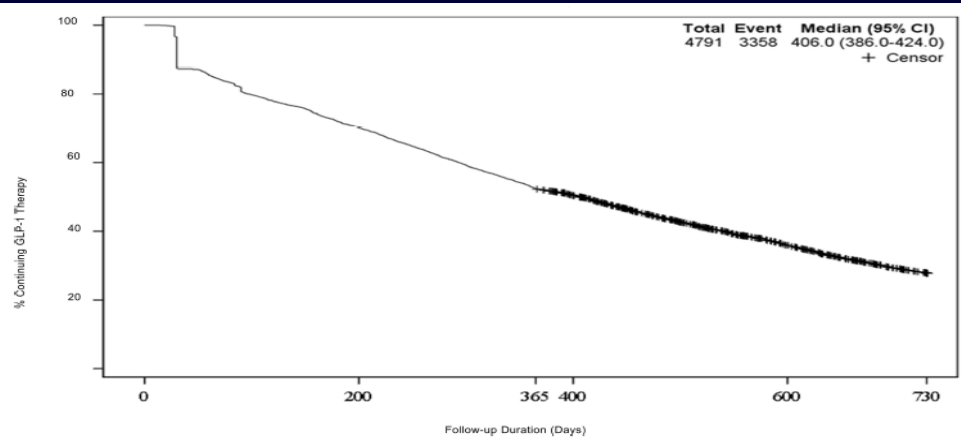


Figure 3 Time to Discontinuation of GLP-1 RAs, Kaplan-Meier Plot, n=4791. Kaplan-Meier plot of days until GLP-1 RA therapy discontinuation. Patients discontinued at median of 406 days (95% CI 386–424) after initiating therapy.

Conclusion: Over half of T2DM patients initiating GLP-1 RA were non-adherent and the majority (70.1%) discontinued therapy by 24 months. Reasons for non-adherence and discontinuation merit further research.

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;

Table 3. Major Adverse Events and Events of Interest Through 12 Years

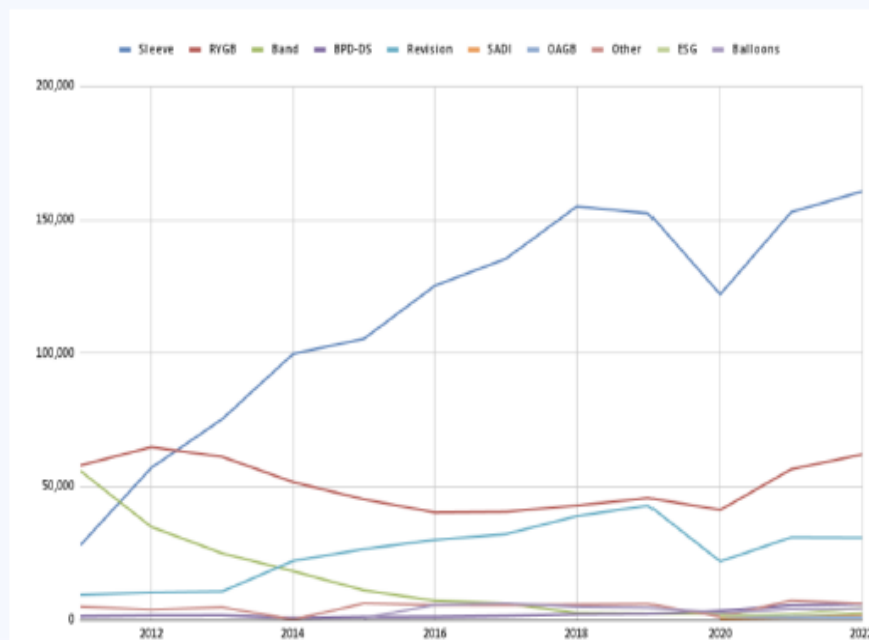
Event	No. (%) Medical/lifestyle (n = 96)	Bariatric surgery (n = 166)
Death ^a	2 (2.1)	2 (1.2)
Cardiovascular		
Coronary revascularization	7 (7.3)	15 (9)
Myocardial infarction	4 (4.2)	10 (6)
Unstable angina	2 (2.1)	4 (2.4)
Significant arrhythmia	4 (4.2)	7 (4.2)
Heart failure	1 (1)	5 (3)
Stroke/transient ischemic attack	3 (3.1)	5 (3)
Peripheral arterial disease	0	2 (1.2)
Venous thromboembolism	2 (2.1)	1 (0.6)
Metabolic		
Severe hypoglycemia	7 (7.3)	11 (6.6)
Diabetic ketoacidosis	1 (1)	0
Gastrointestinal		
Gastric/anastomotic ulcer	2 (2.1)	10 (6)
Bowel obstruction	1 (1)	3 (1.8)
Gastrointestinal leaks	0	1 (0.6)
Gallstones/cholecystitis	3 (3.1)	9 (5.4)
Pancreatitis	1 (1)	3 (1.8)
Alcohol-associated cirrhosis ^b	0	2 (1.2)
Kidney		
Kidney stones	2 (2.1)	11 (6.6)
Initiation of dialysis	2 (2.1)	0
Ocular		
Retinopathy	5 (5.2)	2 (1.2)
Blindness	1 (1)	0
Blood transfusion		
For anemia	3 (3.1)	20 (12)
For gastrointestinal bleeding	2 (2.1)	5 (3)
Miscellaneous		
Fracture	5 (5.2)	22 (13.3)
Cancer ^c	4 (4.2)	9 (5.4)
Suicide attempt	0	1 (0.6)

All Bariatric Surgery Publications
for Complications & Weight Loss
from Level 1 Evidence:
RCTs or Meta-Analyses of RCTs
ARMMS Trial

ANNUAL ASMBS PROCEDURES NUMBERS, 2016-2022

	2022	2021	2020	2019	2018	2017	2016
Sleeve	160,609	152,866	122,056	152,413	154,976	135,401	125,318
RYGB	62,097	56,527	41,280	45,744	42,945	40,574	40,316
Band	2,500	1,121	2,393	2,375	2,660	6,318	7,310
BPD-DS	6,096	5,525	3,555	2,272	2,123	1,588	1,236
Revision	30,894	31,021	22,022	42,881	38,971	32,238	30,077
SADI	1,567	1,025	488	—	—	—	—
OAGB	1,057	1,149	1,338	—	—	—	—
Other	6,189	7,339	1,221	6,060	5,847	5,606	5,665
ESG	4,600	2,220	1,500	—	—	—	—
Balloons	4,358	4,100	2,800	4,655	5,042	6,280	5,744
Total	279,967	262,893	198,651	256,000	252,564	228,005	215,666

The ASMBS total bariatric procedure numbers are based on the best estimation from available data (BOLD, ACS/MBSAQIP, National Inpatient Sample Data and outpatient estimations).



FOR 2022, LSG IS 69% OF PRIMARY BARIATRIC SURGERIES

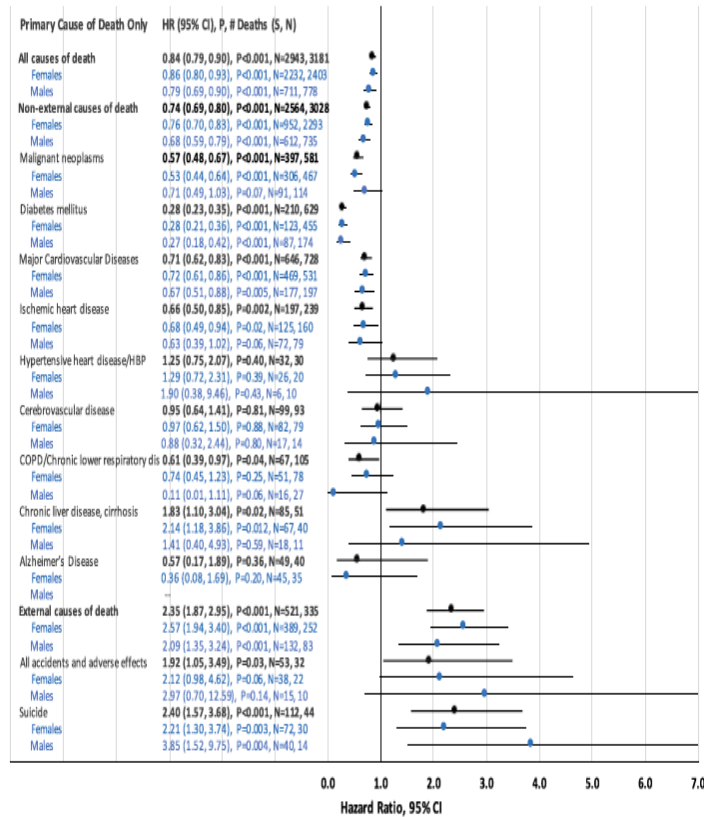
Long-term all-cause and cause-specific mortality for four bariatric surgery procedures

Obesity (Silver Spring) 2023;33(1):574–585.

Ted D. Adams^{1,2,3} | Huong Meeks⁴ | Alison Fraser⁴ | Lance E. Davidson^{2,5} |
John Holmen⁶ | Michael Newman⁷ | Anna R. Ibele⁸ | Nathan Richards¹ |
Steven C. Hunt^{2,9} | Jaewhan Kim¹⁰

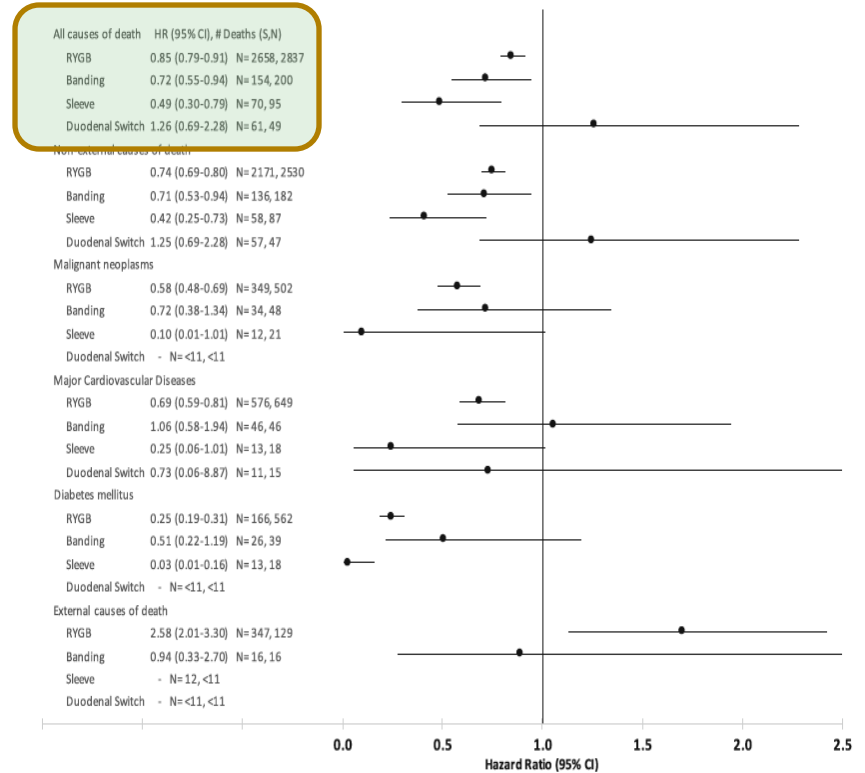
MORTALITY OUTCOMES AFTER BARIATRIC SURGERY

Obesity THE OBESITY SOCIETY WILEY 579



MORTALITY OUTCOMES AFTER BARIATRIC SURGERY

Obesity THE OBESITY SOCIETY WILEY 581

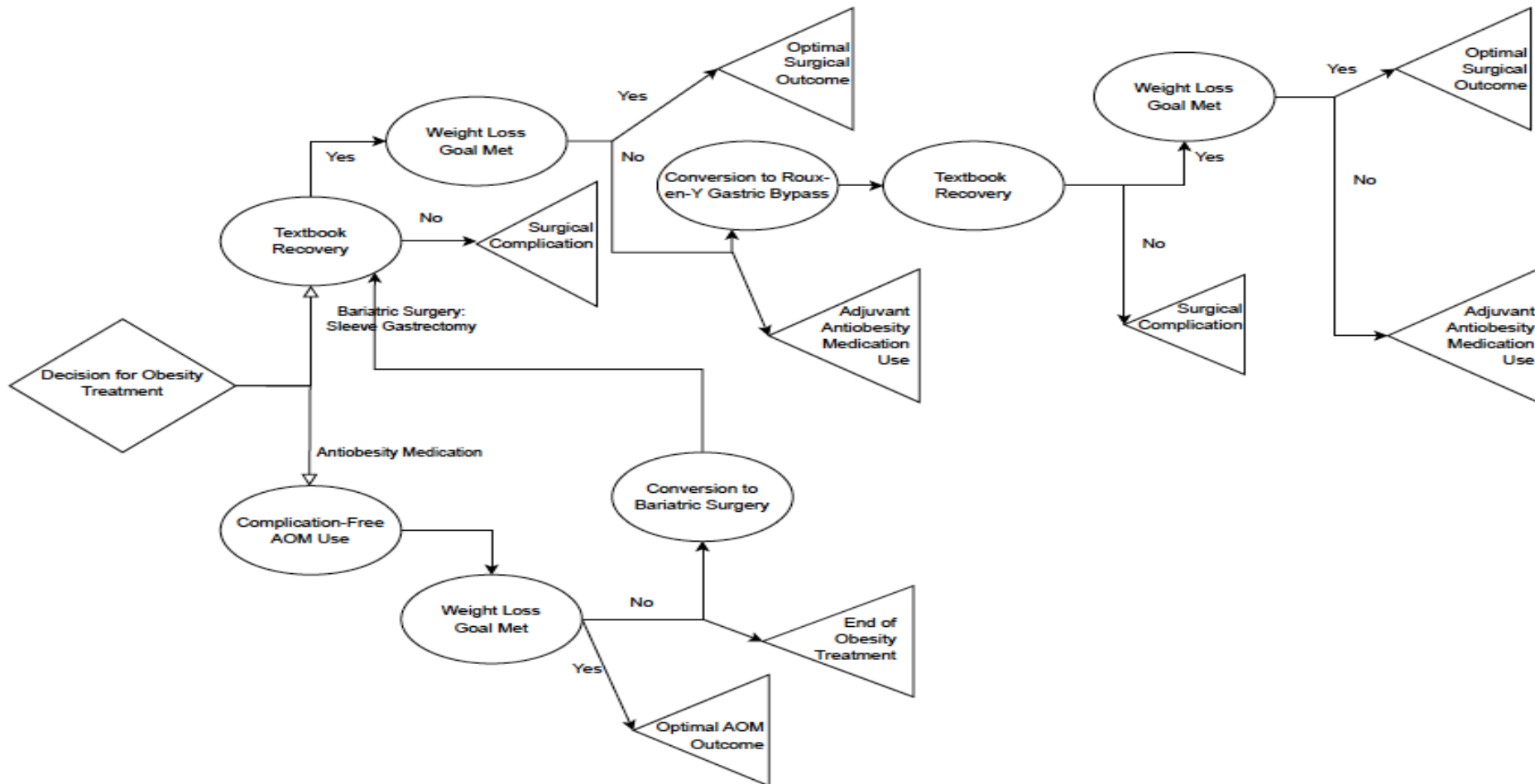


Sleeve with Greatest Mortality Reduction, OR 0.49

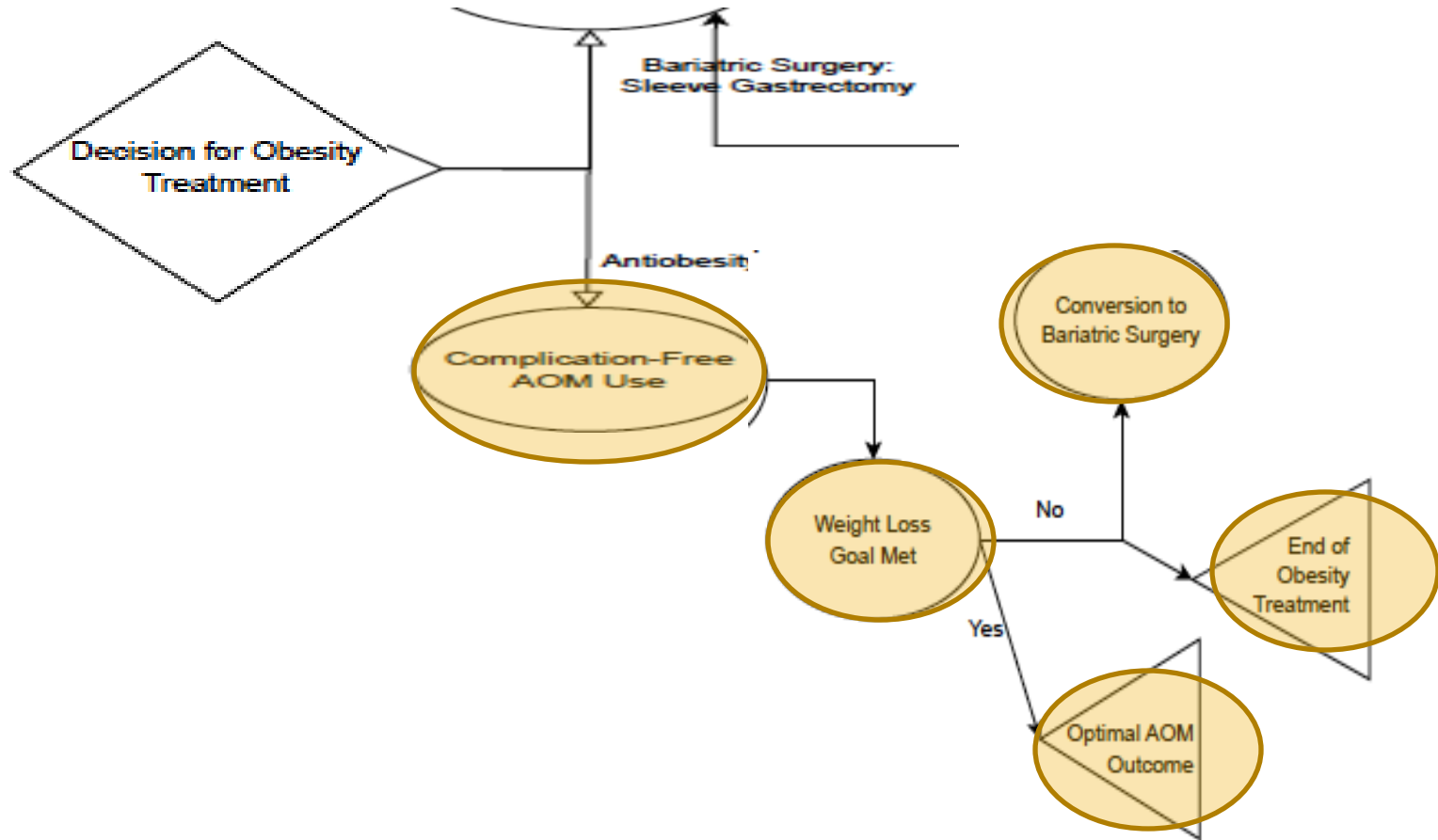
Methods

- **Constructed a decision tree model using Tree Age Pro, 2021 to determine the incremental cost-effectiveness between GLP-1 Medication (Wegovy®) and Laparoscopic Sleeve Gastrectomy**
- **Base Case with Reference Patient**
 - 40 year old woman with BMI of 45 and no diabetes**
 - 40 year perspective consistent with life-time horizon**
- **Chance node probabilities included in the model were based on prior literature demonstrating an association between mortality, weight loss, complications, cost, quality of life.**

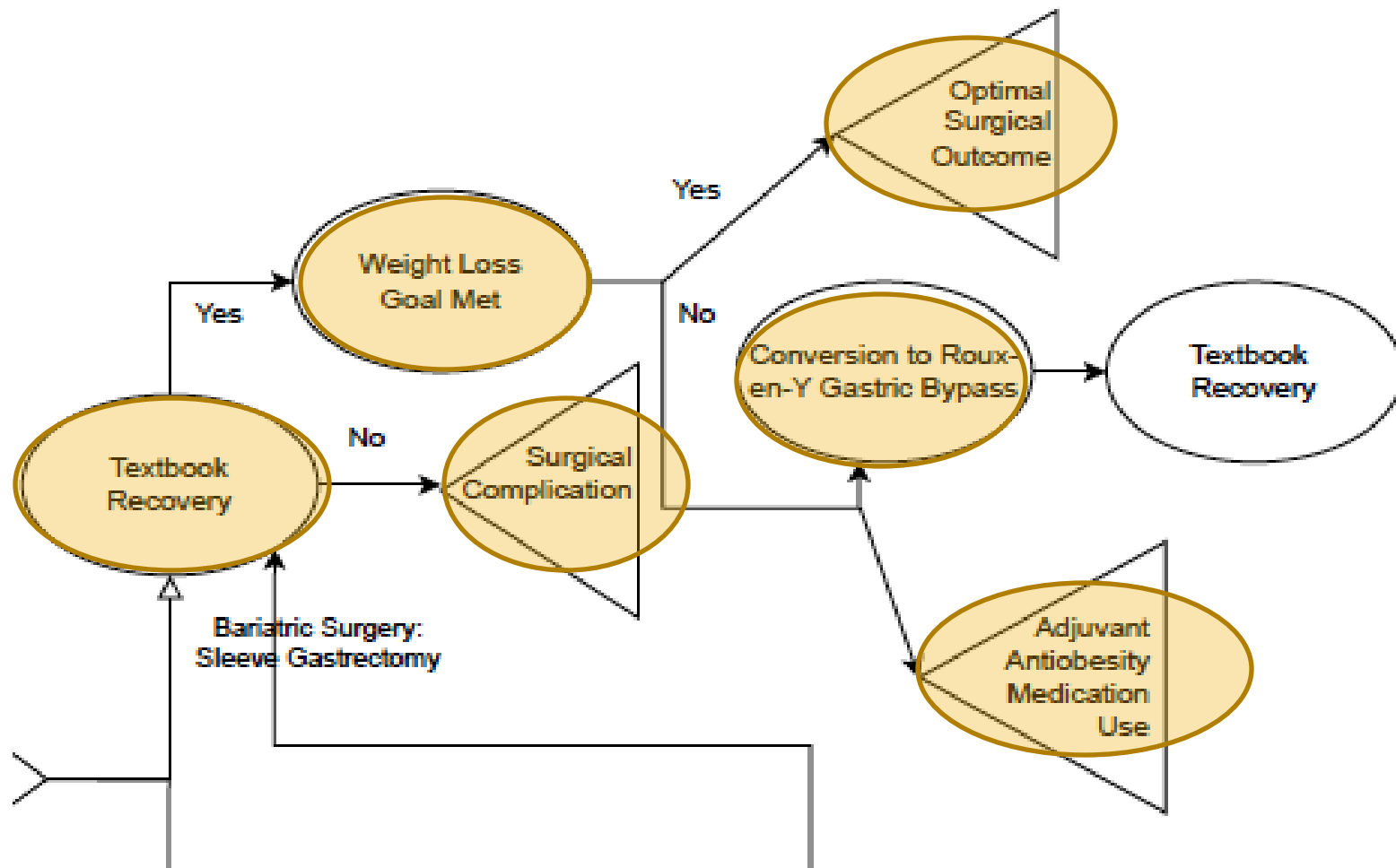
Decision Tree



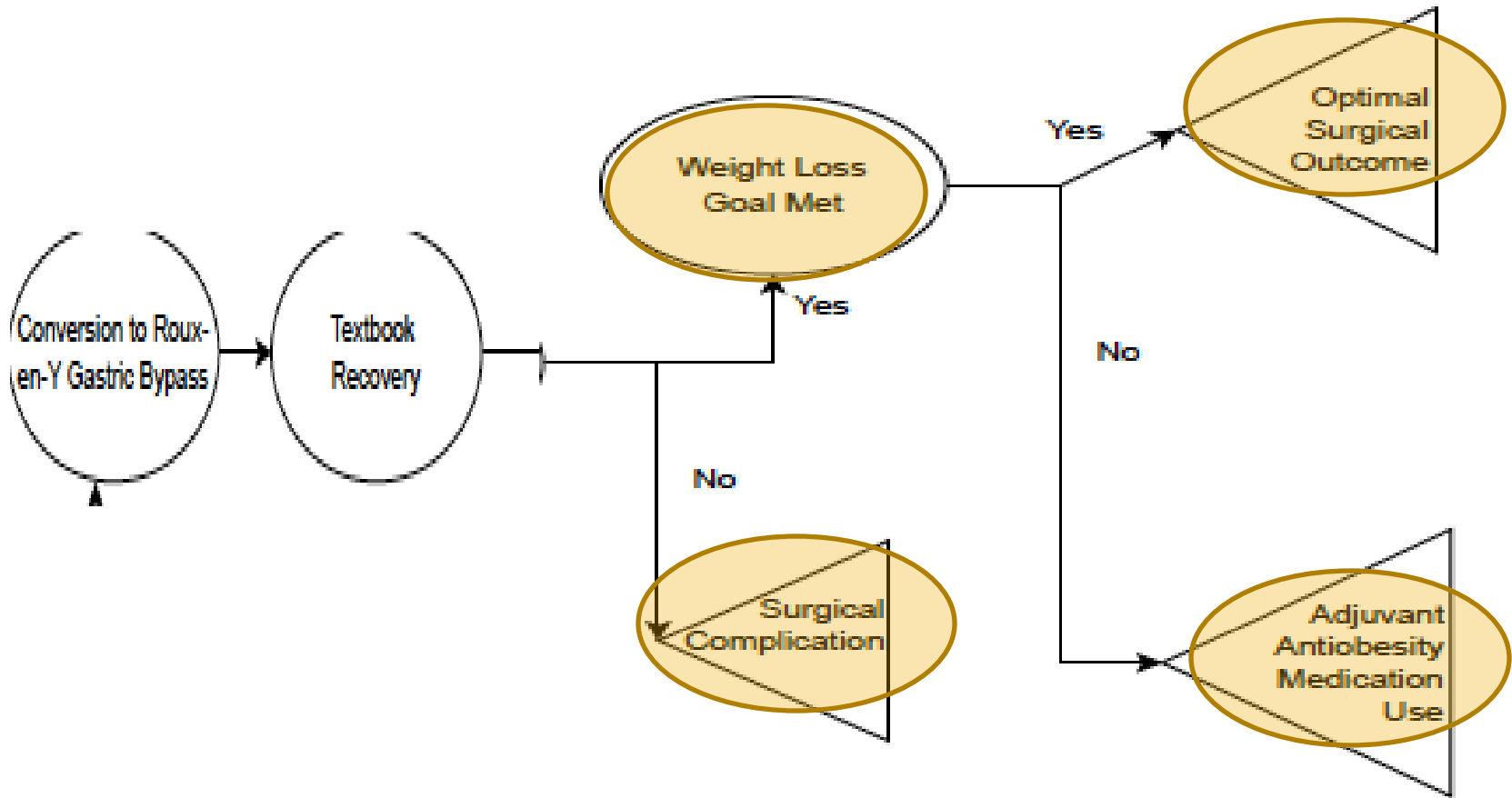
Decision Tree: AOM Arm



Decision Tree: Sleeve Gastrectomy



Decision Tree: Sleeve Gastrectomy to Gastric Bypass



Probabilities, costs, and quality-adjusted life years for cost-effectiveness analysis of prolonged anti-obesity medication versus weight-loss surgery

Parameter	Estimate	SD	Distribution
Conditional Probabilities			
Probability of adhering to antiobesity medications for life	50%	7.5%	Beta
Probability of elective to convert from antiobesity medications to surgery	20%	3.0%	Beta
*Complication within 1 year of bariatric surgery, minor	4.0%	0.6%	Beta
*Complication within 1 year of bariatric surgery, major	2.0%	0.3%	Beta
*Complication more than 1 year after bariatric surgery, minor	8.0%	1.2%	Beta
*Complication more than 1 year after bariatric surgery, major	3.0%	0.5%	Beta
Short:Long-term complication ratio	1:1	15%*	Beta
Major:minor complication ratio, short-term	1:1	15%*	Beta
Major:minor complication ratio, long-term	1:2	15%*	Beta
Weight loss goal met with sleeve gastrectomy	55.9%	6.9%	Beta
Weight loss goal met with Roux-en-Y gastric bypass	69.5%	5.7%	Beta
Adjuvant therapy required after sleeve gastrectomy	30.0%	10%*	Beta
Adjuvant therapy required after Roux-en-Y gastric bypass	20.0%	10%*	Beta
Costs (US 2020\$)^{a,b}			
Antiobesity medication therapy trial	\$57,460	\$8,619	Gamma
Lifelong antiobesity medication	\$1,366,782	\$205,017	
Sleeve gastrectomy procedure and hospitalization	\$26,449	\$3,967	Gamma
Roux-en-Y gastric bypass procedure and hospitalization	\$27,968	\$4,195	
Costs of minor complication, short-term	\$856	\$214	Gamma
Costs of minor complication, long-term	\$1,366	\$342	Gamma
Costs of major complication, short-term	\$44,536	\$11,134	Gamma
Costs of major complication, long-term	\$49,035	\$12,255	Gamma
Long-term costs of obesity	\$173,514	\$3,405	Gamma
Utilities (QALYs)^{a,b}			
Lifetime QALYs of reference case	23.3	3.5	Normal
Disutility from lifelong obesity	6.1	0.9	Normal
Disutility from lifelong antiobesity medication use	0.07	0.01	Normal
Disutility from sleeve gastrectomy	0.21	0.04	Normal
Disutility from Roux-en-Y gastric bypass	0.21	0.04	Normal
Disutility of minor complication, short-term	0.11	0.01	Normal
Disutility of minor complication, long-term	2.61	0.4	Normal
Disutility of major complication, short-term	0.36	0.04	Normal
Disutility of major complication, long-term	8.57	1.3	Normal

*SD: +/- 15% of estimate, a conventional assumption when primary data is not available.

^aAll values discounted to present at 3% per year.

QALY, quality adjusted life year

Cost-effectiveness analysis of prolonged anti-obesity medication versus weight-loss surgery

Strategy	EV cost (US\$ 2020)	Incremental EV cost (US\$ 2020)	EV effectiveness (QALYs)	Incremental EV effectiveness (QALYs)	ICER (\$/QALYs)
Weight-loss Surgery	302,862 (300,336- 302,900)	-385,321 (-384,614- - 387,792))	21.58 (21.58-21.72)	1.08 (1.08-1.09)	-\$356,778/QALY n/a ^a
Anti-obesity Medications	688,183 (685,509- 690,133)		20.50 (20.50-20.64))		

\$/QALY

WLS: 14,034

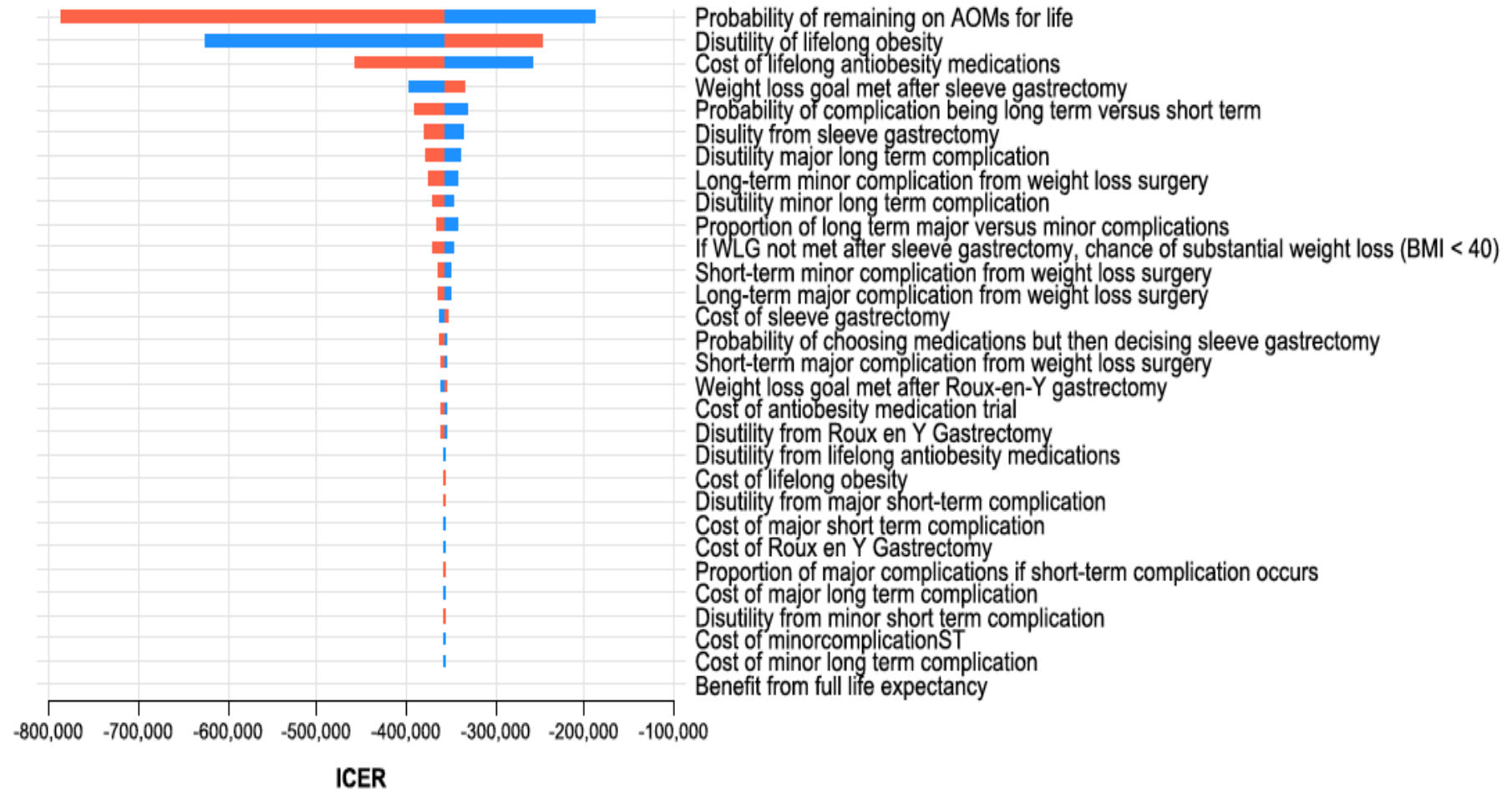
AOM: 33,570

95% confidence intervals in parentheses; EV, expected value; QALYs, quality adjusted life years; ICER, incremental cost-effectiveness ratio

^a The ICER is reported with caution due to it being a negative number. Its role in cost-effectiveness studies quantitatively assess the added benefit for an intervention that is also costlier. Weight-loss surgery dominates (lower cost, high benefit) Anti-obesity medications, and a negative ICER would not be further used in the interpretation of these results.

Tornado Diagram: ICER

Weight Loss Surgery vs. Anti-Obesity Medications



Incremental cost-effectiveness ratio is a summary measure representing the economic value of an intervention, compared with an alternative (comparator) The tornado diagram is used to visually demonstrate the resulting ICERs when 1 variable is changed to become either the maximum or minimum value of the range provided. It is used to identify the relative importance of a variable since it can demonstrate if the economic conclusion changes based on changing the variable

Monte Carlo simulation probabilistic analysis of cost-effectiveness of weight loss surgery versus anti-obesity medications

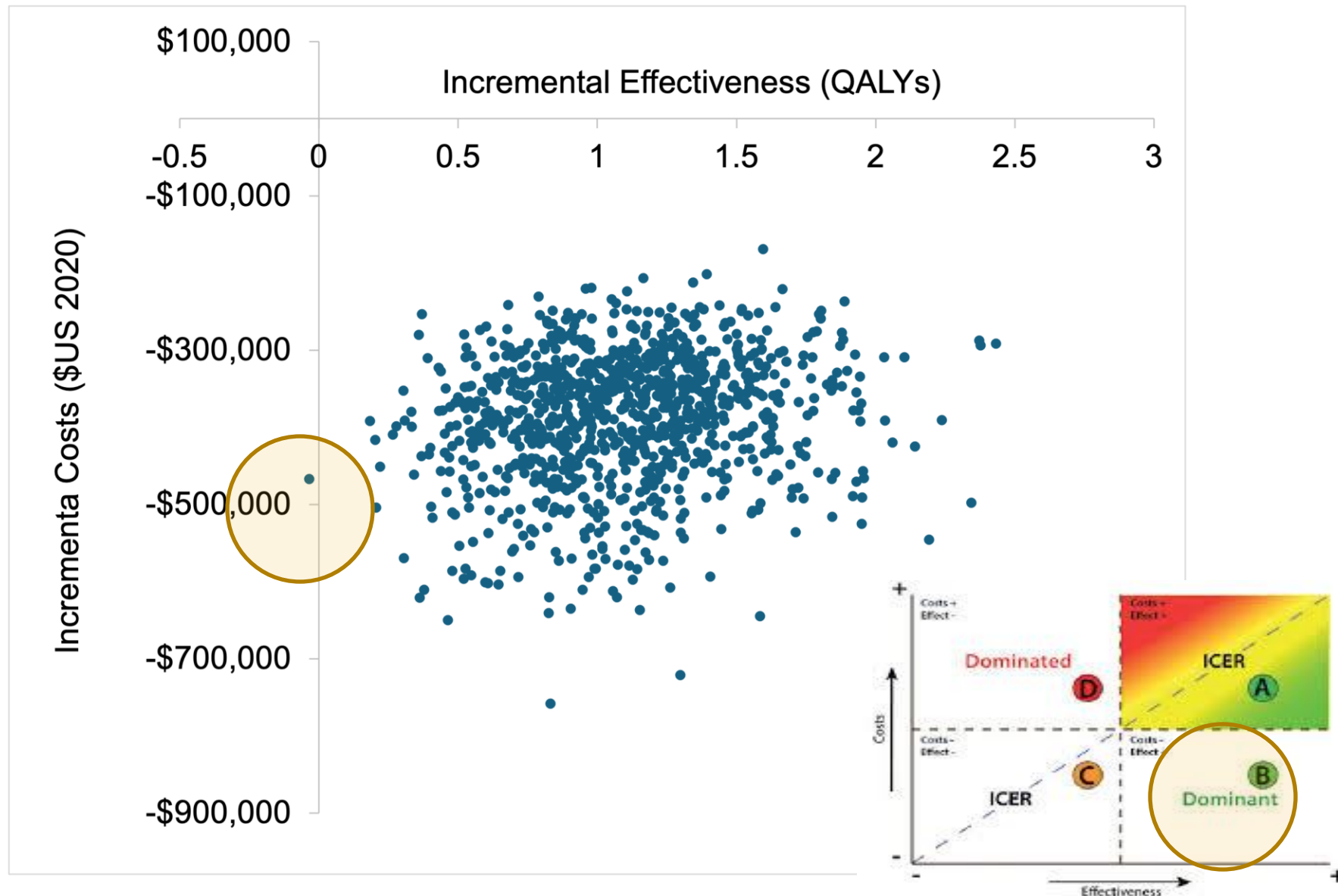


Figure 4: Cost-effectiveness plots. The upper left quadrant reflects inter-

Extreme Sensitivity Analysis: Assumes 90% long-term adherence

What happens to the heart when
people stop GLP-1 drugs?

Xie, Choi, Al-Aly | BMJ Medicine 2026

333,000+

adults with type 2 diabetes, 3 years

16

treatment scenarios, target trial emulation

WHAT 3 YEARS OF CONTINUOUS USE BUILDS

reduced risk of heart attack, stroke, and death vs sulfonylureas

3 years
continuous use



-18%

WHAT STOPPING TAKES AWAY

increased risk of heart attack, stroke, and death vs staying on

6 months off



+4%

1 year off



+14%

1.5 years off



+18%

2 years off



+22%

The asymmetry

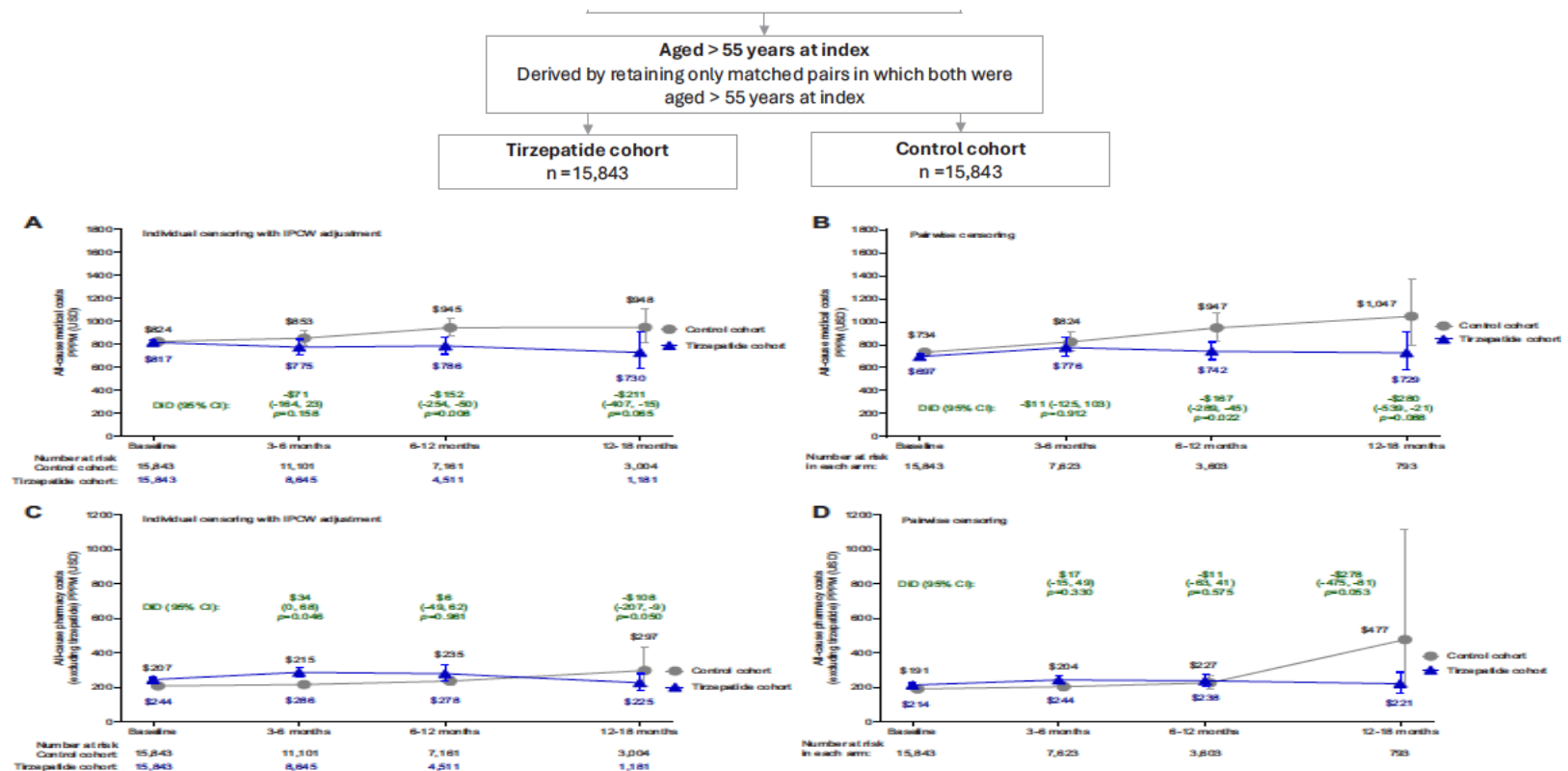
3 years to build an 18% reduction in cardiovascular risk.

~1.5 years off the drug to erase it.

Trends in Cost of Care With Tirzepatide in Adults Aged Over 55 Years With Obesity or Overweight Without Diabetes: A Matched Cohort Analysis

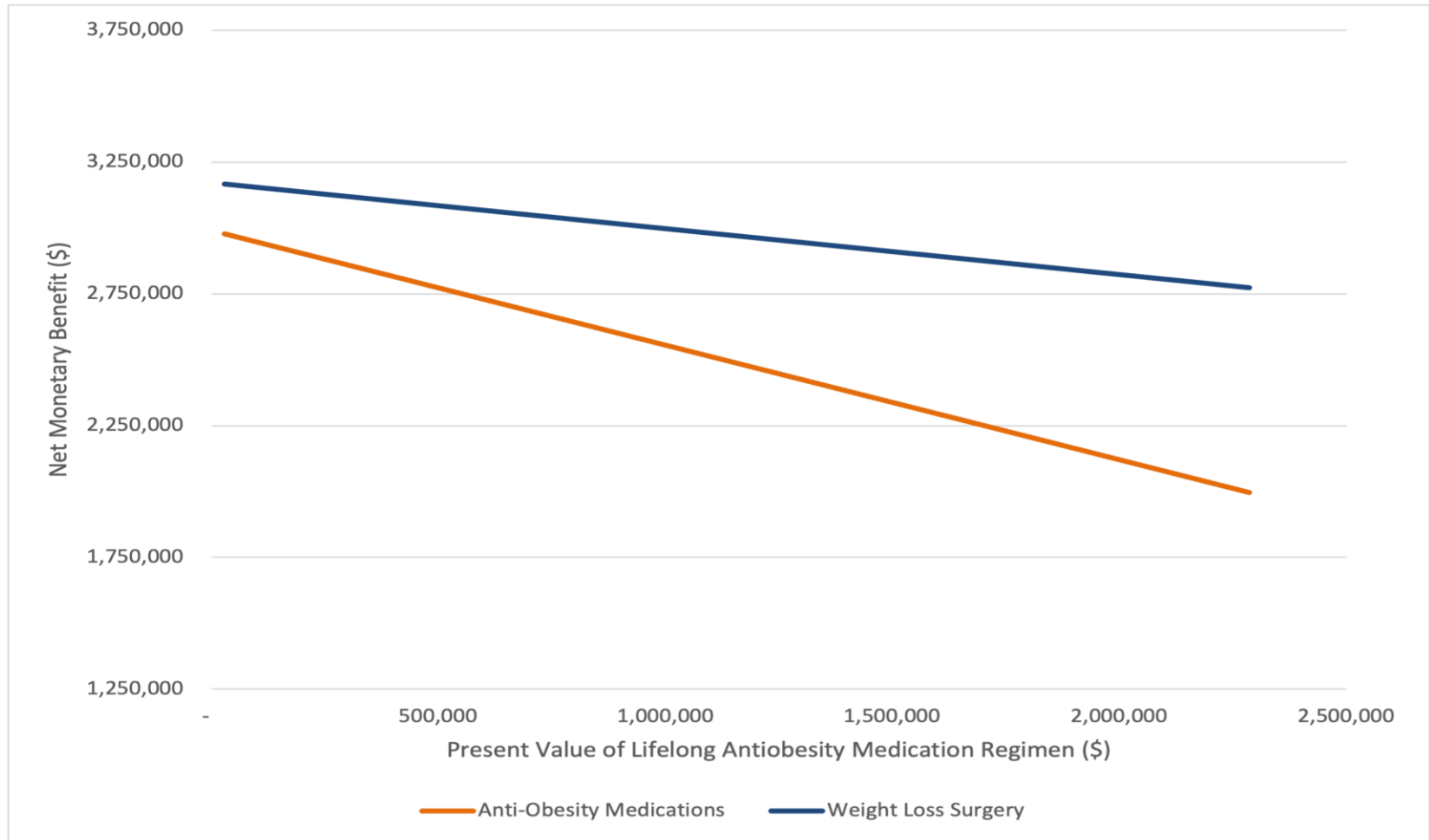
Navneet Upadhyay¹  | Ali Bonakdar² | Keshab Subedi² | Soutrik Banerjee³ | Benjamin Behrend¹ | Emily R. Hankosky¹ 

¹Eli Lilly and Company, Indianapolis, Indiana, USA | ²Cencora, Conshohocken, Pennsylvania, USA | ³Aixial Group, Boulogne-Billancourt, France



Conclusions: Monthly cost offsets for persistent tirzepatide users versus untreated individuals grew over time, offsetting \$319 (ranging from \$94 to \$544) tirzepatide costs by 12–18 months. These results have implications for the \$195 monthly net Medicare cost for the Bridge programme, suggesting tirzepatide may generate near-term cost savings in an older population that stays on treatment.

Extreme Sensitivity Analysis: Assumes 50% long-term adherence to anti-obesity medications.



Summary & Conclusions

- **Inputs for Cost-Effectiveness Model Sourced from Long-Term, Highest Level of Evidence Literature**
- **Base Case of 40 yo woman with BMI 45 with 40 year perspective**
 - **Laparoscopic Sleeve Gastrectomy and Wegovy**
- **Tree Age Decision Tree w Revisional & Combination Therapy**
- **Sensitivity Analyses Performed for 50% and 90% Adherence**
 - **Only inflection is at 90% adherence with monthly cost of \$310**
- **Weight-loss surgery dominates (lower cost, higher benefit) anti-obesity medications**

Thank You

An aerial photograph of the Yale University campus in New Haven, Connecticut. The image shows a mix of historic Gothic architecture, including the prominent red brick Gothic Revival building of the Sterling Memorial Library with its tall, ornate tower, and more modern stone buildings. The campus is surrounded by green trees and a clear blue sky. A dark blue rectangular box with the word 'Yale' in white serif font is overlaid on the left side of the image.

Yale

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