

Gastric Bypass vs. Sleeve Gastrectomy for Diabetes



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Presenter Disclosure

Philip R. Schauer MD

Board Member/Advisory Panel – GI Dynamics; Persona; Keyron, Mediflix

Consultant – Ethicon, Medtronic, Keyron, Novo Nordisk, Lilly

Research Support – Ethicon, NIH, Medtronic, Pacira;

Stock/Shareholder - SEHQC, LLC

Clinical Trials (Last 2 Years):

STAMPEDE

MS-MACE

ARMMS

SPLENDOR-NASH

SPLENDID-Cancer

RYGB vs. SG 30-day Complications

N= 141,646; RYGB =43,354; SG= 98,292

Mortality 0.1 vs. 0.2

ICU 1.3 vs. 0.6

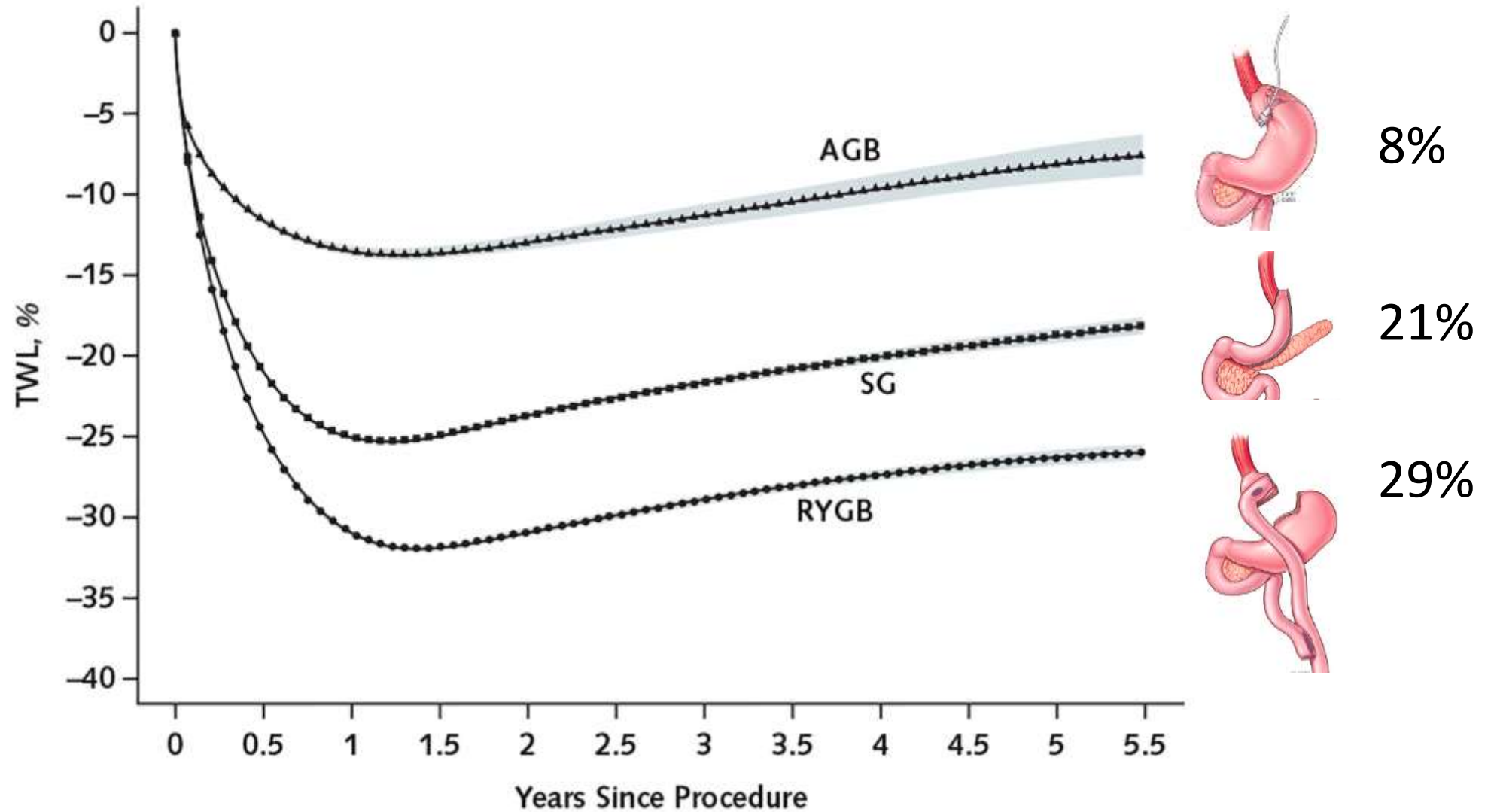
Reoperation 2.5% vs. 1.0%

Readmission 2.8% vs. 1.2%

Risk of Selected Nutritional Deficiencies Resulting from Bariatric Surgery

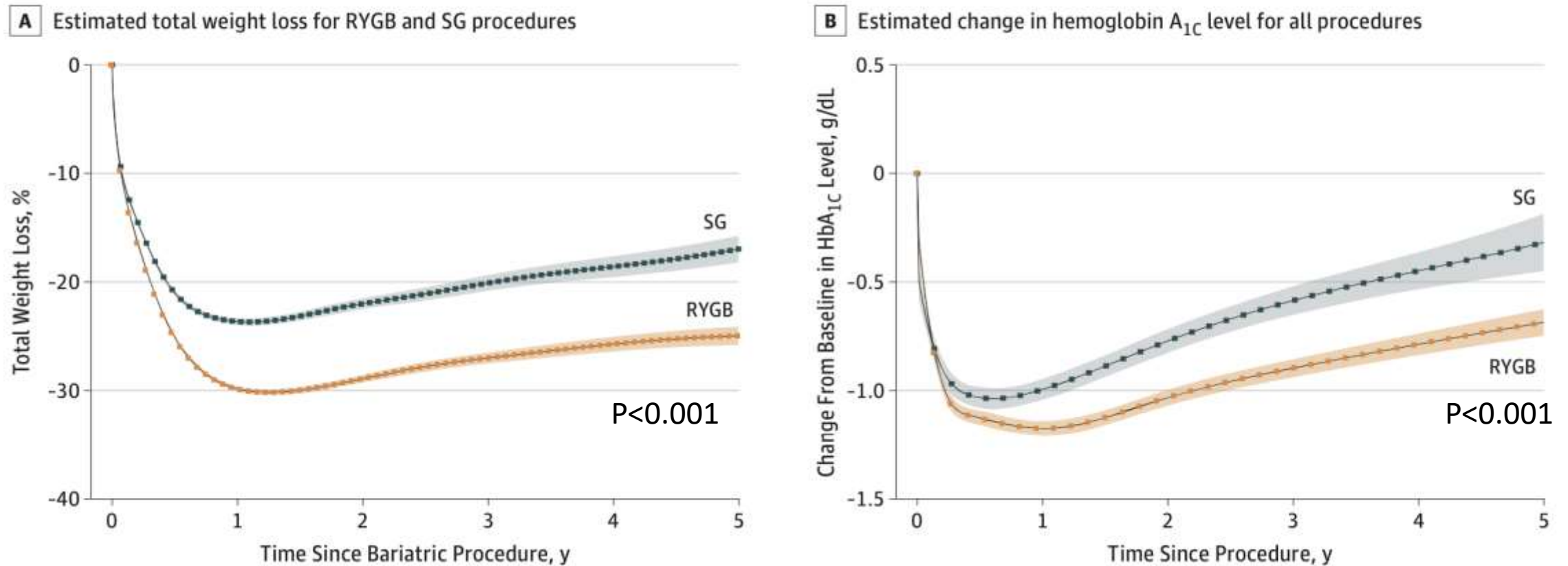
Nutrient	LAGB	LSG	RYGB	BPD/DS
Macronutrients				√√√
Thiamine ^a	√	√	√	√
Iron ^b			√√	√
Vitamin B ₁₂		√√	√√√	√
Vitamin D			√√√	√√√
Vitamin A			√	√√

5-year Comparative Effectiveness of Bariatric surgery for Weight Loss: A PCORnet Cohort Study N=46,510



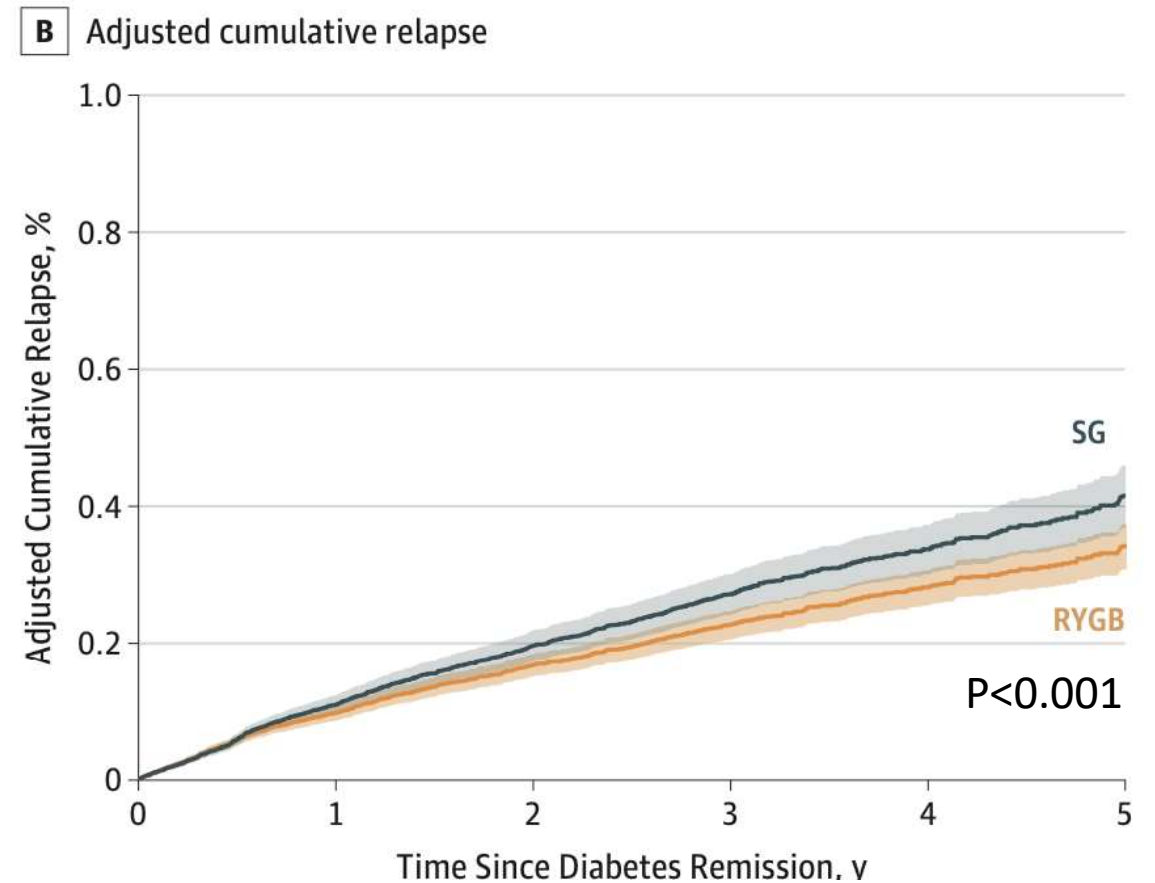
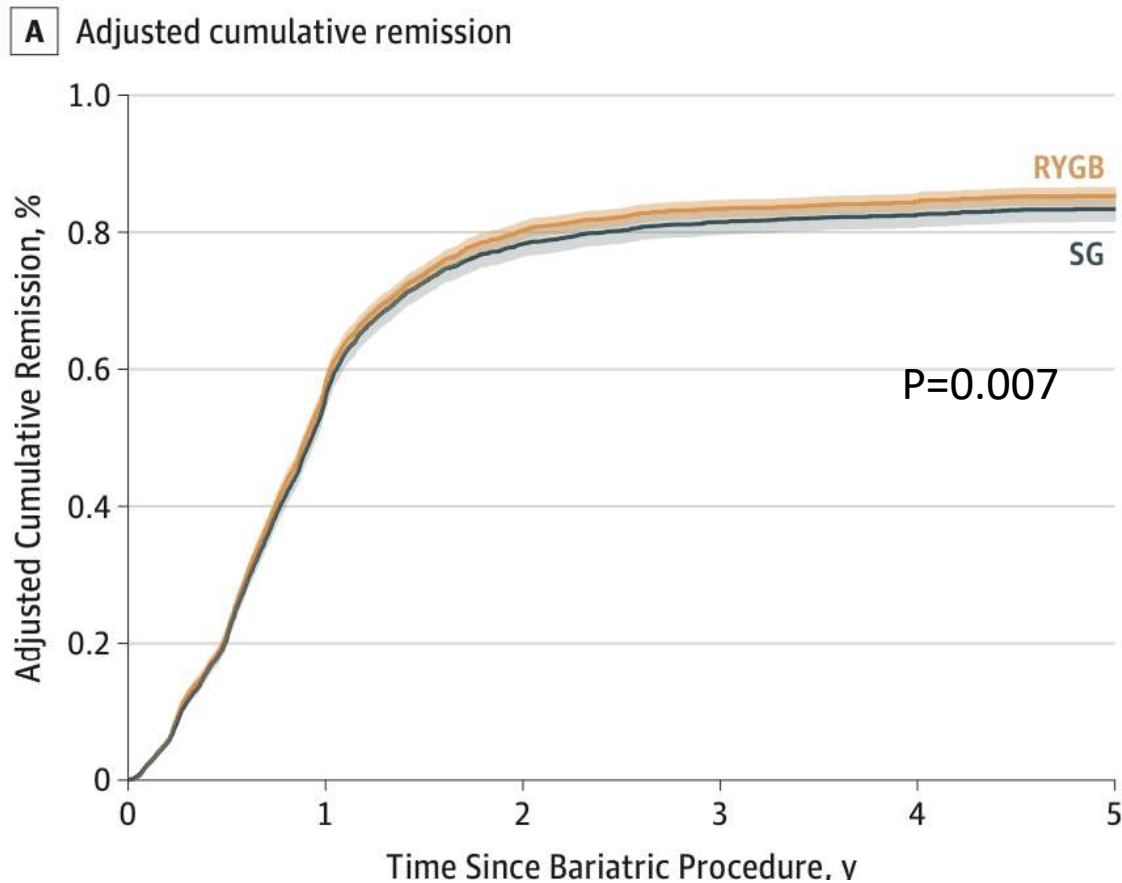
Comparing the 5-year Diabetes Outcomes of Sleeve Gastrectomy and Gastric Bypass (PCORnet) N=9710

Figure 1. Adjusted Total Weight Loss and Change in Hemoglobin A_{1c} Level by Procedure Over 5 Years of Follow-up

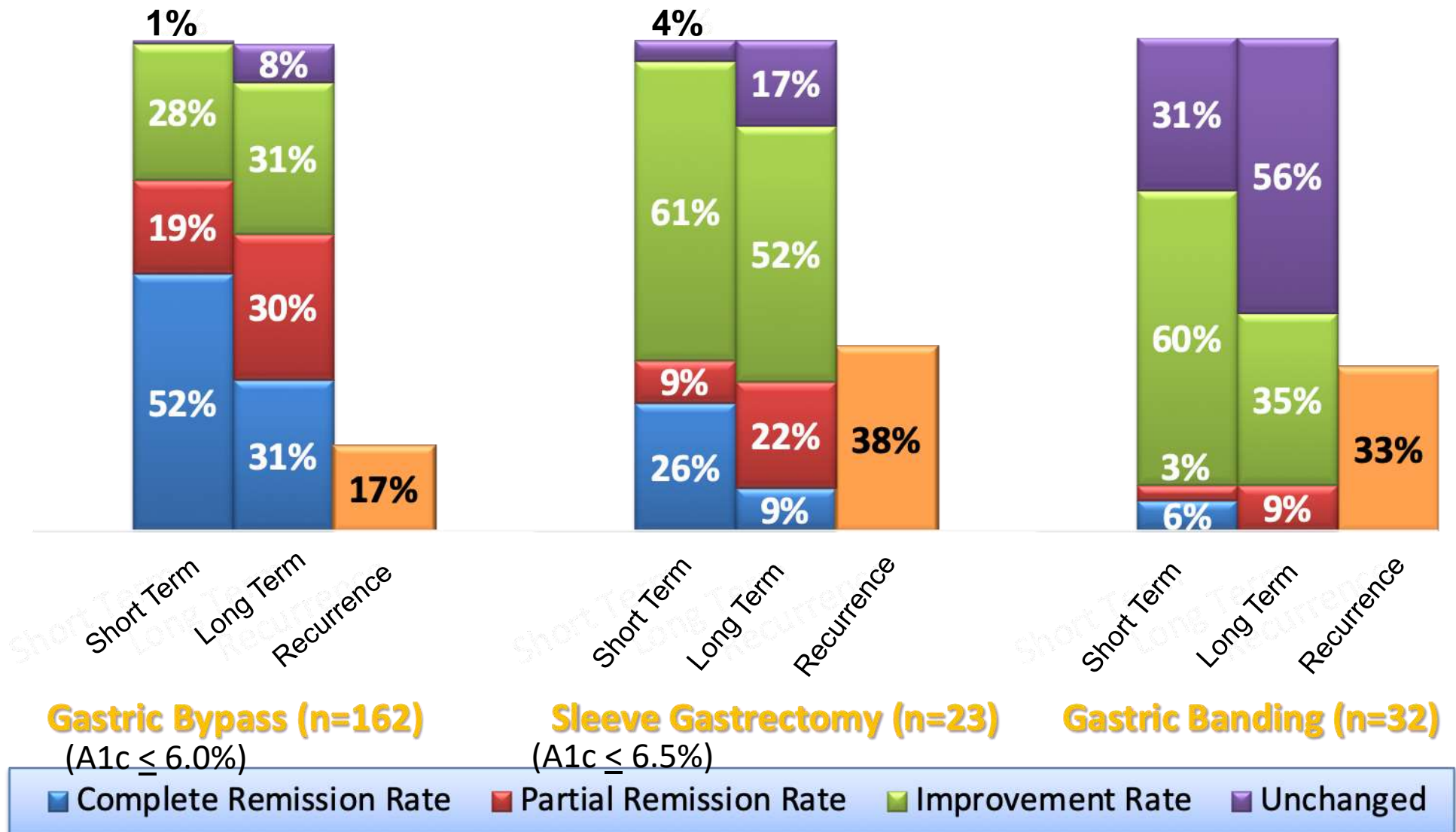


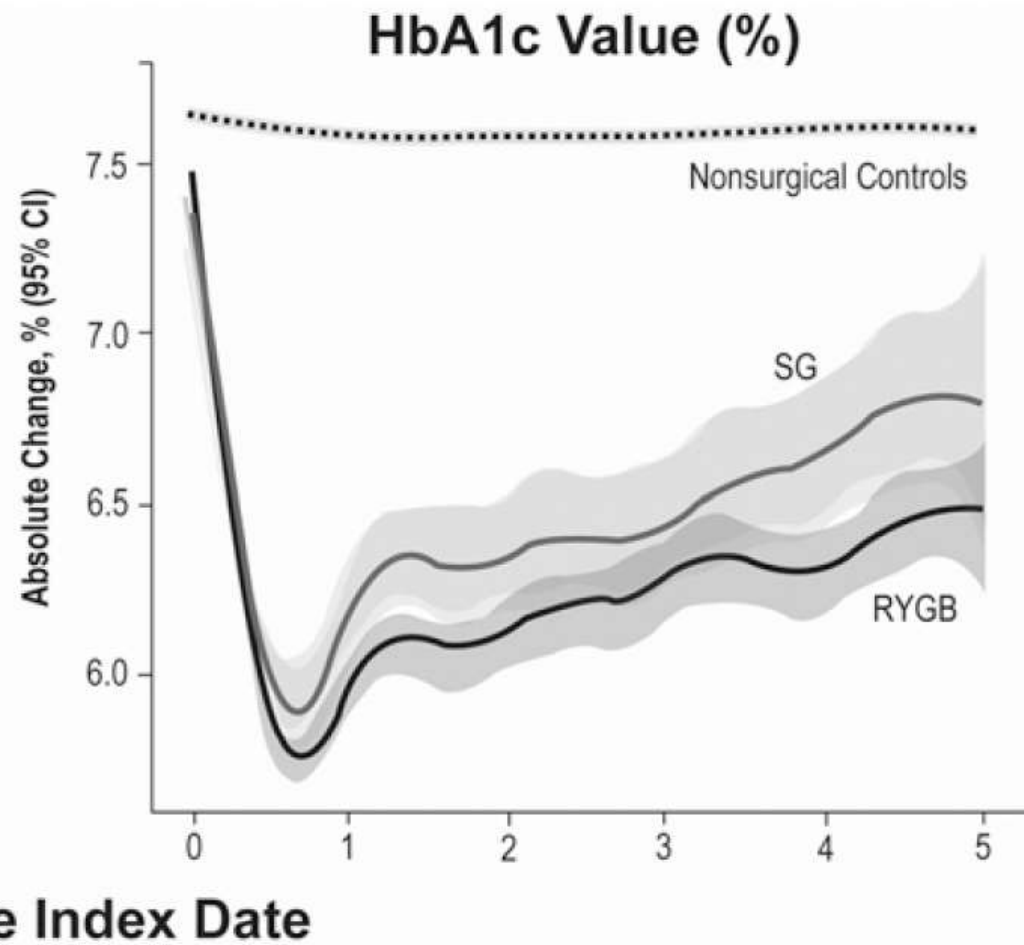
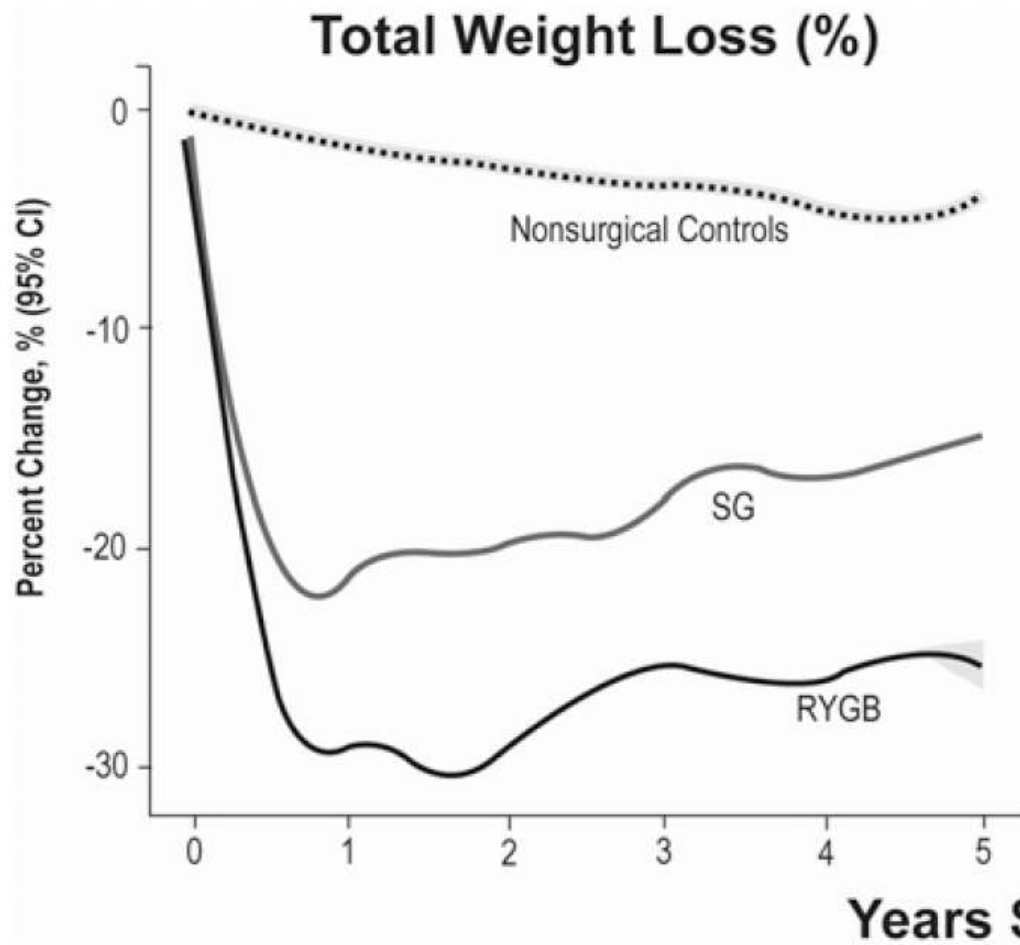
Comparing the 5-year Diabetes Outcomes of Sleeve Gastrectomy and Gastric Bypass (PCORnet) N=9710

Figure 2. Cumulative Incidence Rates of Type 2 Diabetes Remission and Relapse Across 5 Years in the National Patient-Centered Clinical Research Network Bariatric Study Cohort



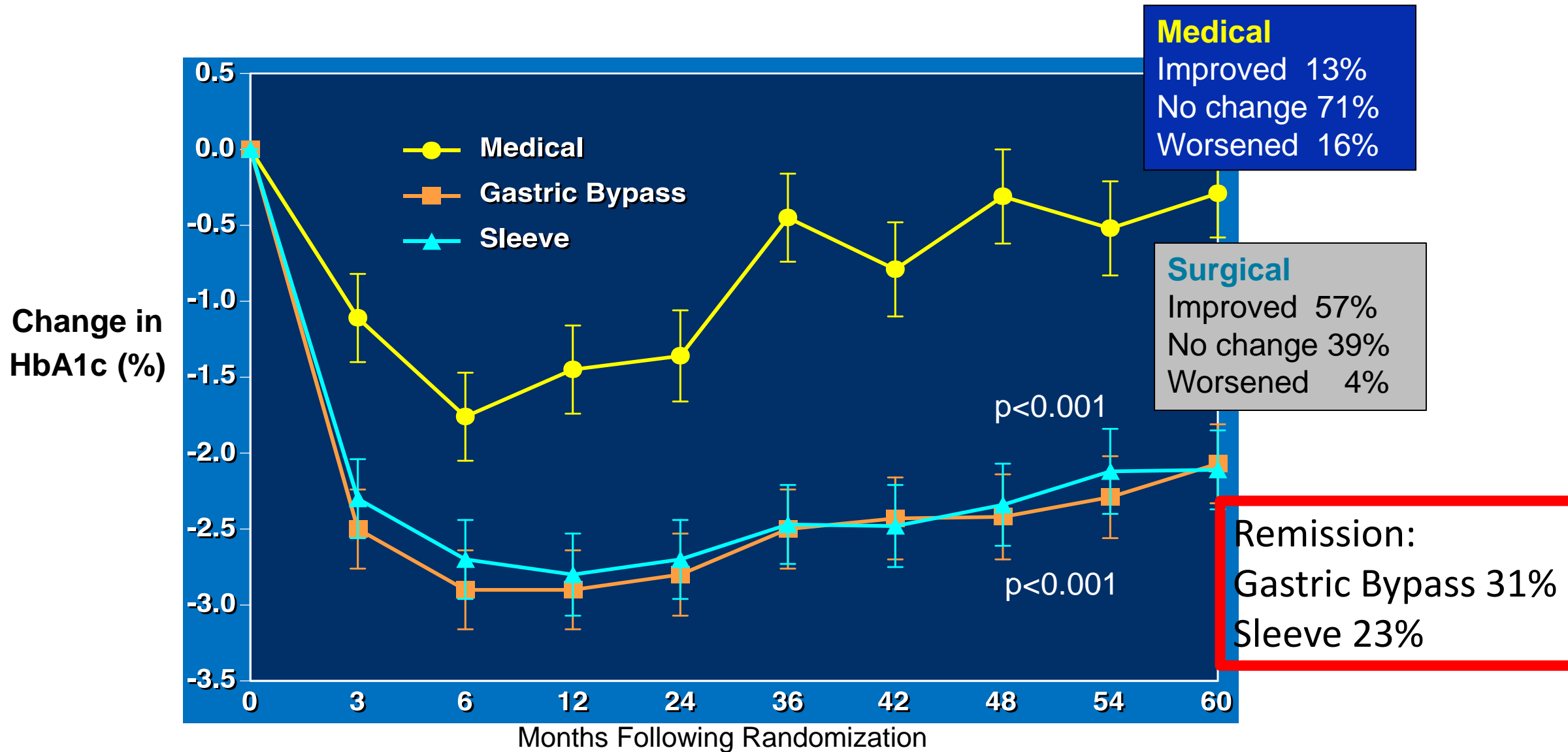
Remission and Recurrence By Metabolic Surgery at 5 years



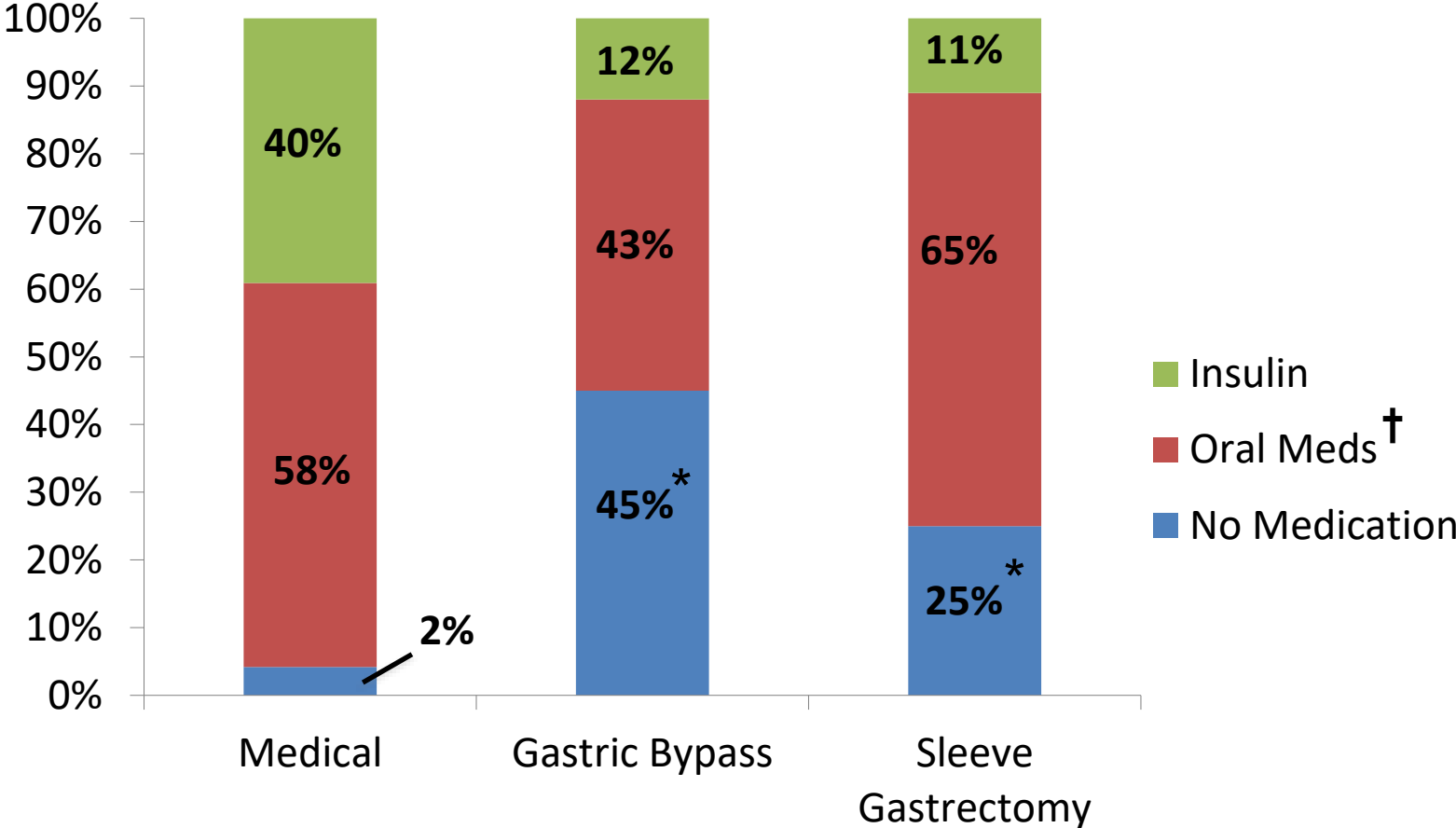


Randomized Controlled Trials

Change in HbA1c Over 5 Years



Diabetes Medications at 5 Years



There was similar reduction in CV meds with surgery

P<0.05 compared to medical therapy; † Includes injectables such as GLP-1 agonists.
Schauer PR, et al. *N Engl J Med.* 2017;376(7):641-651.

Change in Body Mass Index Over 5 years

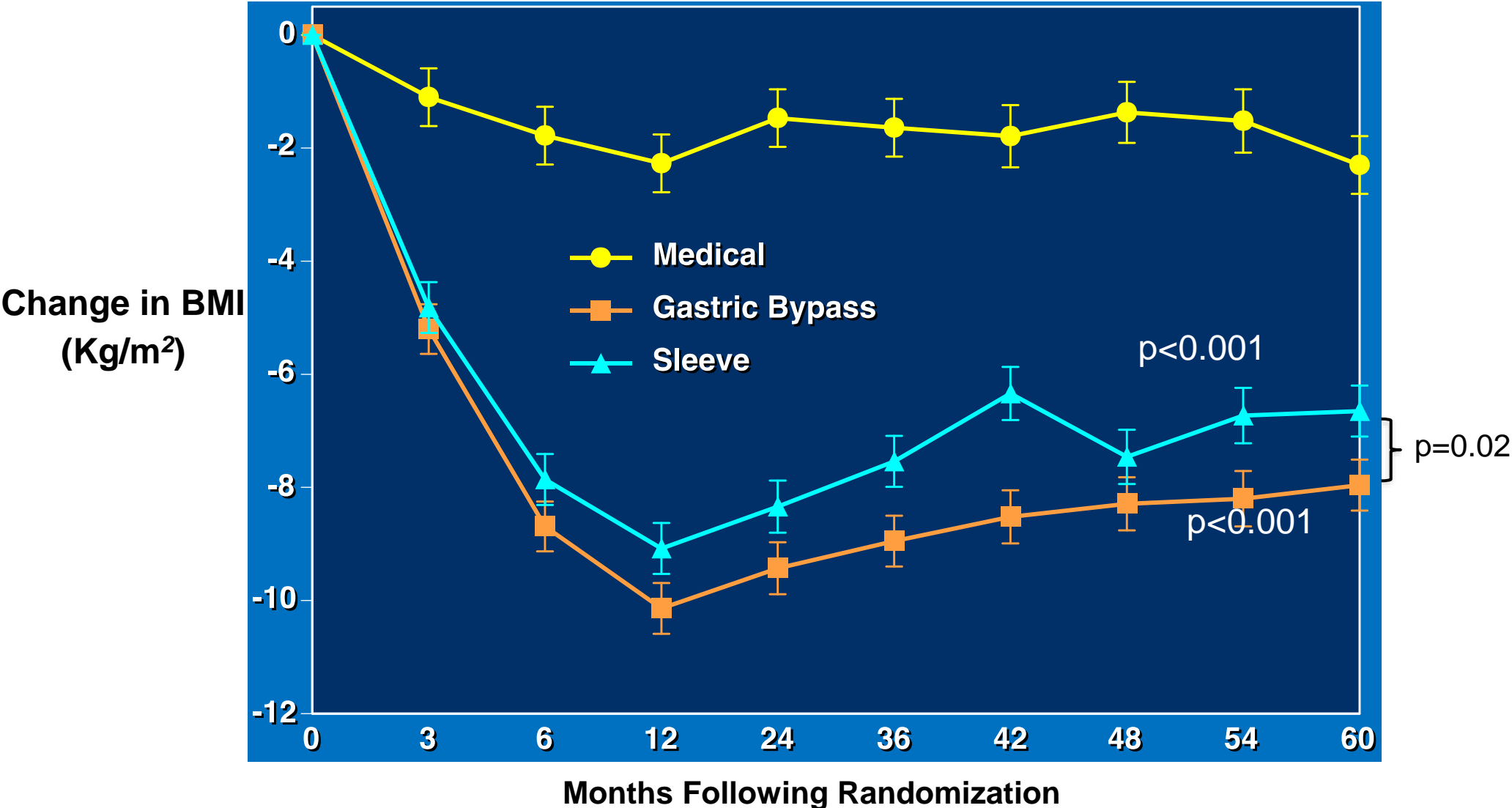


Table 2. Long-term remission rate (%) of type 2 diabetes (T2DM) after Roux-en-Y gastric bypass (RYGB) versus sleeve gastrectomy (SG) in randomized clinical trials (RCTs)

RCT	RYGB % (n with remission /n with T2DM)	SG % (n with remission /n with T2DM)	P value*
Advanced Diabetes STAMPEDE ²¹	31% (15/49)	23% (11/47)	0.57
Advanced Diabetes SLEEVEPASS ²²	45% (18/40)	37% (15/41)	0.59
Mild diabetes SIM-BOSS ²³	75% (21/28)	77% (20/26)	0.88
Mild diabetes Ruiz-Tovar et al ²⁴	86% (51/59)	82% (50/61)	0.67
4 RCTs	60% (105/176)	55% (96/175)	0.42

Long-term remission of T2DM has been defined as glycated hemoglobin <6.5% off diabetes medications 5-years after surgery.

*P values from Yates-corrected Pearson's chi-square test.

SleevePass RCT 10 yr RCT

RCT Sleeve v Bypass n= 240, 85% Follow-up

% with T2D =

LSG vs RYGB

%EWL 43% vs. 50% $P < 0.05$

Remission T2D 23% vs. 33% NS

Remission of HTN 8% vs. 24%, $P < 0.05$

Esophagitis 31% vs. 7%, $P < 0.05$

Reoperation 15% vs. 18.5% NS

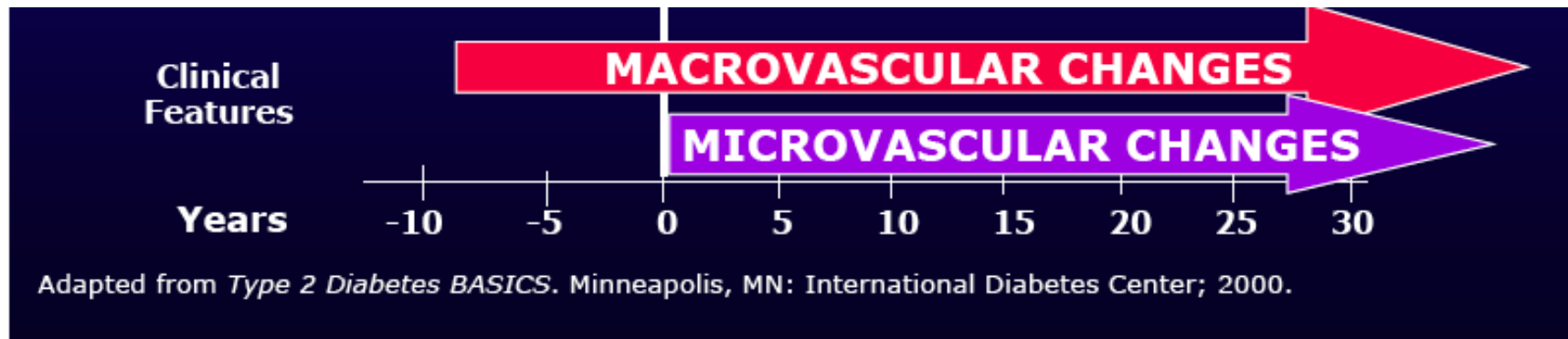
Table 3. Minor and Major Late Complications After Laparoscopic Sleeve Gastrectomy (LSG) and Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) Reported Cumulatively After 30 Days to 10 Years of Follow-up

	No. (%)		P value
	LSG (n = 121)	LRYGB (n = 119)	
Minor complications			
Vomiting/dehydration	0	3 (2.5)	NA
Gastroesophageal reflux	38 (31.4)	8 (6.7)	NA
Ulcer/stricture at gastrojejunal anastomosis	2 (1.7)	8 (6.7)	NA
Dumping	1 (0.8) ^a	3 (2.5)	NA
Fistula and abscess	1 (0.8) ^b	0 (0.0)	NA
Ureterolithiasis	0	1 (0.8)	NA
Adhesion-related intestinal obstruction	0	1 (0.8)	NA
Ventral hernia	0	1 (0.8)	NA
Suspected internal herniation	0	1 (0.8)	NA
Nonspecific abdominal pain	0	1 (0.8)	NA
Anemia	0	1 (0.8)	NA
Hypokalemia	0	1 (0.8)	NA
Total	42 (34.7)	29 (24.4)	.08 ^c
Major complications			
Fistulectomia	1 (0.8) ^b	0 (0.0)	NA
Gastroesophageal reflux	14 (11.6) ^a	0 (0.0)	NA
Internal herniation	0	18 (15.1) ^d	NA
Incisional hernia	3 (2.5)	3 (2.5) ^d	NA
Candy cane/blind loop resection	0	1 (0.8)	NA
Abdominal pain and stricture	0	1 (0.8)	NA
Sleeve stenosis	1 (0.8)	0 (0.0)	NA
Total	19 (15.7)	22 (18.5) ^d	.57 ^c

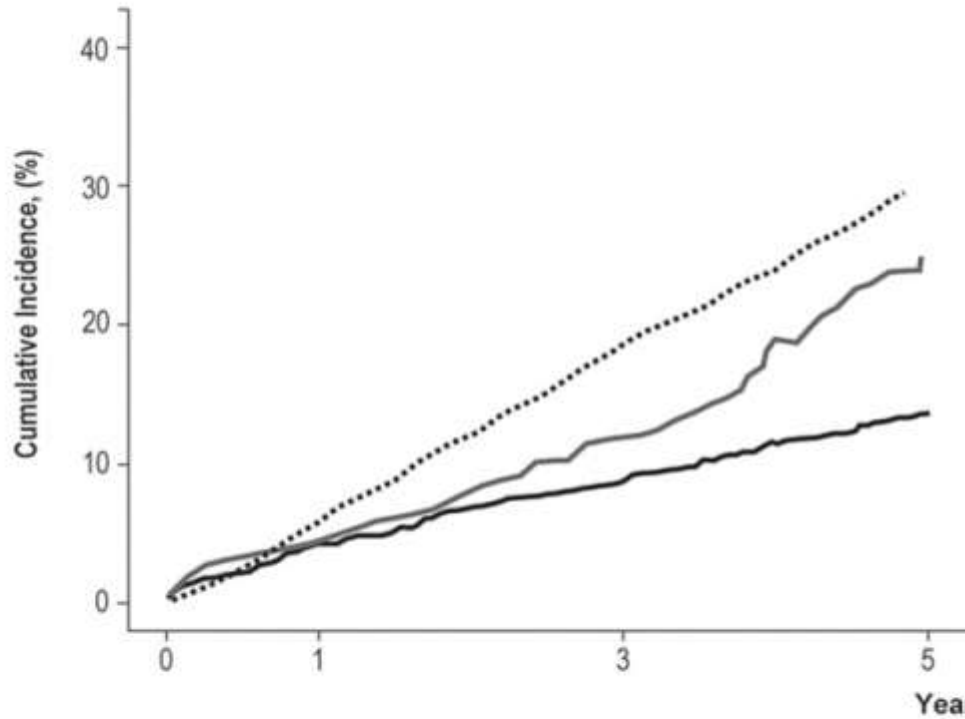
Patient-reported outcomes, weight loss, and remission of type 2 diabetes 3 years after gastric bypass and sleeve gastrectomy (Oseberg); a single-centre, randomised controlled trial

- RCT (Triple Blinded) LSG vs. RYGB, N=109
- All with T2DM
- 3-yr follow-up 85%
- RYGB superior to LSG
 - QOL (9.4, CI 3.3 to 15.5)
 - Less reflux (0.54, 0.17-0.90)
 - %TBWL 25% vs. 17%, P<0.05
 - T2D remission 67% vs 33%, p<0.05

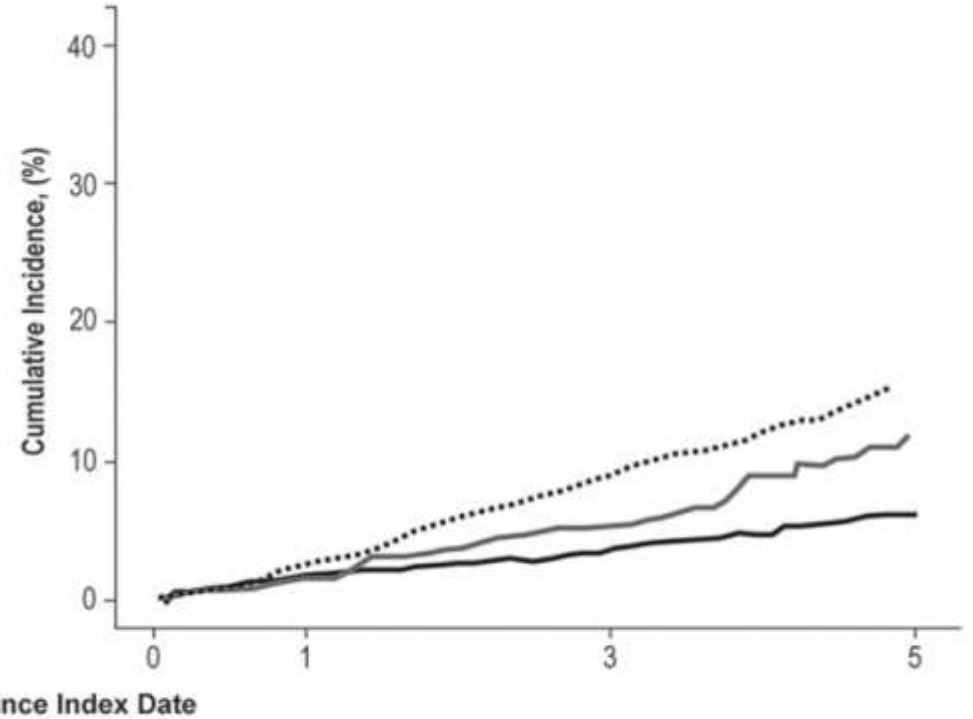
What about the effect of surgery on Long-term Morbidity/ Mortality



MACE (6 component)



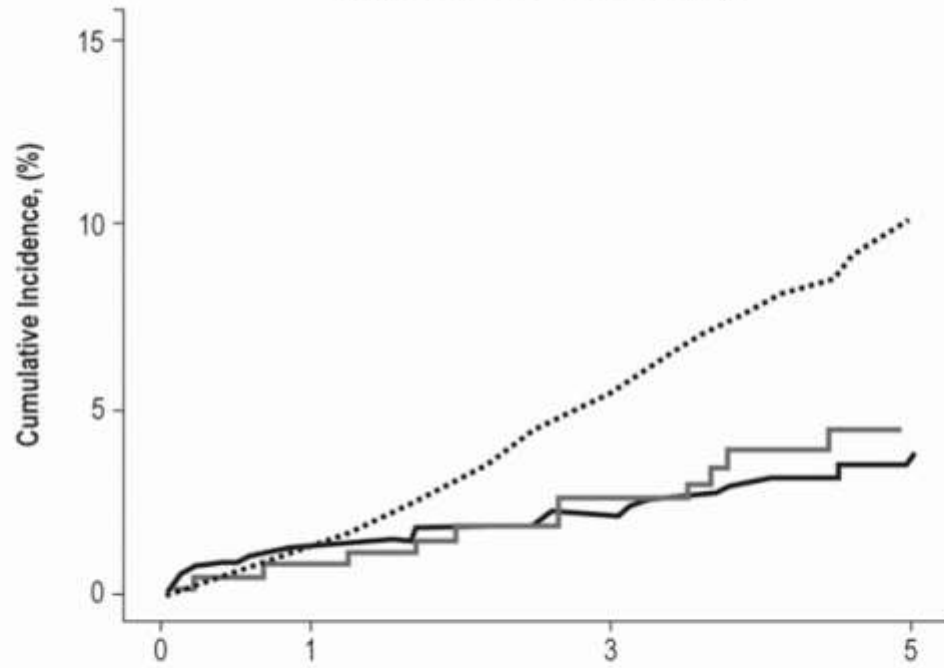
MACE (3 component)



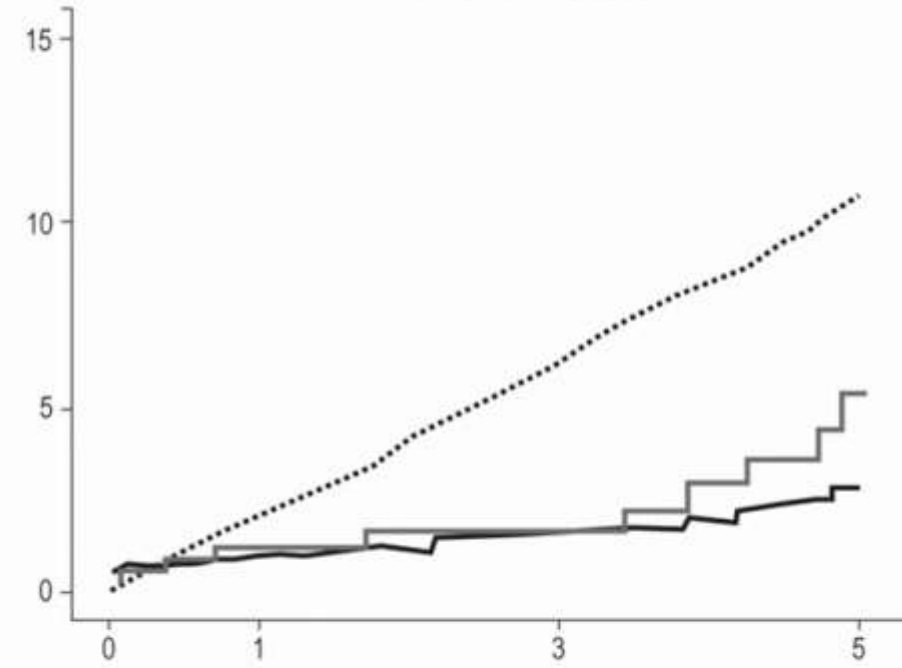
	N at RISK			
	0	1	3	5
..... Non-Surgical Controls	11435	9932	6342	3345
— SG	693	470	240	95
— RYGB	1362	1102	753	511

	N at RISK			
	0	1	3	5
..... Non-Surgical Controls	11435	10274	7074	4058
— SG	693	486	259	113
— RYGB	1362	1128	794	559

All-cause Mortality

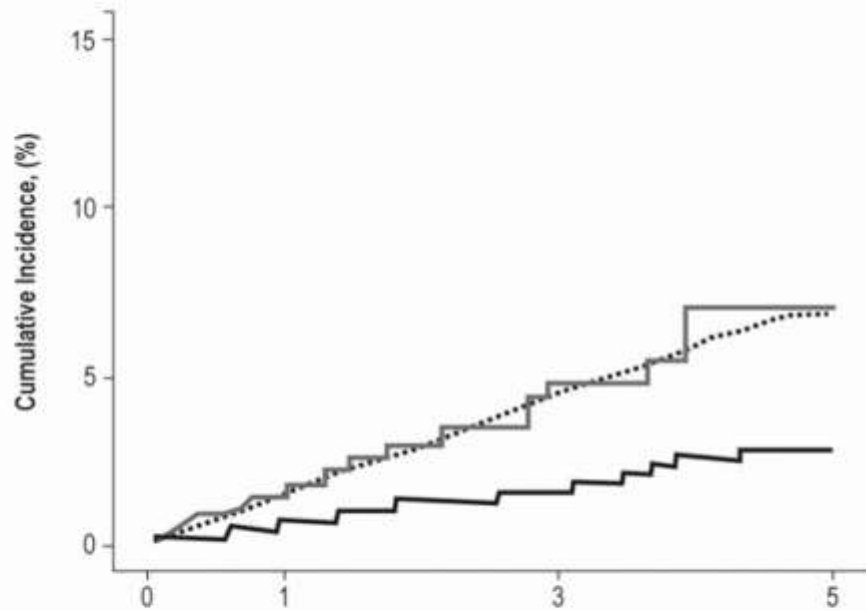


Heart Failure

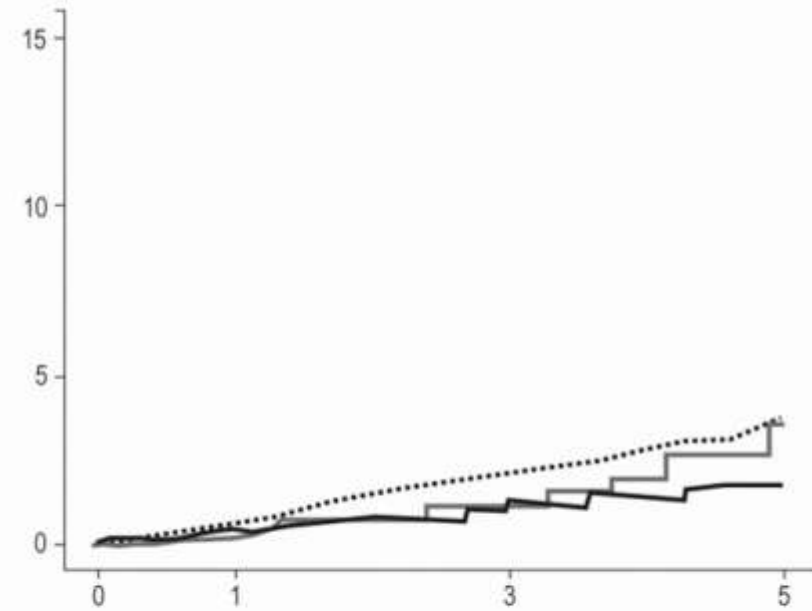


N at RISK									
.....	Non-Surgical Controls	11435	10383	7304	4270	10093	9023	6171	3549
—	SG	693	489	268	119	594	402	222	92
—	RYGB	1362	1137	804	570	1257	1038	733	514

Coronary Artery Disease

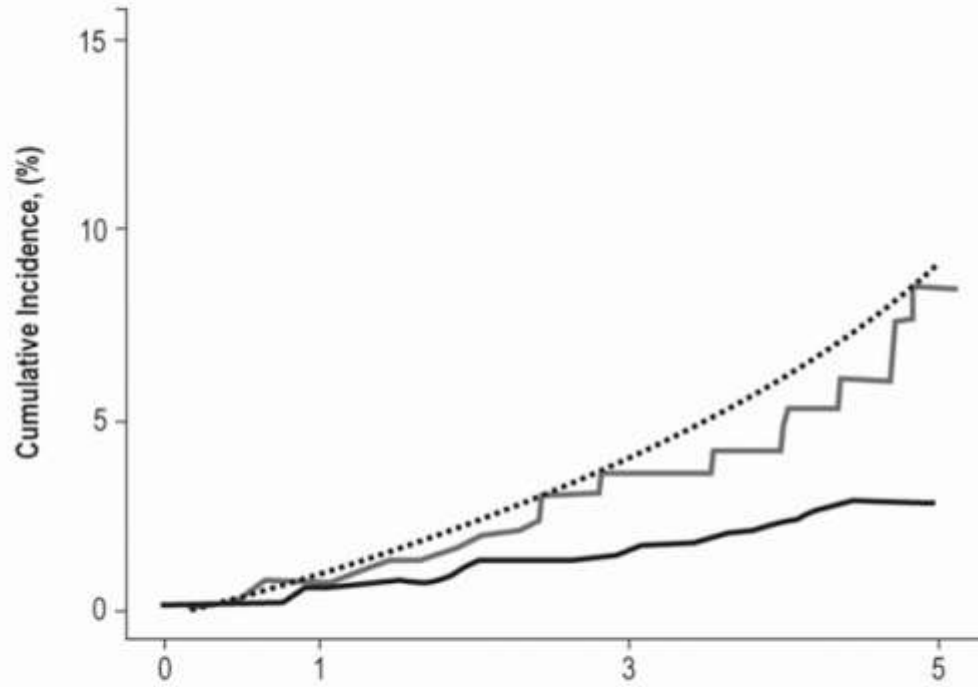


Cerebrovascular Disease

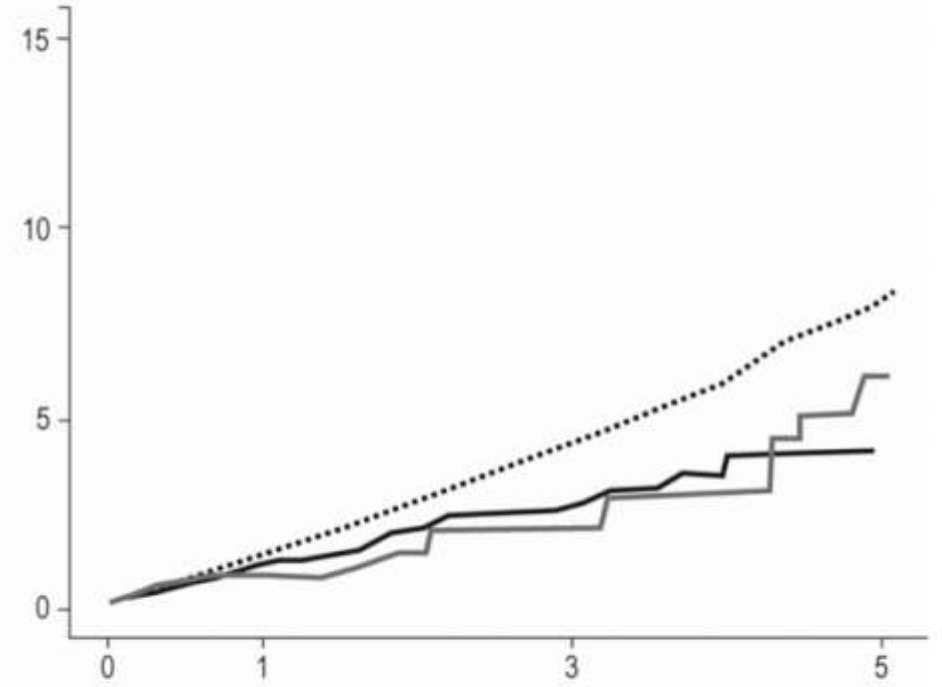


N at RISK									
.....	Non-Surgical Controls	10331	9242	6344	3628	11077	9997	6963	4032
—	SG	612	419	223	95	674	471	256	113
—	RYGB	1233	1024	714	500	1344	1117	785	554

Nephropathy

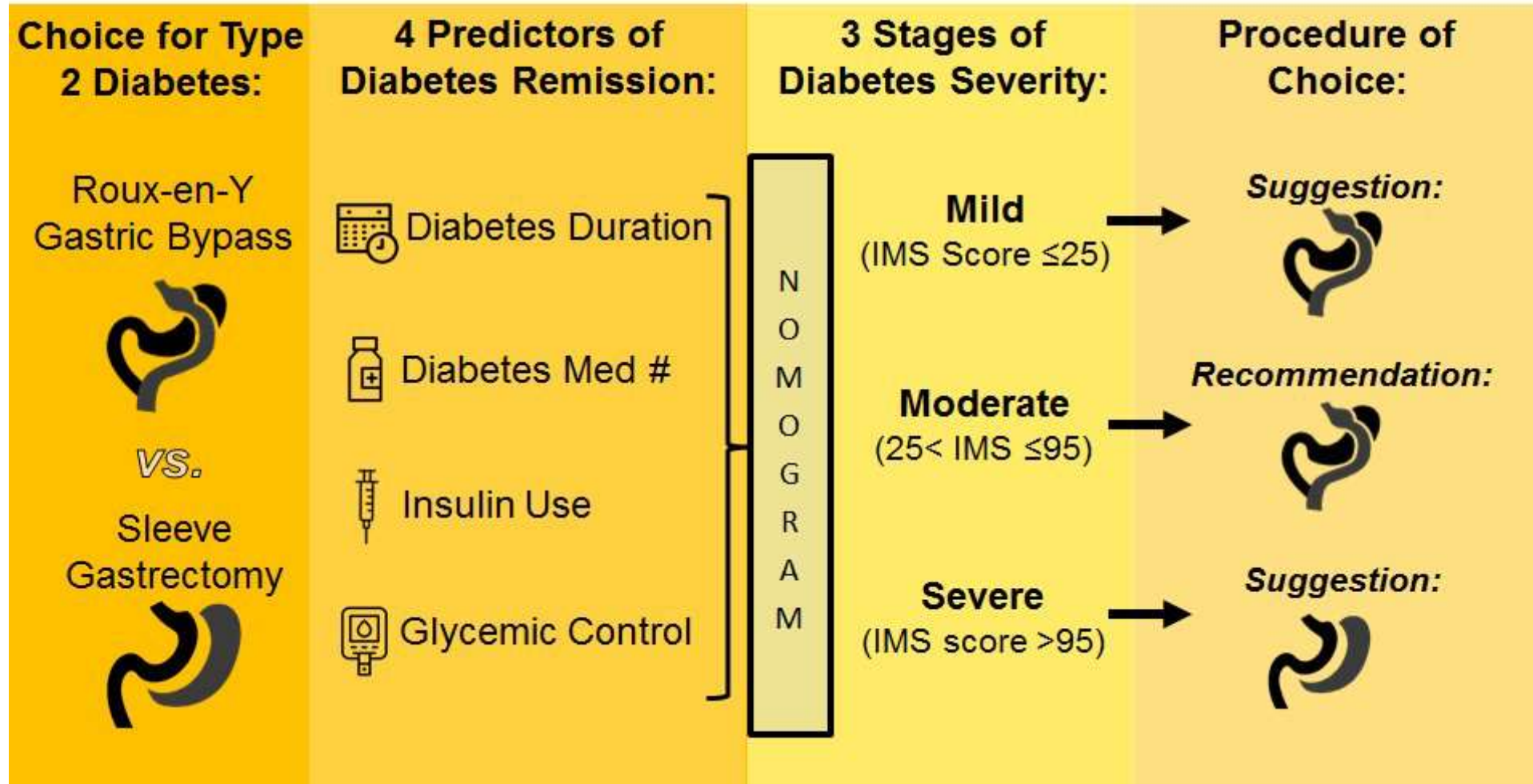


Atrial Fibrillation



	Nephropathy				Atrial Fibrillation			
N at RISK	0	1	3	5	0	1	3	5
..... Non-Surgical Controls	9190	8331	5786	3268	10734	9645	6666	3811
— SG	574	399	214	92	630	435	235	99
— RYGB	1175	970	676	473	1291	1066	742	517

Individualized Metabolic Surgery (IMS) Score: Bariatric Procedure Selection Based on Diabetes Severity



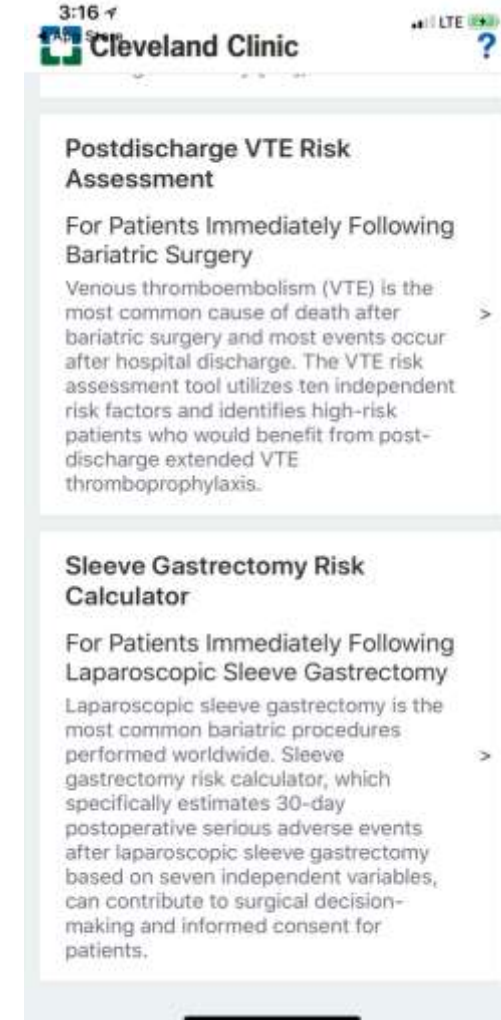
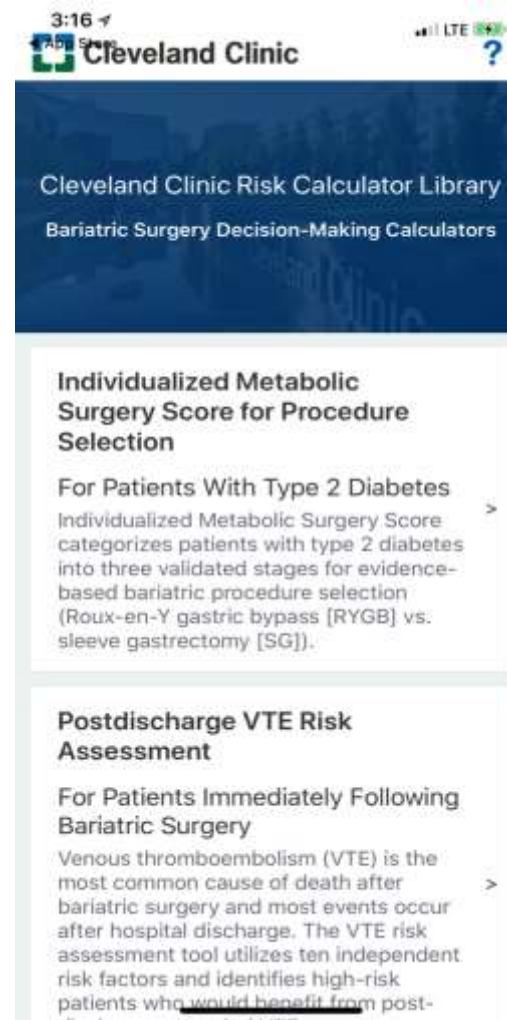
Aminian et al. *Ann Surg.* August 2017. **ANNALS OF SURGERY**

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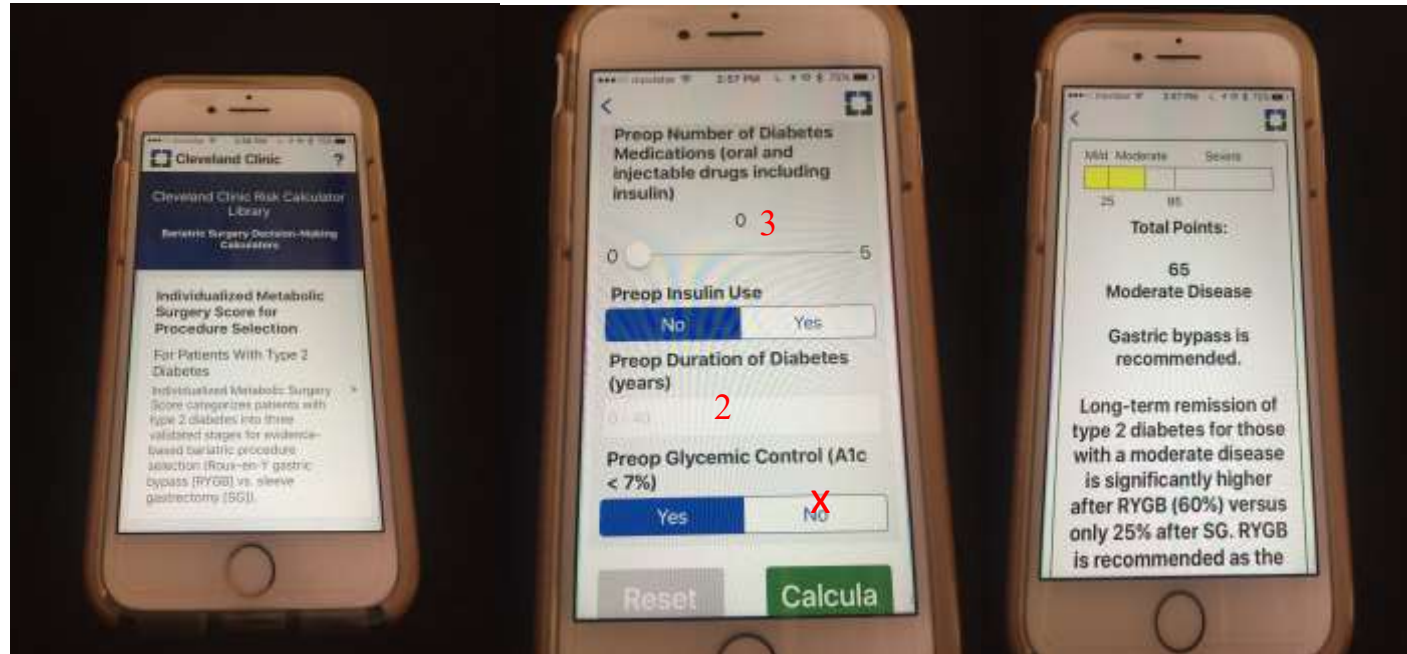
A Monthly Review of Surgical Science Since 1885

Free Decision Support App for Bariatric Surgery

Ali Aminian, MD



Free Smart Phone App for Procedure Selection



Which Operation?

Disease Severity

- Mild T2D – RYGB or LSG
- Moderate T2D-RYGB
- Severe Disease-LSG OR RYGB
- FAVOR RYGB: young, GERD, other comorbidities
responsive to weight loss