Malabsorptive surgery for morbid obesity is more efficient and cost effective

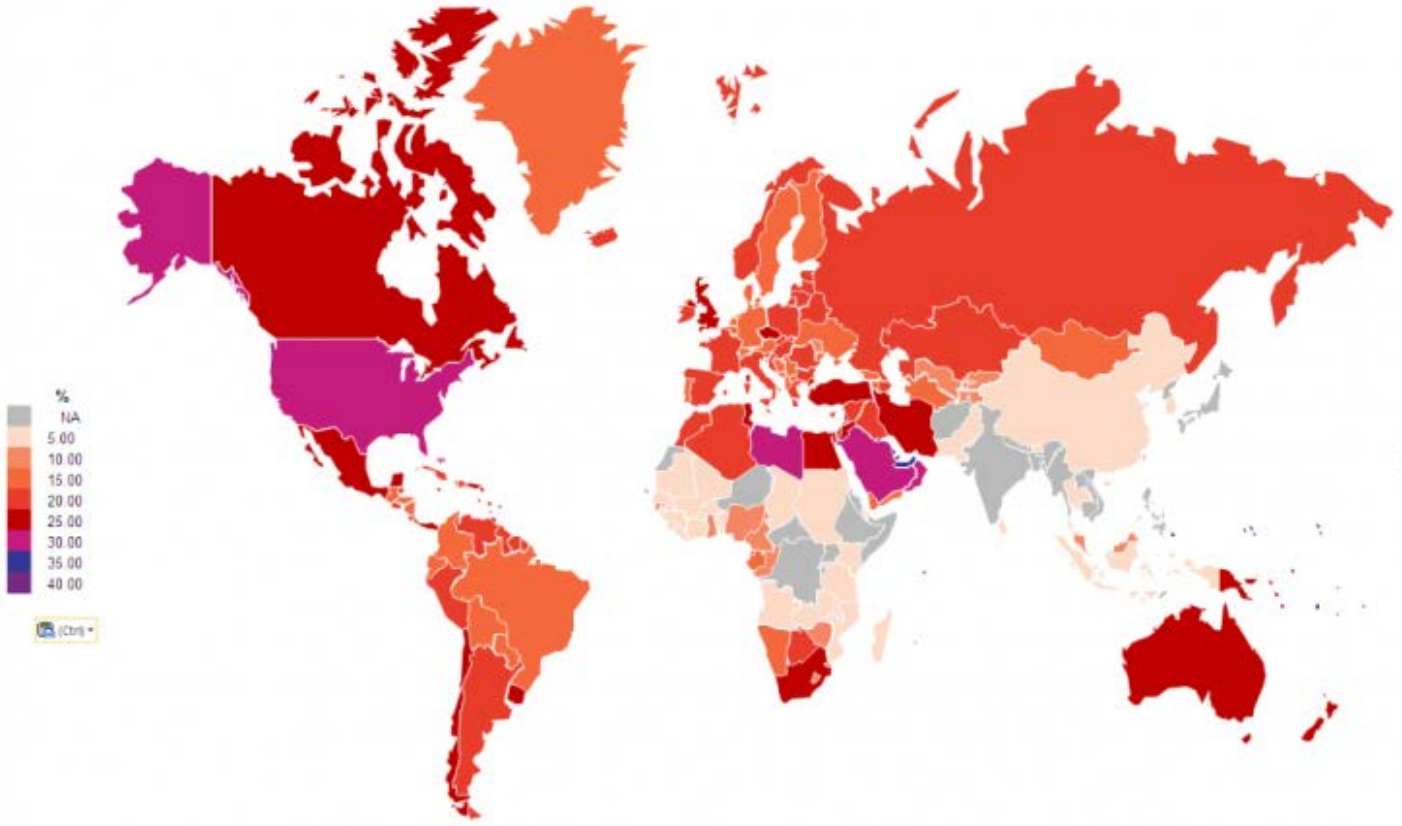
Danie Folscher

Surgeon, George

Honorary Senior Lecturer

Dept of Surgery, UCT and Groote Schuur Hospital

Adult obesity prevalence 2014
Obesity is BMI > 30kg/m2
Estimates from World Obesity Federation and World Health Organization
Map © World Obesity 2015

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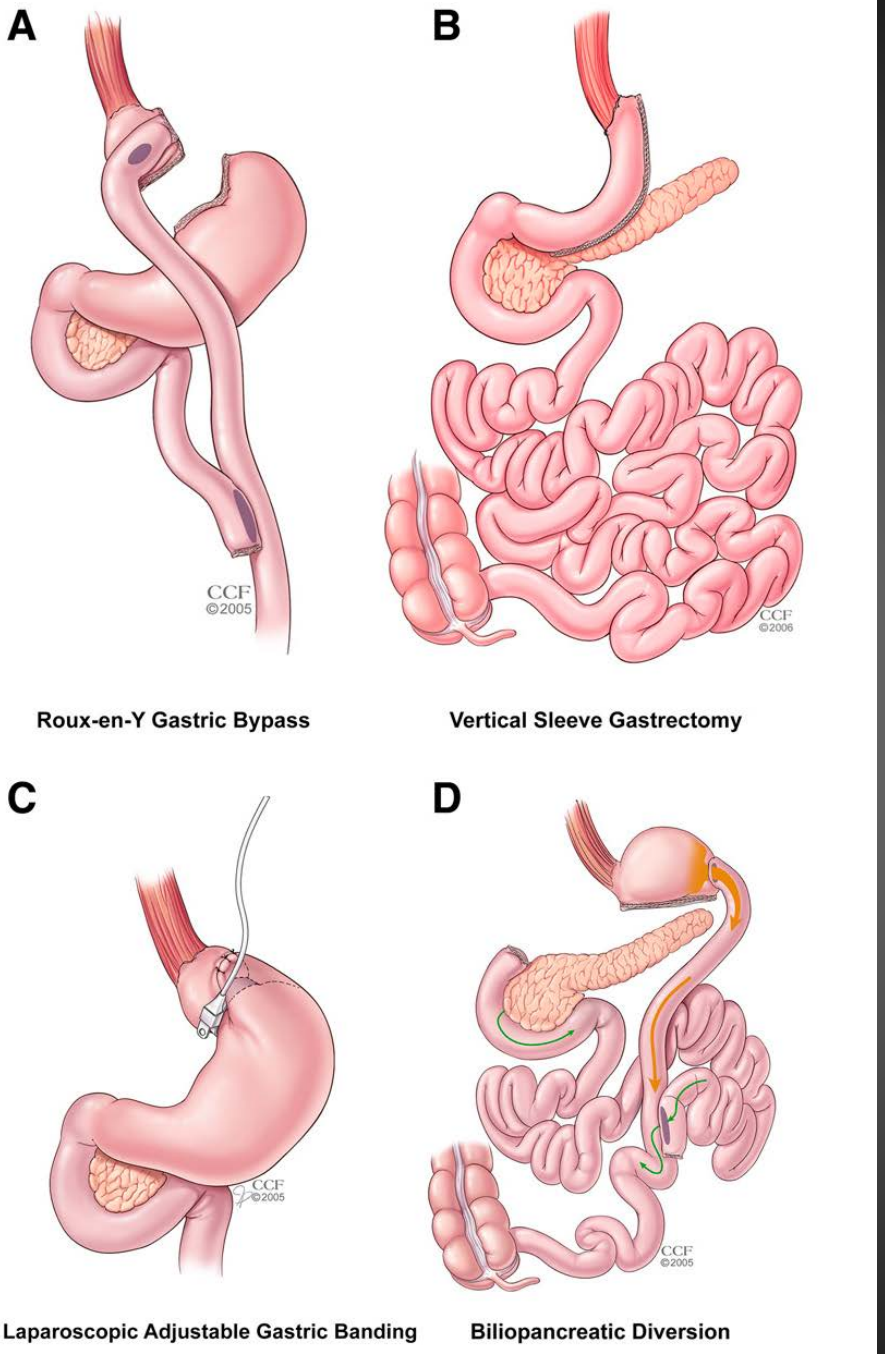
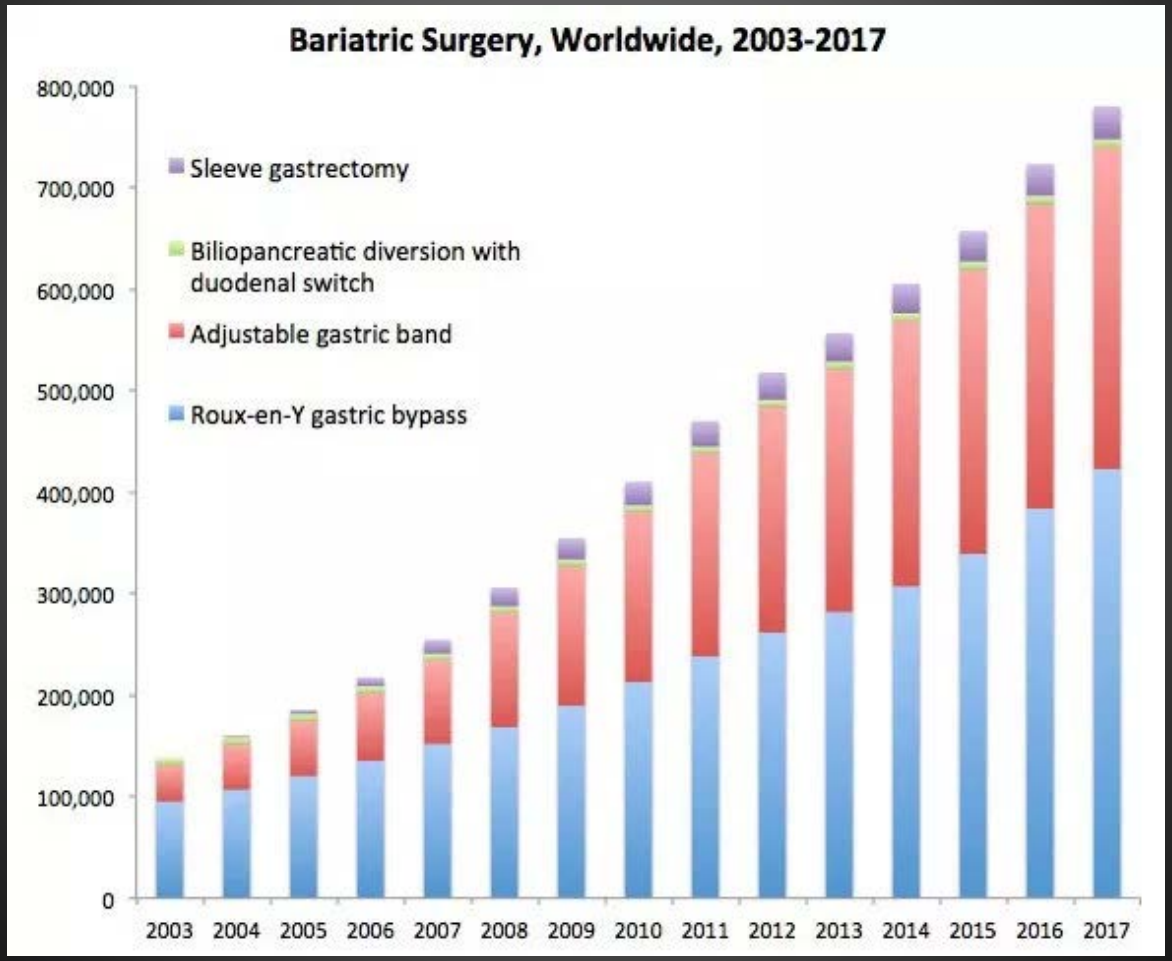
GLOBAL THREAT WAITING AREA
OBESITY
BIRD FLU
GLOBAL WARMING
caglecartoons.com

Bariatric surgery

"Weight loss surgery" (>50% Excess Weight Loss)


A
CCF
©2005
B
CCF
©2006
Roux-en-Y Gastric Bypass
Vertical Sleeve Gastrectomy
C
CCF
©2005
D
CCF
©2005
Laparoscopic Adjustable Gastric Banding
Biliopancreatic Diversion


Bariatric Surgery, Worldwide, 2003-2017
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Sleeve gastrectomy
Biliopancreatic diversion with duodenal switch
Adjustable gastric band
Roux-en-Y gastric bypass
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

Metabolic Surgery in the Treatment Algorithm for Type 2 Diabetes: A Joint Statement by International Diabetes Organizations

Diabetes Care 2016;39:861–877 | DOI: 10.2337/dc16-0236

Francesco Rubino,[1] David M. Nathan,[2] Robert H. Eckel,[3] Philip R. Schauer,[4] K. George M.M. Alberti,[5] Paul Z. Zimmet,[6] Stefano Del Prato,[7] Linong Ji,[8] Shaukat M. Sadikot,[9] William H. Herman,[10] Stephanie A. Amiel,[1] Lee M. Kaplan,[2] Gaspar Taroncher-Oldenburg,[11] and David E. Cummings,[12] on behalf of the Delegates of the 2nd Diabetes Surgery Summit*

At the time this article went to press, the DSS-II consensus statements and guidelines had been officially endorsed by 45 leading professional societies across the globe, of which 30 are primarily medical (diabetes, endocrinology, and gastroenterology) and 15 are primarily surgical organizations (Table 1). Additional medical and scientific societies are currently considering endorsing these results as well.

Table 1—International societies that have ratified and/or endorsed the DSS-II consensus statements and guidelines

Partner diabetes organizations that helped develop and have ratified the DSS-II consensus statements and guidelines:	Country
American Diabetes Association (ADA)	USA
International Diabetes Federation (IDF)	International
Diabetes UK (DUK)	UK
Chinese Diabetes Society (CDS)	China
Diabetes India (DI)	India
Other organizations that formally endorse the DSS-II consensus statements and guidelines (to date):	
American Association of Clinical Endocrinologists (AACE)	USA
American College of Surgeons (ACS)	USA
American Gastroenterological Association (AGA)	USA
American Society for Metabolic and Bariatric Surgery (ASMBS)	USA
Argentinian Society of Diabetes (SAD)	Argentina
Argentinian Society for Bariatric and Metabolic Surgery (SACO)	Argentina
Asia-Pacific Bariatric and Metabolic Surgery Society (APBMSS)	International
Association of British Clinical Diabetologists (ABCD)	UK
Australian Diabetes Society (ADS)	Australia
Belgian Diabetes Association (ABD)	Belgium
Brazilian Society of Diabetes (SBD)	Brazil
Brazilian Society of Bariatric and Metabolic Surgery (SBCBM)	Brazil
British Obesity and Metabolic Surgery Society (BOMSS)	UK
Czech Society for the Study of Obesity (CSSO)	Czech Republic
Chilean Society of Endocrinology and Diabetes (SCED)	Chile
Chilean Society for Bariatric and Metabolic Surgery (SCCBM)	Chile
Endocrine Society	USA
European Association for the Study of Obesity (EASO)	International
French Society of Diabetes (SFD)	France
French Society of Bariatric and Metabolic Surgery (SOFFCO)	France
German Diabetes Society (DDG)	Germany
German Society for Obesity Surgery (CA-ADIP)	Germany
Hellenic Diabetes Association (HDA)	Greece
International Federation for the Surgery of Obesity & Metabolic Disorders (IFSO)	International
Israel Diabetes Association (IDA)	Israel
Italian Society of Bariatric & Metabolic Surgery (SICOB)	Italy
Italian Society of Diabetology (SID)	Italy
Japan Diabetes Society (JDS)	Japan
Latin American Association of Diabetes (ALAD)	International
Mexican College of Bariatric and Metabolic Surgery (CMCOEM)	Mexico
Mexican Society of Nutrition and Endocrinology (SMNE)	Mexico
Qatar Diabetes Association (QDA)	Qatar
Saudi Diabetes and Endocrine Association (SDEA)	Saudi Arabia
Society of American Gastrointestinal and Endoscopic Surgeons (SAGES)	USA
Society for Endocrinology (SfE)	UK
Society for Surgery of the Alimentary Tract (SSAT)	USA
South African Society for Surgery Obesity and Metabolism (SASSO)	South Africa
Spanish Society for Bariatric and Metabolic Surgery (SECO)	Spain
Spanish Society of Diabetes (SED)	Spain
The Obesity Society (TOS)	USA

This table indicates the societies that, at the time this article went to press, had officially ratified and/or endorsed the DSS-II consensus statements and guidelines. Additional international medical and scientific societies are currently considering endorsing these results as well.

Rubino 2016

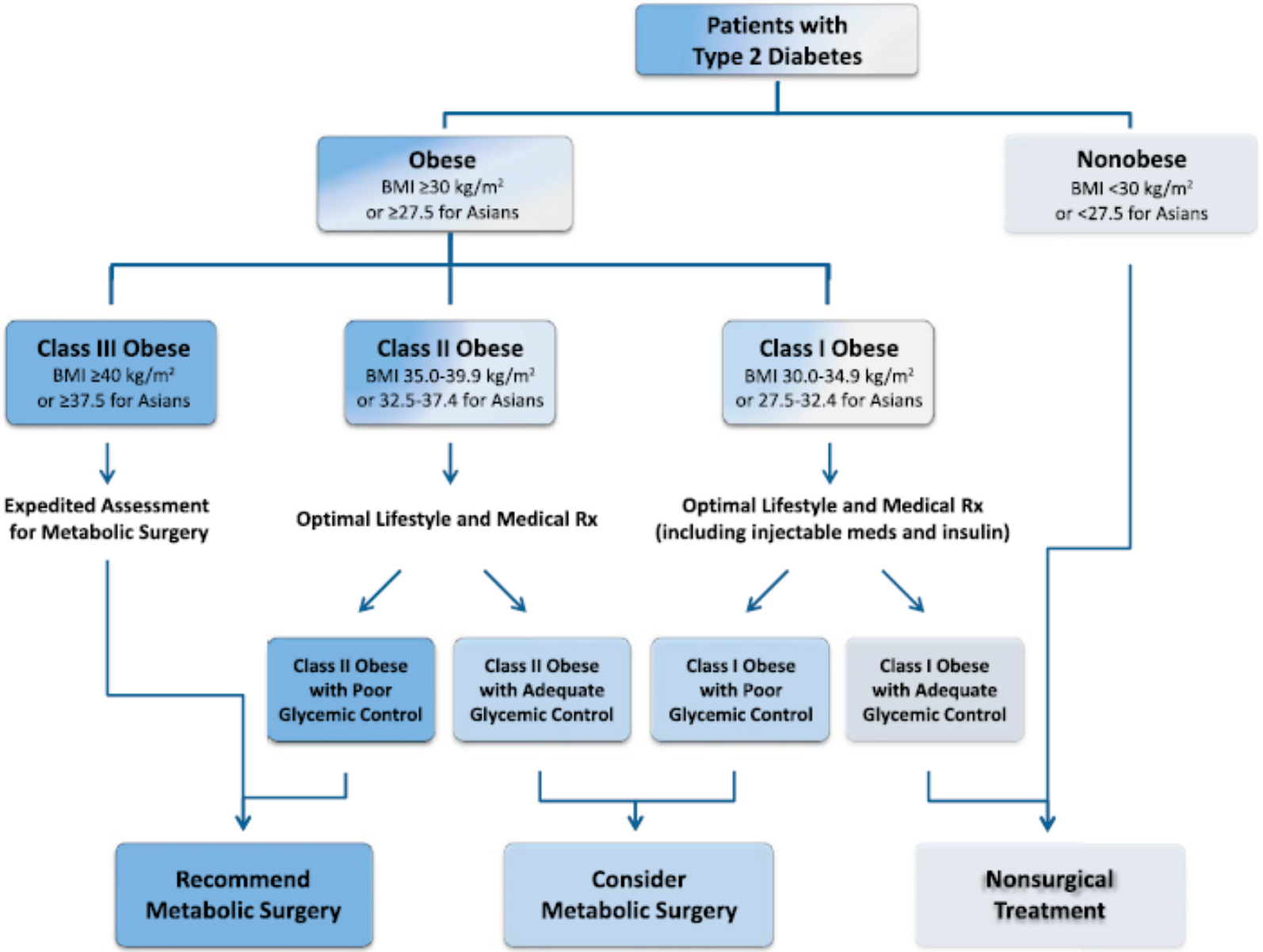
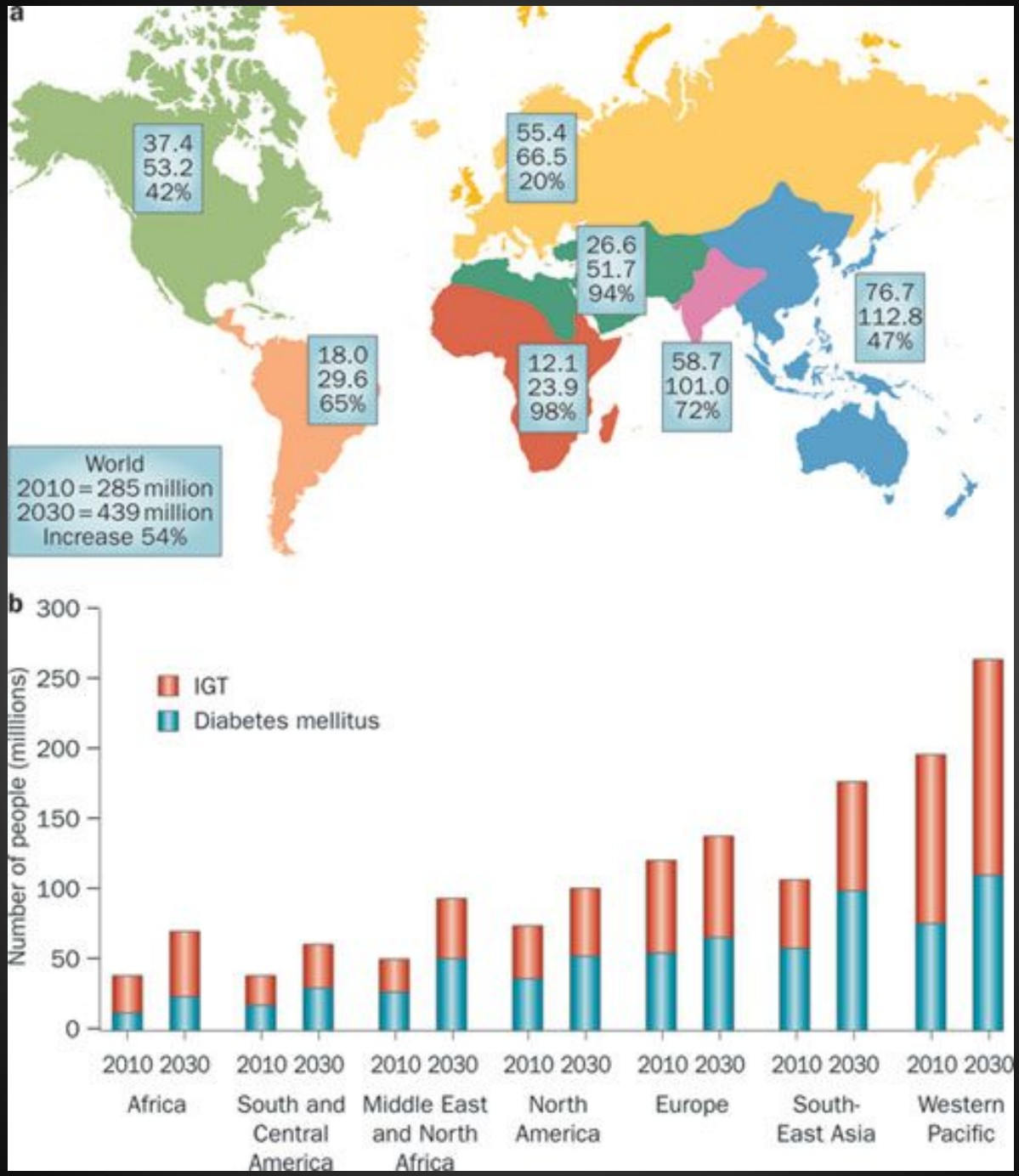


Figure 4—Algorithm for the treatment of T2D, as recommended by DSS-II voting delegates. The indications above are intended for patients who are appropriate candidates for elective surgery. meds, medications.

Rubino 2016


a
37.4
53.2
42%
55.4
66.5
20%
26.6
51.7
94%
76.7
112.8
47%
18.0
29.6
65%
12.1
23.9
98%
58.7
101.0
72%
World
2010 = 285 million
2030 = 439 million
Increase 54%
b
Number of people (millions)
300
250
200
150
100
50
0
IGT
Diabetes mellitus
2010 2030
Africa
South and Central America
Middle East and North Africa
North America
Europe
South-East Asia
Western Pacific

Bariatric surgery

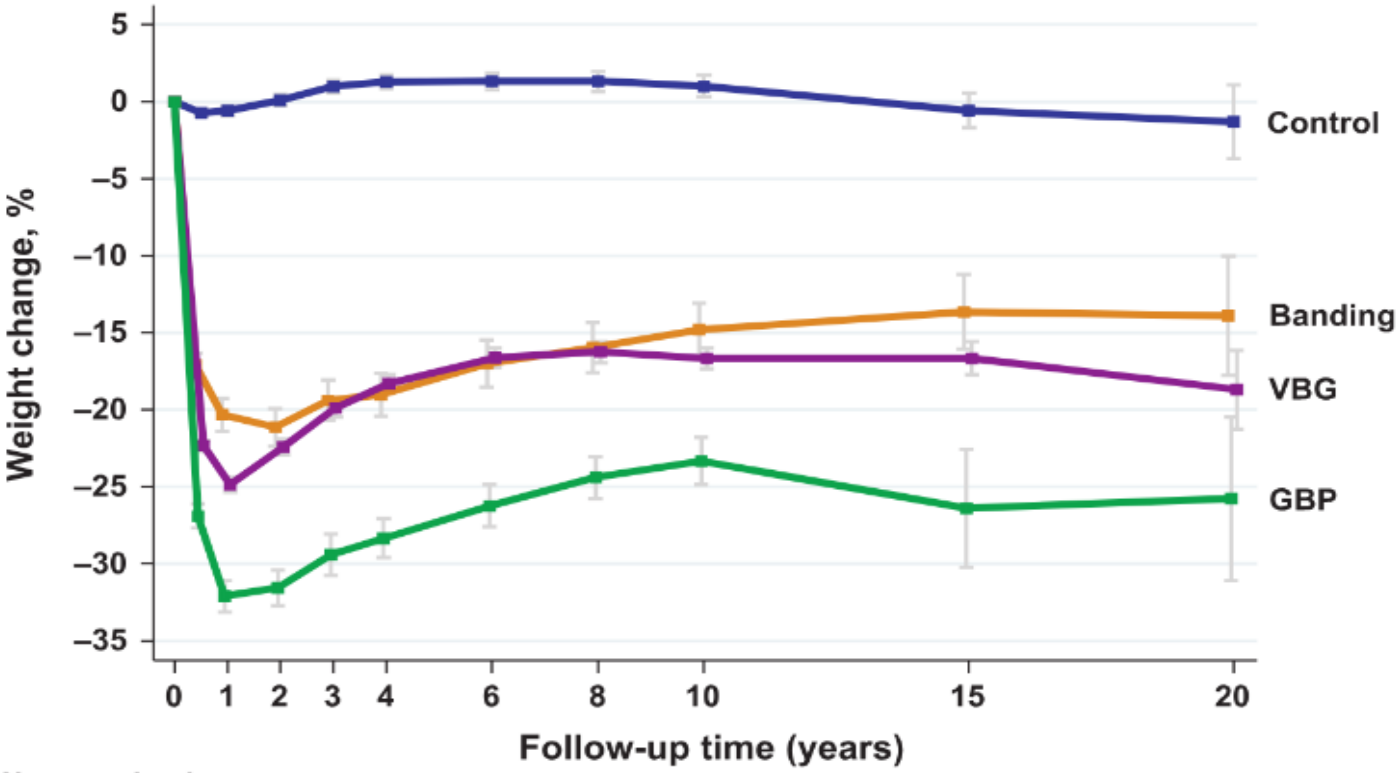
"Weight loss surgery" (>50% Excess Weight Loss)

"Metabolic Surgery" (Partial or complete resolution of comorbidities, especially Type II Diabetes)

With sustained effect and efficacy

Fried 2013

Weight loss



No. examined

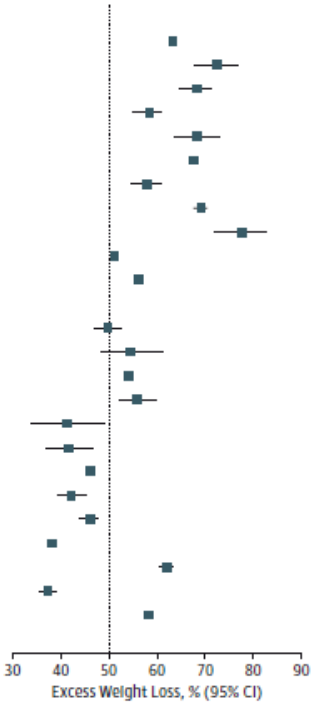
Control	2037	1490	1242	1267	556	176
Banding	376	333	284	284	150	50
VBG	1369	1086	987	1007	489	82
GBP	265	209	184	180	37	13

Sjostrom J Int Med 2012

Weight loss

Figure. Long-term Excess Weight Loss After Gastric Bypass and Gastric Band Procedures

	Study Type	Follow-up, y	No. of Patients	Mean % EWL (95% CI)
Gastric Bypass				
Hall et al,[15] 1990	RCT	3	85	63.6[a]
Skroubis et al,[16] 2006	RCT	2	62	72.6 (68.6-76.6)
Nguyen et al,[17] 2009	RCT	2	94	68.9 (65.7-72.1)
Adams et al,[6] 2012	Matched cohort	5	379	58.0 (55.6-60.4)
Kalfarentzos et al,[23] 2006	Cohort	3	59	68.3 (63.9-72.7)
Courcoulas et al,[7] 2013	Cohort	3	1581	67.7[a]
Pories et al,[26] 1995	Case series	5	317	58.0 (55.1-60.9)
Sekhar et al,[28] 2007	Case series	2	783	69.3 (68.1-70.5)
Czupryniak et al,[27] 2007	Case series	2	68	77.8 (72.4-83.2)
Yan et al,[29] 2008	Case series	2	50	51.1
Hauser et al,[30] 2010	Case series	2	66	56.0
Gastric Band				
O'Brien et al,[19] 2005	RCT	2	198	49.5 (46.9-52.1)
van Dielan et al,[18] 2005	RCT	2	50	54.9 (48.4-61.4)
Suter et al,[20] 2005	RCT	2	156	54.5
Gravante et al,[21] 2007	RCT	2	356	56.0 (52.3-59.7)
Mathus-Vliegen et al,[22] 2007	RCT	5	44	41.6 (33.9-49.3)
Nguyen et al,[17] 2009	RCT	2	79	41.8 (37.4-46.2)
Basdevant et al,[24] 2007	Cohort	2	876	46.1
Phillips et al,[8] 2009	Cohort	3	228	41.1 (37.8-44.4)
Van Nieuwenhove et al,[25] 2011	Cohort	5	656	46.2 (44.3-48.1)
Courcoulas et al,[7] 2013	Cohort	3	567	38.1[a]
Ponce et al,[31] 2005	Case series	3	68	62.0 (60.6-63.4)
Favretti et al,[32] 2007	Case series	5	765	37.3 (35.5-39.1)
Ray and Ray,[33] 2011	Case series	4	66	58.0

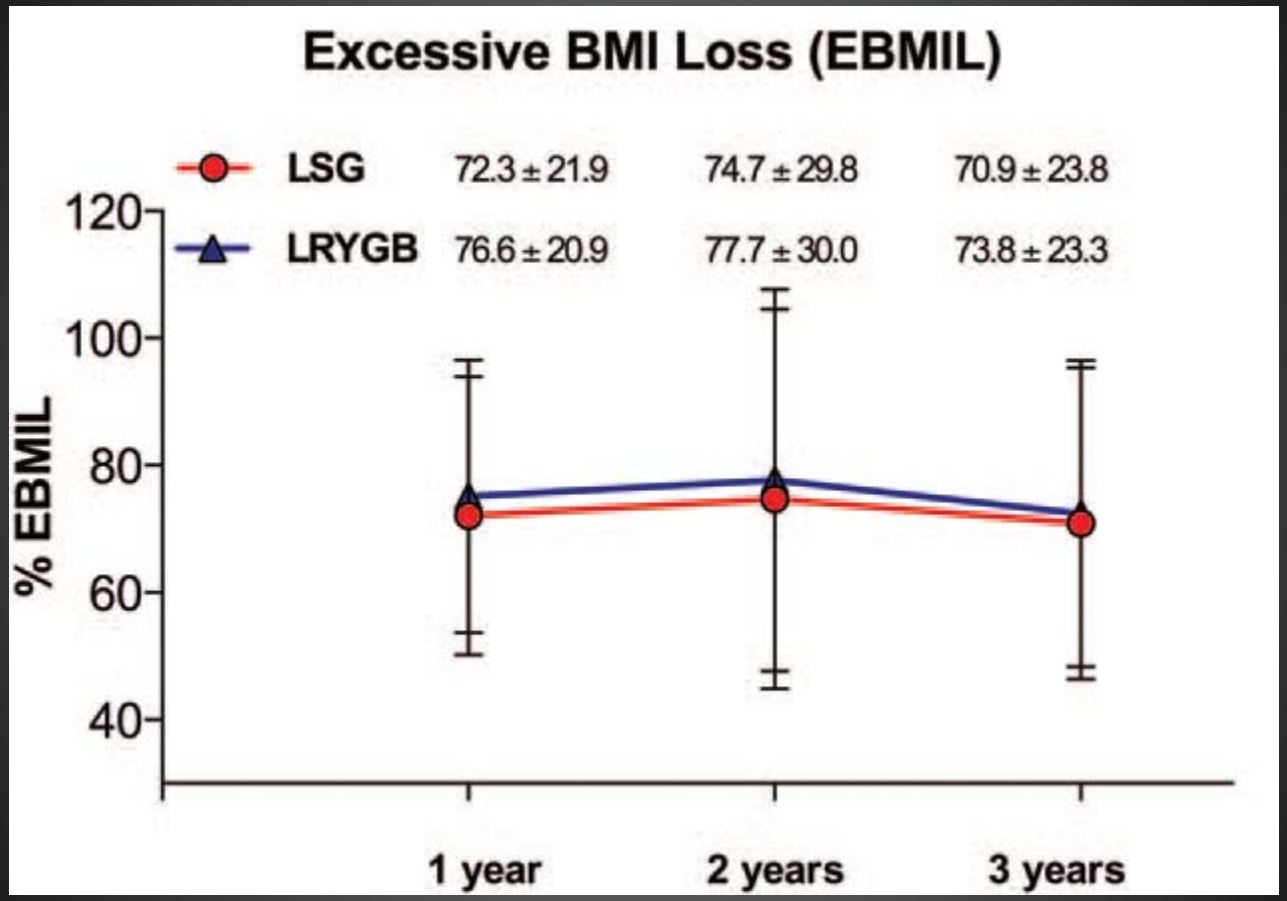


When standard deviation was not reported, confidence interval could not be calculated. The vertical rule at 50% excess weight loss (EWL) indicates the historical surgical consensus threshold delineating success. RCT indicates randomized clinical trial.

[a] Median.

Puzziferri
JAMA 2014

Weight loss



Peterli An
Surg 2017

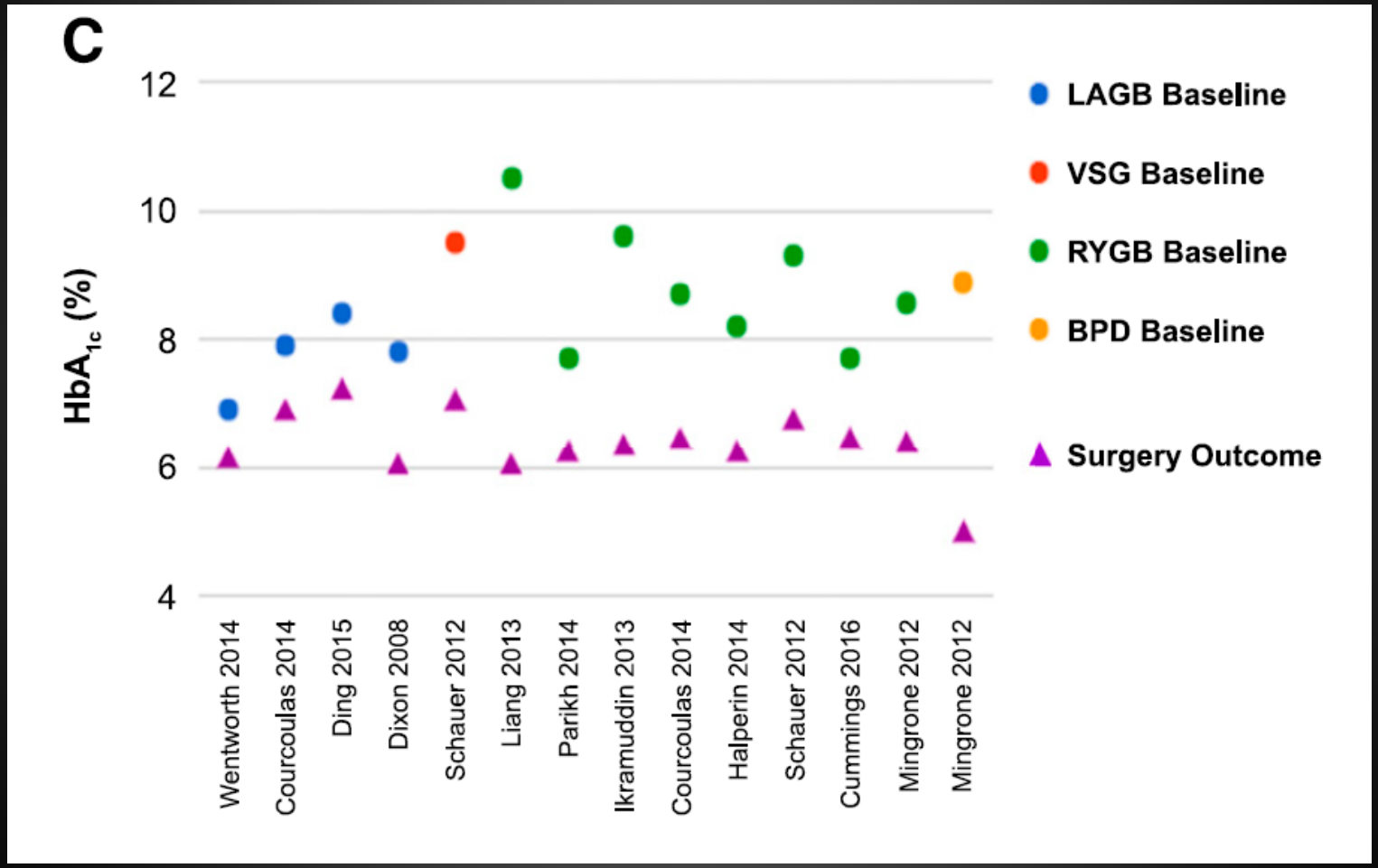
Table 4. Meta-analyses of Weight Change Outcomes*

	Mean (95% CI)				
	GB	AGB	SG	Control	Overall
ΔBMI					
Year 1					
RCT					
Estimates	−14.53 (−16.82 to −12.25)	−10.48 (−13.70 to −7.25)	−16.20 (−24.45 to −7.95)	†	−13.53 (−15.51 to −11.55)
No. of studies/arms	9/15	3/3	1/1	0/0	12/22
OBS					
Estimates	−14.32 (−19.02 to −9.62)	−7.70 (−9.37 to −6.03)	−12.14 (−14.02 to −10.26)	−1.01 (−5.26 to 3.23)	−11.79 (−13.89 to −9.69)
No. of studies/arms	27/37	24/27	17/18	3/4	57/87
Year 2					
RCT					
Estimates	−14.47 (−16.98 to −11.97)	−11.35 (−14.24 to −8.46)	†	†	−13.23 (−15.36 to −11.11)
No. of studies/arms	6/10	2/2	0/0	0/0	8/15
OBS					
Estimates	−12.93 (−17.39 to −8.47)	−8.75 (−10.37 to −7.13)	−13.39 (−19.52 to −7.26)	0.10 (−7.39 to 7.60)	−11.80 (−13.92 to −9.69)
No. of studies/arms	12/16	14/16	5/5	1/2	29/40
Year 3					
RCT					
Estimates	†	−9.20 (−15.85 to −2.54)	†	†	−9.20 (−15.85 to −2.54)
No. of studies/arms	0/0	1/2	0/0	0/0	1/2
OBS					
Estimates	−16.78 (−20.57 to −12.99)	−11.43 (−18.14 to −4.72)	−21.88 (−27.96 to −15.79)	†	−15.48 (−18.79 to −12.18)
No. of studies/arms	6/9	7/8	2/2	0/0	17/21
Year 4					
RCT					
Estimates	†	†	†	†	†
No. of studies/arms	0/0	0/0	0/0	0/0	0/0
OBS					
Estimates	−17.86 (−22.20 to −13.53)	−6.20 (−18.62 to 6.22)	†	†	−17.00 (−20.80 to −13.19)
No. of studies/arms	5/8	1/1	0/0	0/0	8/11
Year 5					
RCT					
Estimates	†	−11.40 (−28.08 to 5.28)	†	†	−11.40 (−28.08 to 5.28)
No. of studies/arms	0/0	1/1	0/0	0/0	1/1
OBS					
Estimates	−15.96 (−20.52 to −11.40)	−12.36 (−16.92 to −7.79)	−16.10 (−28.22 to −3.98)	†	−14.32 (−17.19 to −11.45)
No. of studies/arms	4/7	4/7	1/1	0/0	10/16

(continued)

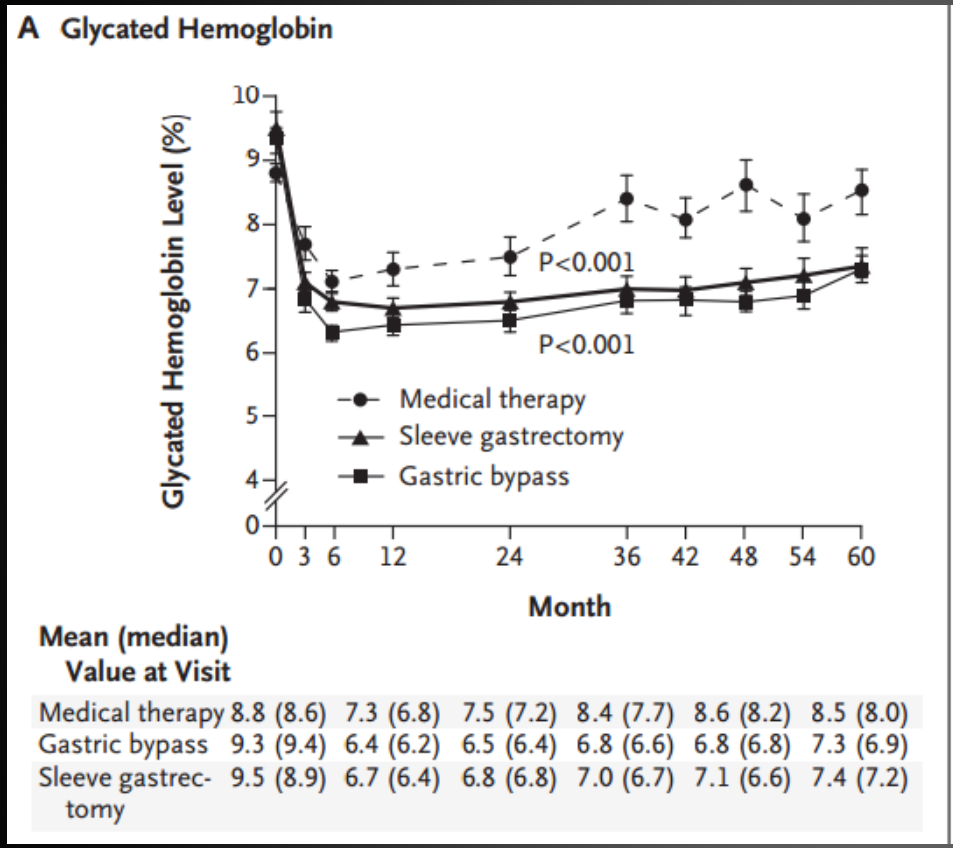
Puzziferri
JAMA 2014

Diabetes remission



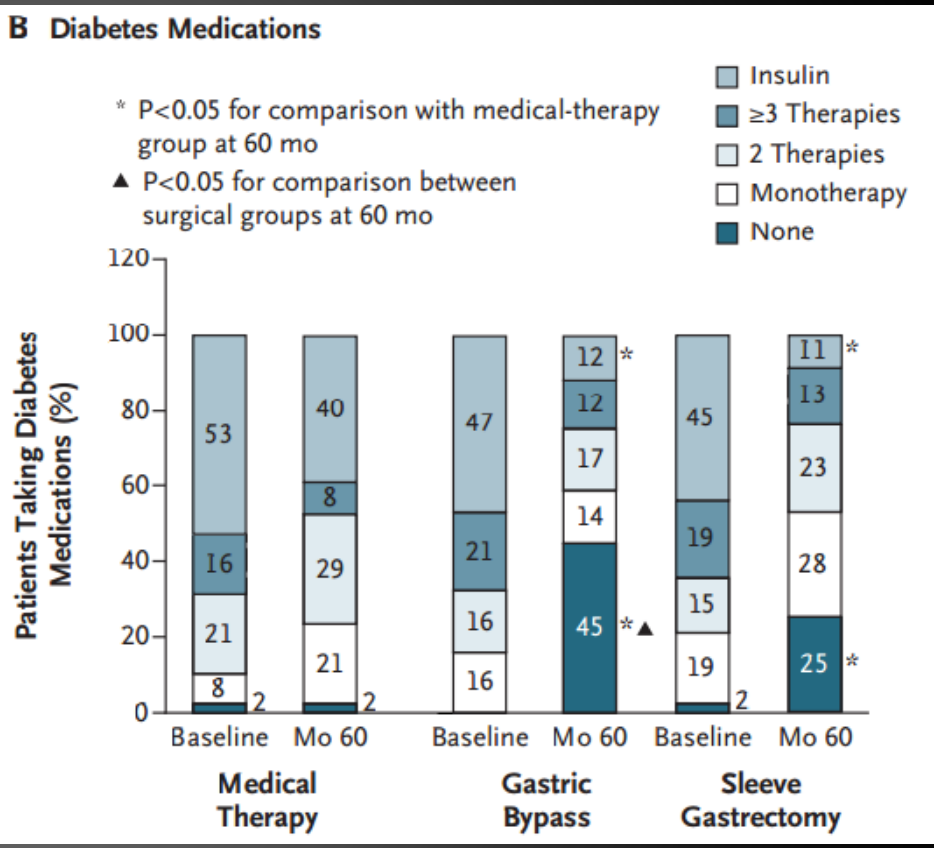
Rubino Diab Care 2016

Diabetes remission



Mean (median) Value at Visit

Medical therapy	8.8 (8.6)	7.3 (6.8)	7.5 (7.2)	8.4 (7.7)	8.6 (8.2)	8.5 (8.0)
Gastric bypass	9.3 (9.4)	6.4 (6.2)	6.5 (6.4)	6.8 (6.6)	6.8 (6.8)	7.3 (6.9)
Sleeve gastrectomy	9.5 (8.9)	6.7 (6.4)	6.8 (6.8)	7.0 (6.7)	7.1 (6.6)	7.4 (7.2)



Schauer NEJM 2017

Complications (early)

	Reoperation	Readmission
RYGB	2,5%	5,1%
LAGB	0,6% (3Y) >20%(5-10y)	2,0%
VSG	0,6%	5,5%

Rubino Diabetes Care 2016

Complications

VSG

- Leaks
- Strictures
- Bleeding
- GORD
- Malabsorbtion

GBP

- Leaks
- Bleeding
- Internal hernia
- Protein malabsorbtion
- Nutritional deficiencies
- Marginal ulcer

Complications

	LRYGB (10906 pts)	LSG (4816 pts)
Leak:	1,9%	2,3%
Mortality:	0,4%	0,2%

Zelmer meta-analysis Am J Surg 2014

RYGB

vs BPD: better resolution of comorbidities but more *(and much more severe)* metabolic complications in BPD group.

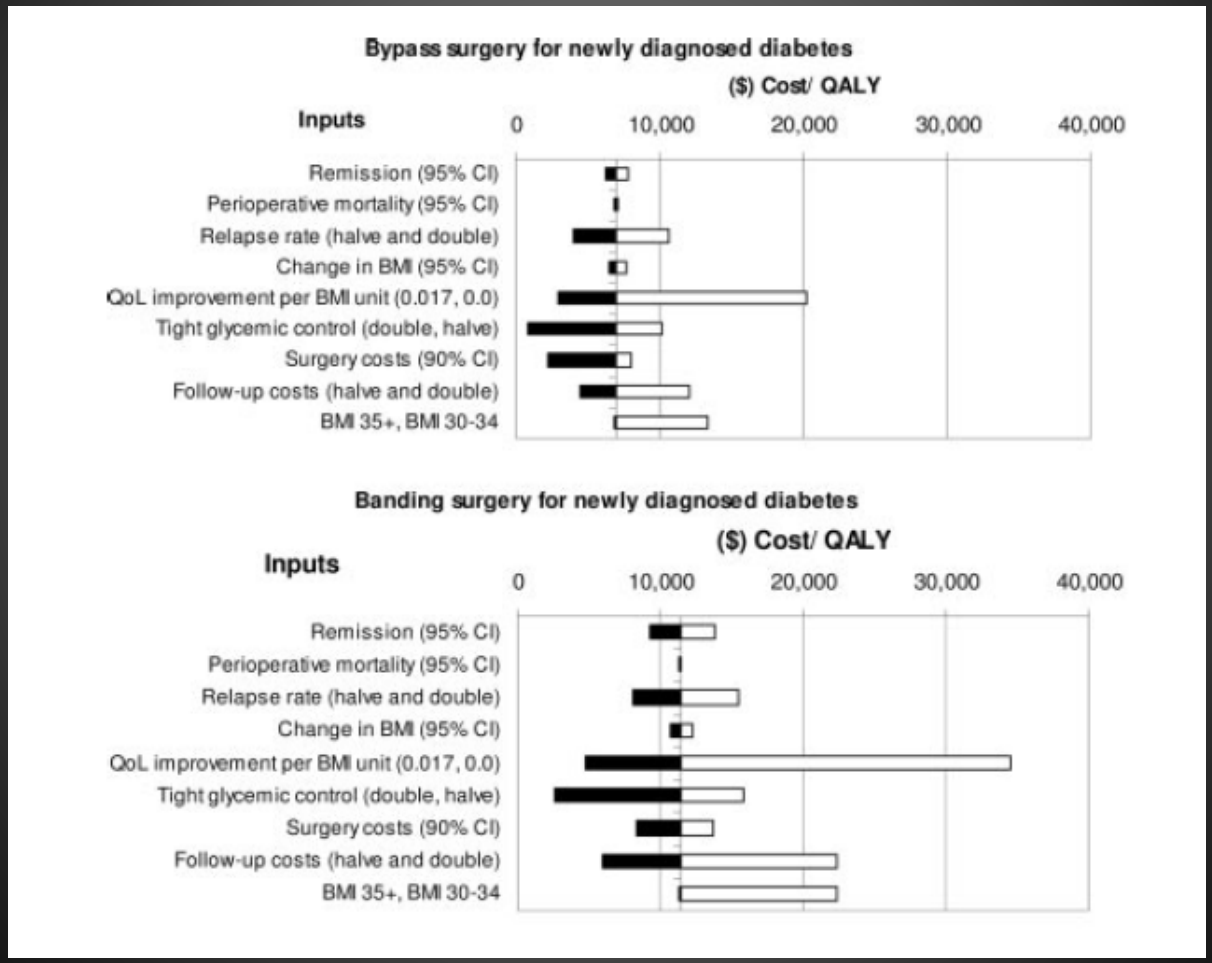
Rubino Diabetes Care 2016

RYGB

vs LAGB: greater diabetes remission, higher risk of postoperative complications but lower risk of long-term reoperations.

vs VSG: higher diabetes remission rates, better lipid control, better quality of life and higher incidence of postoperative complications.

Rubino Diabetes Care 2016



Hoerger Diab Care 2010

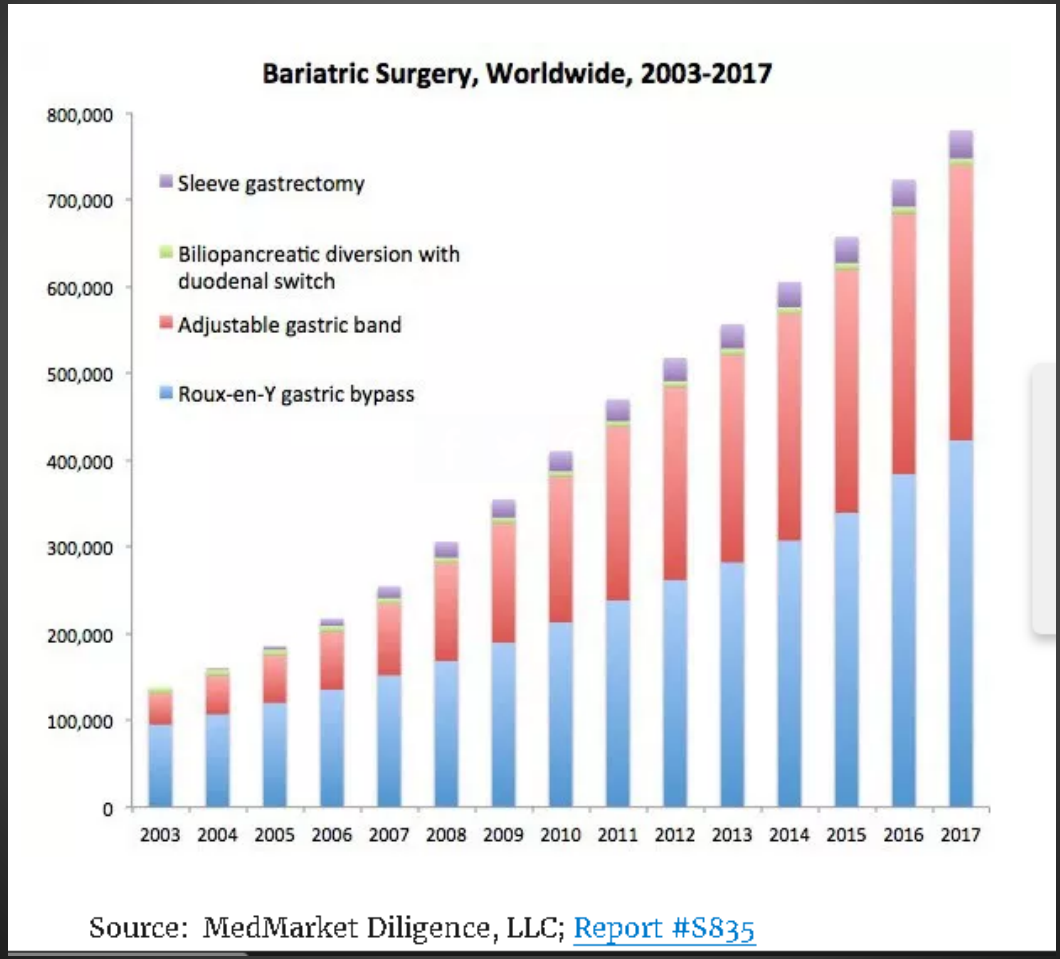
Cost-effectiveness of bariatric surgery

Table 2—*Life-years gained and cost-effectiveness ratios (relative to no surgery) for baseline analyses*

	Total costs*	Remaining life-years	QALYs*	Cost-effectiveness ratio ($/QALY)†
Patients with newly diagnosed diabetes				
No surgery (standard care)	$71,130	21.62	9.55	
Bypass surgery	$86,665	23.34	11.76	
Incremental (vs. no surgery)	$15,536	1.72	2.21	$7,000
Banding surgery	$89,029	22.76	11.12	
Incremental (vs. no surgery)	$17,900	1.14	1.57	$11,000
Patients with established diabetes				
No surgery	$79,618	16.86	7.68	
Bypass surgery	$99,944	17.95	9.38	
Incremental (vs. no surgery)	$20,326	1.09	1.70	$12,000
Banding surgery	$96,921	17.80	9.02	
Incremental (vs. no surgery)	$17,304	0.94	1.34	$13,000

*Costs and QALYs are discounted at a 3% annual rate. †Cost-effectiveness ratios are rounded to the nearest $1,000/QALY.

Hoerger Diab Care 2010



Source: MedMarket Diligence, LLC; Report #S835

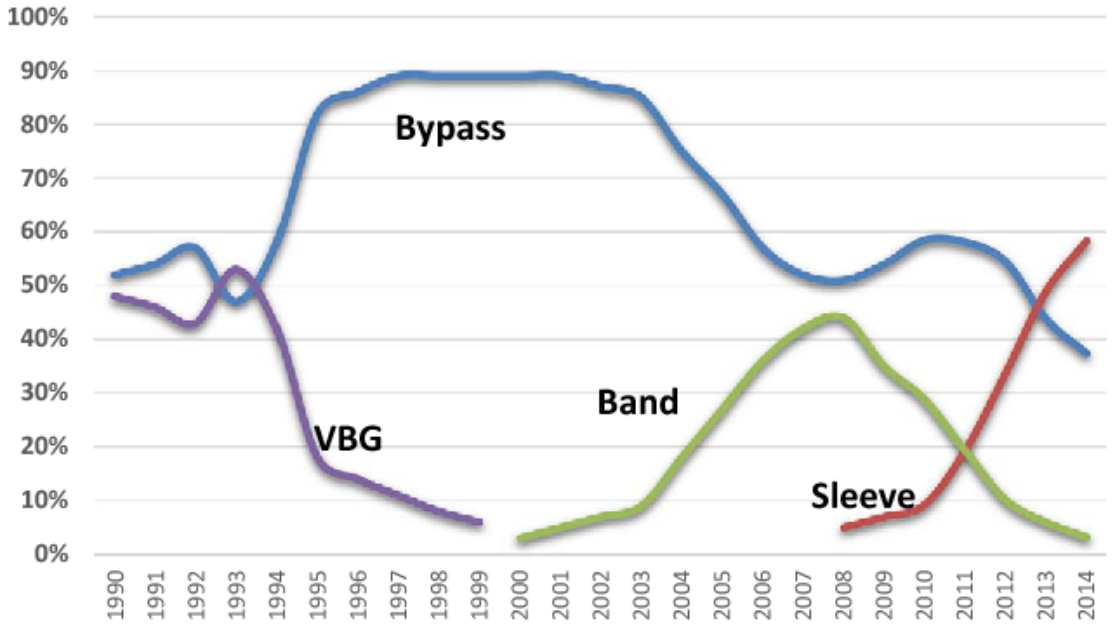
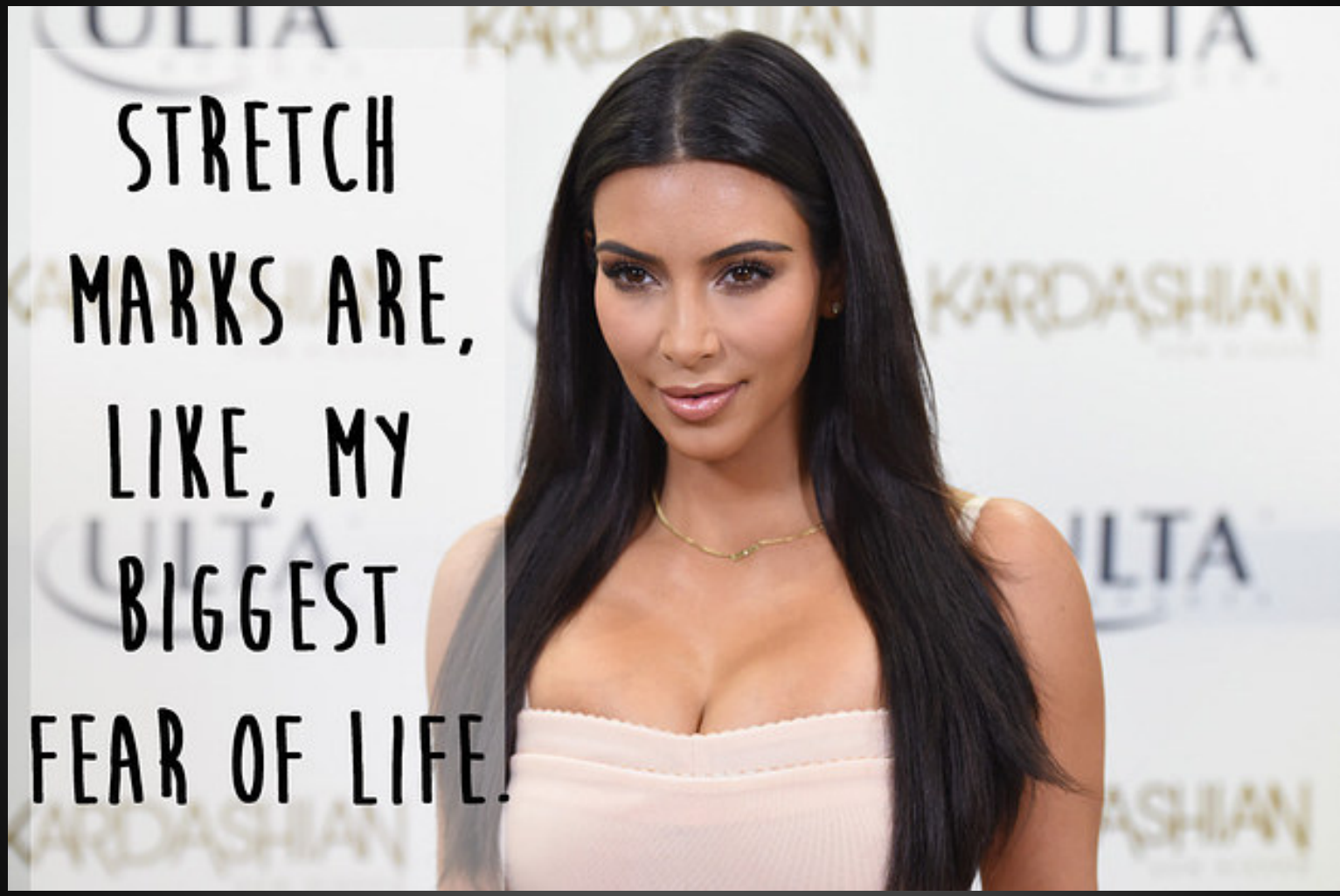


Fig. 4. Combined analysis of available literature data on utilization of bariatric surgery since 1990. Source: Pope [13] (1990–1997), Trus [14] (1990–2000), Santry [15] (1998–2002), Nguyen [16] (2003–2008),

Schauer 2017


STRETCH MARKS ARE, LIKE, MY BIGGEST FEAR OF LIFE.

Published July 2016

	2011	2012	2013	2014	2015
Total	**158,000**	**173,000**	**179,000**	**193,000**	**196,000**
RNY	36.7%	37.5%	34.2%	26.8%	23.1%
Band	35.4%	20.2%	14%	9.5%	5.7%
Sleeve	17.8%	33%	42.1%	51.7%	53.8%
BPD/DS	0.9%	1%	1%	0.4%	0.6%
Revisions	6%	6%	6%	11.5%	13.6%
Other	3.2%	2.3%	2.7%	0.1%	3.2%
Balloons					~700 cases
V-Bloc					18 cases

ASMBS total bariatric procedures numbers from 2011, 2012, 2013, 2014 and 2015 are based on the best estimation from available data (BOLD, ASC/MBSAQIP, National Inpatient Sample data and outpatient estimations).

Review Article

SJS
SCANDINAVIAN
JOURNAL OF SURGERY

WEIGHT LOSS AND RESOLUTION OF COMORBIDITIES AFTER SLEEVE GASTRECTOMY: A REVIEW OF LONG-TERM RESULTS

D. M. Felsenreich, F. B. Langer, G. Prager

Division of General Surgery, Department of Surgery, Medical University of Vienna, Vienna, Austria

- 2018 review of all long term studies to date

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- 2018 review of all long term studies to date
- 21-27% new GORD
- T2DM relapse after 3-5 years
- **Conversion rate 20-29% (8-9y)**

  25-37% (>10y)

Choice of procedure

21.	RYGB is a well-standardized surgical procedure, and among the four accepted operations for metabolic surgery, it appears to have a more favorable risk-benefit profile in most patients with T2D.	Grade U; LoC 100%

Malabsorptive surgery for morbid obesity is more efficient and cost effective

Danie Folscher
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