What are the target benchmark outcomes for bypass surgery?

Marco Bueter, MD, PhD

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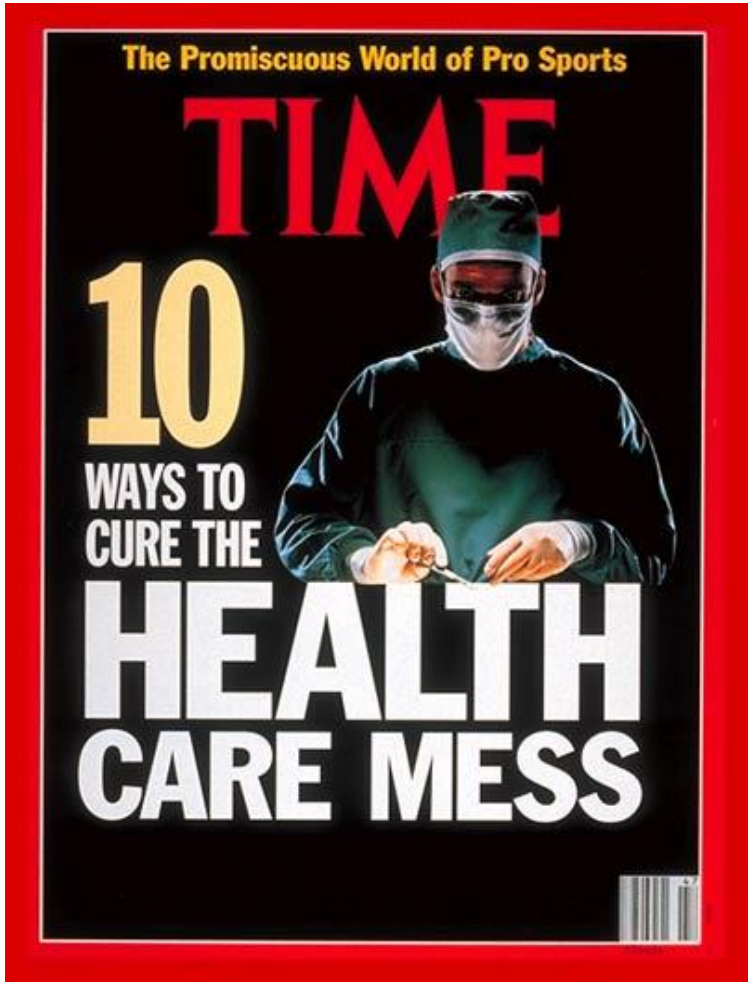
I have the following potential conflict(s) of interest to report:

- **<u>Receipt of grants/research supports</u>**:
  - Swiss National Foundation (SNF) (32003B_182309, 32003B_212213)
  - Hartmann-Müller Foundation
  - National Institutes of Health (NIH) (R01 DK 092608-01A1, R21 DC 012751-01)
  - Uniscientia Foundation
- **<u>Receipt of honoraria or consultation fees</u>:**

Quality assessment in surgery is relevant!



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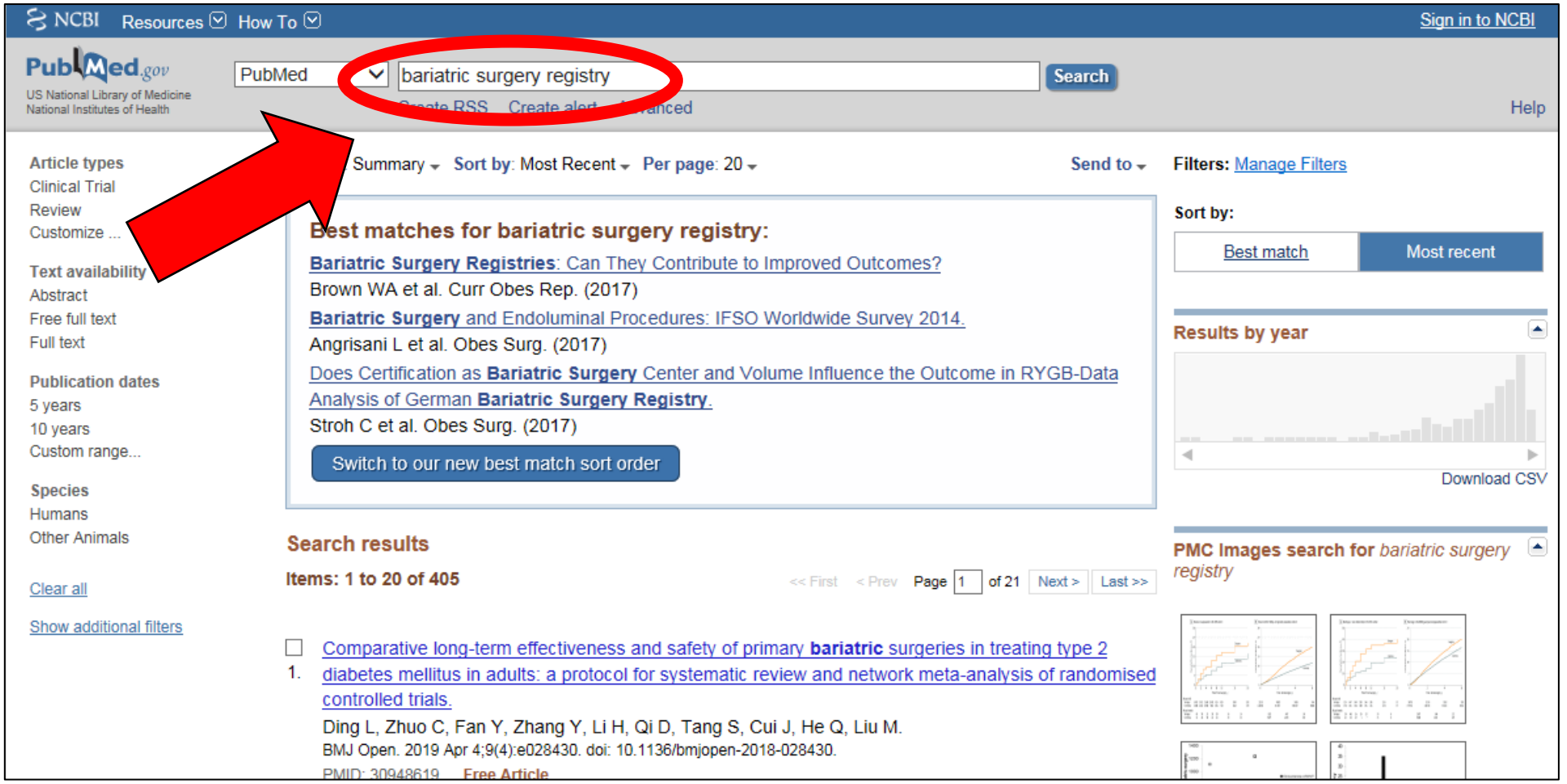
DGAV
Exzellenzzentrum
für Adipositaschirurgie

Traditional option: Registry data



Traditional option: Registry data

Limitations

- **heterogenous** patient populations
- **different case-mix!**
- **small-volume** & high-volume centers
- usually national, **not international**

Comparability on an individual level is limited!!

Novel methodology: Concept of Benchmarking

ANNALS OF SURGERY
A Monthly Review of Surgical Science Since 1885

ORIGINAL ARTICLE

How to Establish Benchmarks for Surgical Outcomes?

A Checklist Based on an International Expert Delphi Consensus

Daniel Gero, MD, Xavier Muller, MD,* Roxane D. Staiger, MD, PhD,*
Christian A. Gutschow, MD,* René Vonlanthen, MD, MHA,* Marco Bueter, MD, PhD,*
Pierre-Alain Clavien, MD, PhD,*✉ and Milo A. Puhan, MD, PhD†✉*

*Gero D et al., **Ann Surg** 2022 Jan 1;275(1):115-120*

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Aim: to define the best possible outcome after BS

*Gero D et al., **Ann Surg** 2022 Jan 1;275(1):115-120*

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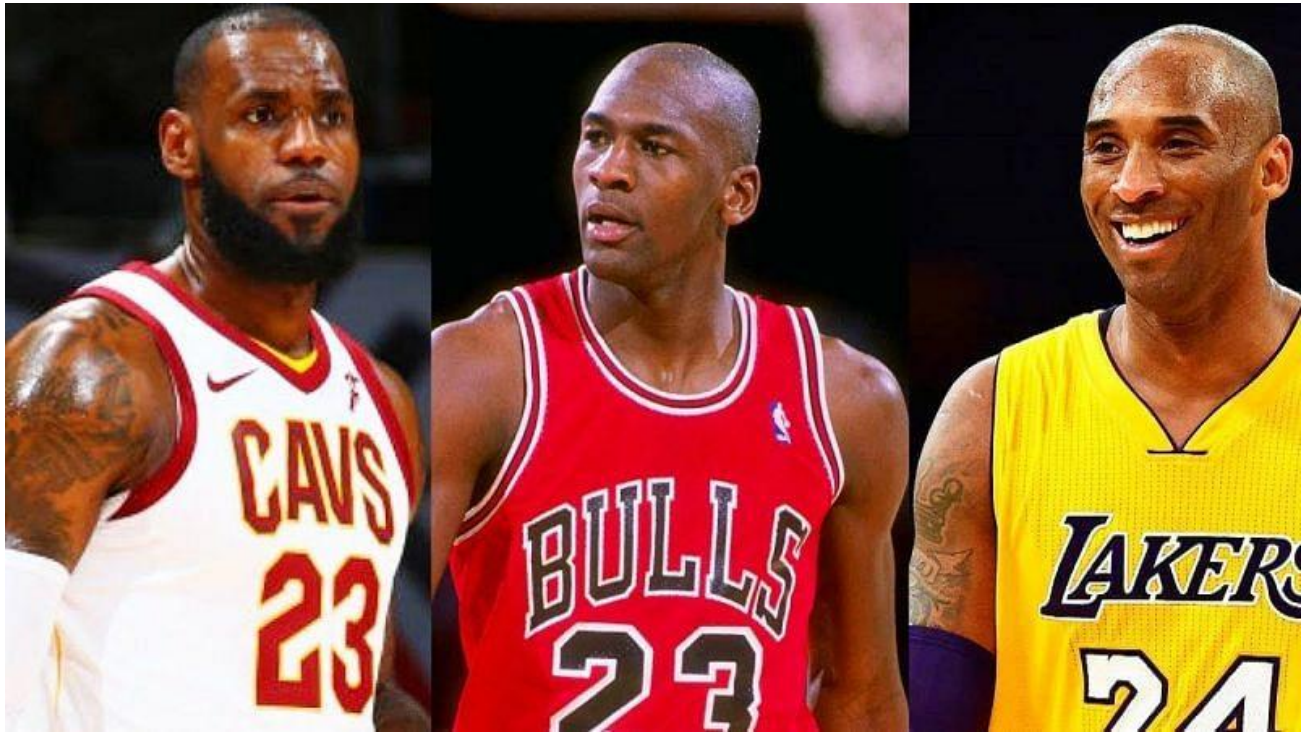
Please note: Benchmark is not……

Benchmark is to compare yourself with the Best!



Publication #1 in 2019

ANNALS OF SURGERY
A Monthly Review of Surgical Science Since 1885

ESA PAPER

Defining Global Benchmarks in Bariatric Surgery

A Retrospective Multicenter Analysis of Minimally Invasive Roux-en-Y Gastric Bypass and Sleeve Gastrectomy

Daniel Gero, MD, Dimitri A. Raptis, MD, MSc, PhD,*† Wouter Vleeschouwers, MD,‡ Sophie L. van Veldhuisen, MD,§ Andres San Martin, MD,¶ Yao Xiao, MD,||** Manoela Galvao, MD,†† Marcoandrea Giorgi, MD,‡‡ Marine Benois, MD,§§ Felipe Espinoza, MD,¶¶ Marianne Hollyman, MD, PhD,|||| Aaron Lloyd, MPH,*** Hanna Hosa, MD,* Henner Schmidt, MD,* José Luis Garcia-Galocha, MD,††† Simon van de Vrande, MD,‡‡‡ Sonja Chiappetta, MD,§§§ Emanuele Lo Menzo, MD,¶¶¶ Cristina Mamédio Aboud, RN, MSc,|||||| Sandra Gagliardo Lüthy,**** Philippa Orchard, MD,†††† Steffi Rothe, MBA,‡‡‡‡ Gerhard Prager, MD,‡‡‡‡ Dimitri J. Pournaras, MD, PhD,†††† Ricardo Cohen, MD,|||||| Raul Rosenthal, MD,¶¶¶ Rudolf Weiner, MD,§§§ Jacques Himpens, MD, PhD,‡‡‡§§§§ Antonio Torres, MD, PhD,††† Kelvin Higa, MD,*** Richard Welbourn, MD,|||| Marcos Berry, MD,¶¶ Camilo Boza, MD,¶¶ Antonio Iannelli, MD,§§ Sivamainthan Vithiananthan, MD,‡‡ Almino Ramos, MD,†† Torsten Olbers, MD, PhD,**¶¶¶¶ Matias Sepúlveda, MD,¶ Eric J. Hazebroek, MD, PhD,§ Bruno Dillemans, MD,‡ Roxane D. Staiger, MD,* Milo A. Puhan, MD, PhD,|||||||| Ralph Peterli, MD,**** and Marco Bueter, MD, PhD*✉*

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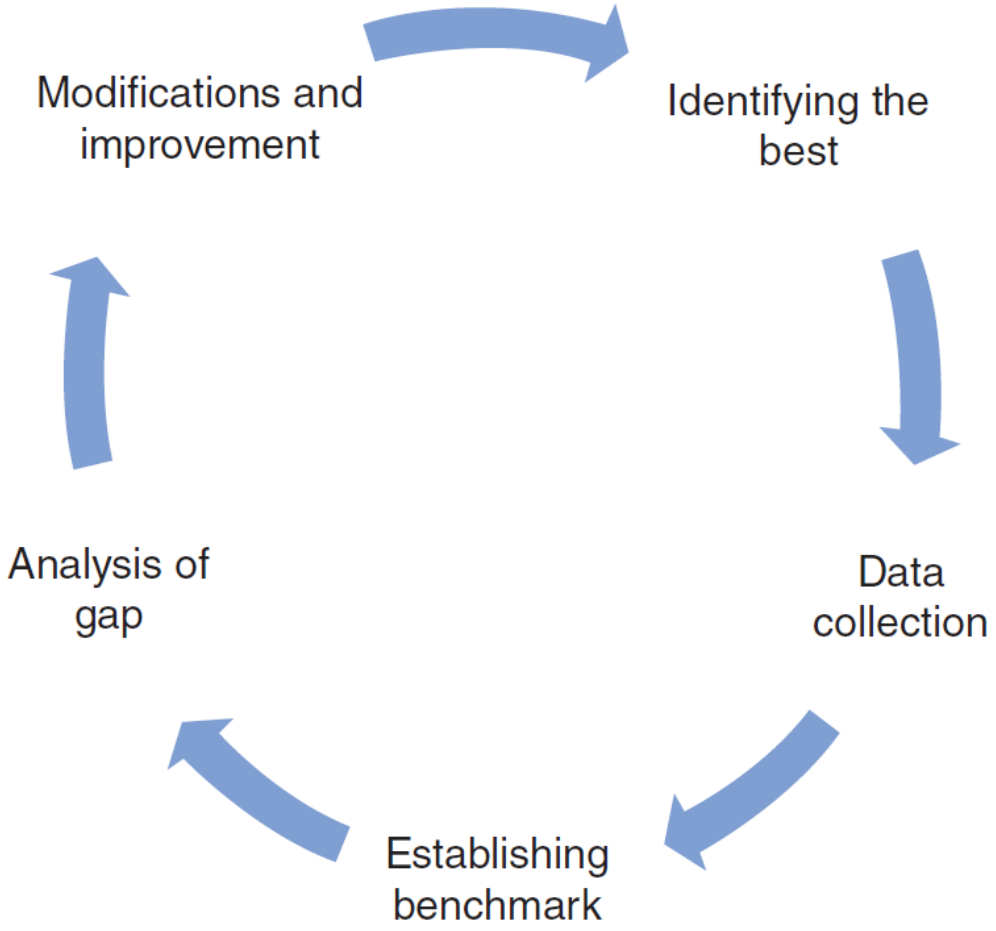
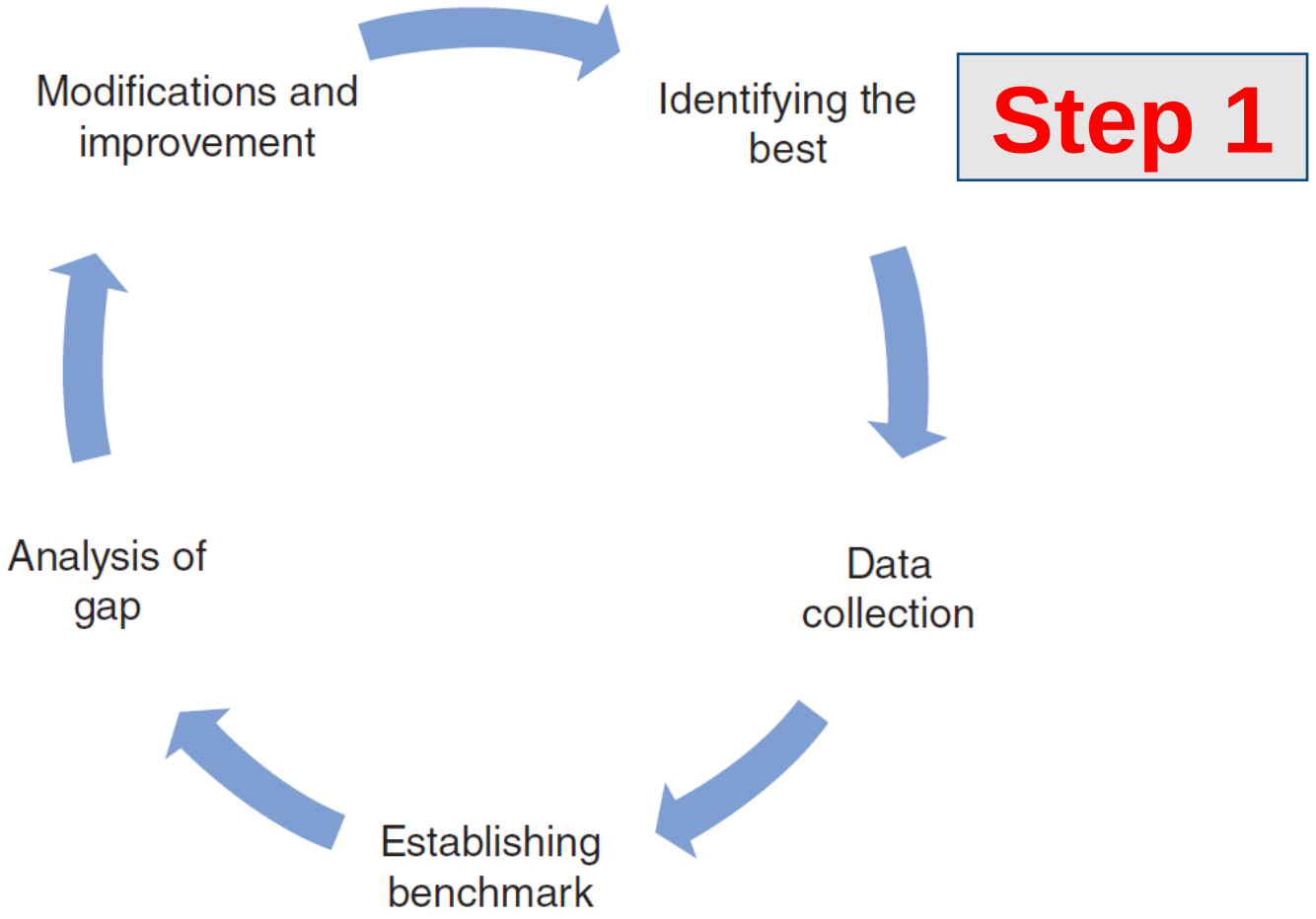
Benchmark cycle



Staiger RD et al., ***Br J Surg*** *2019 Jan;106(1):59-64*

Benchmark cycle

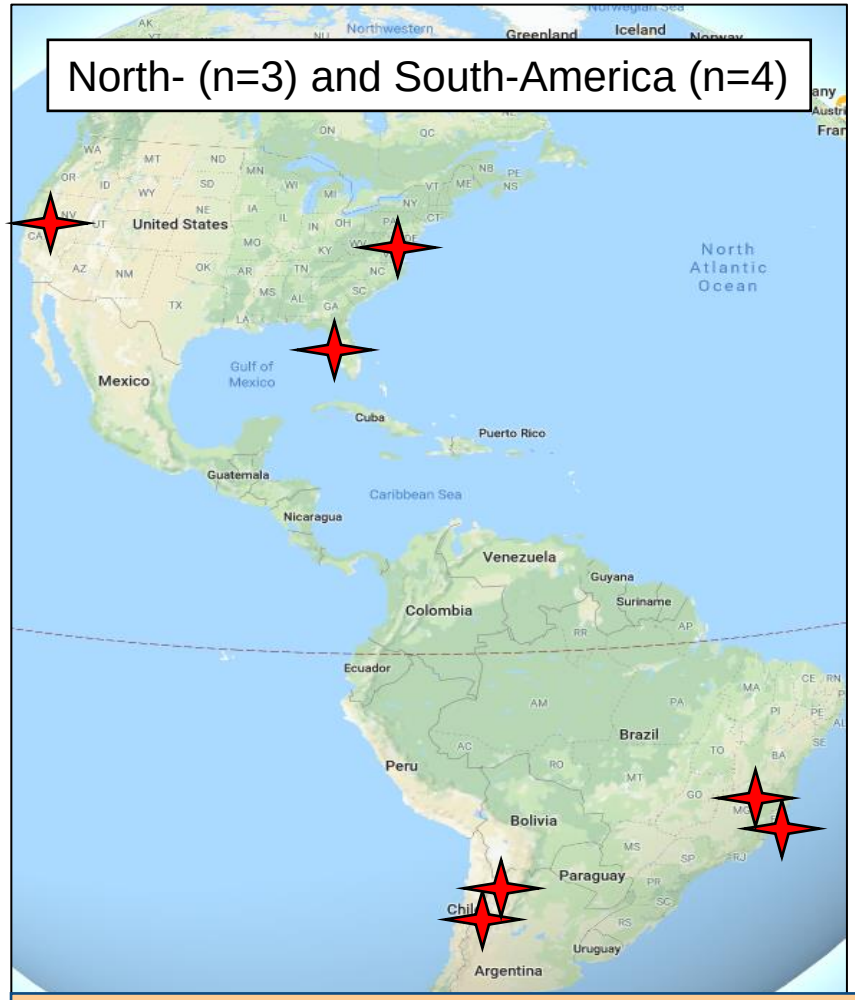


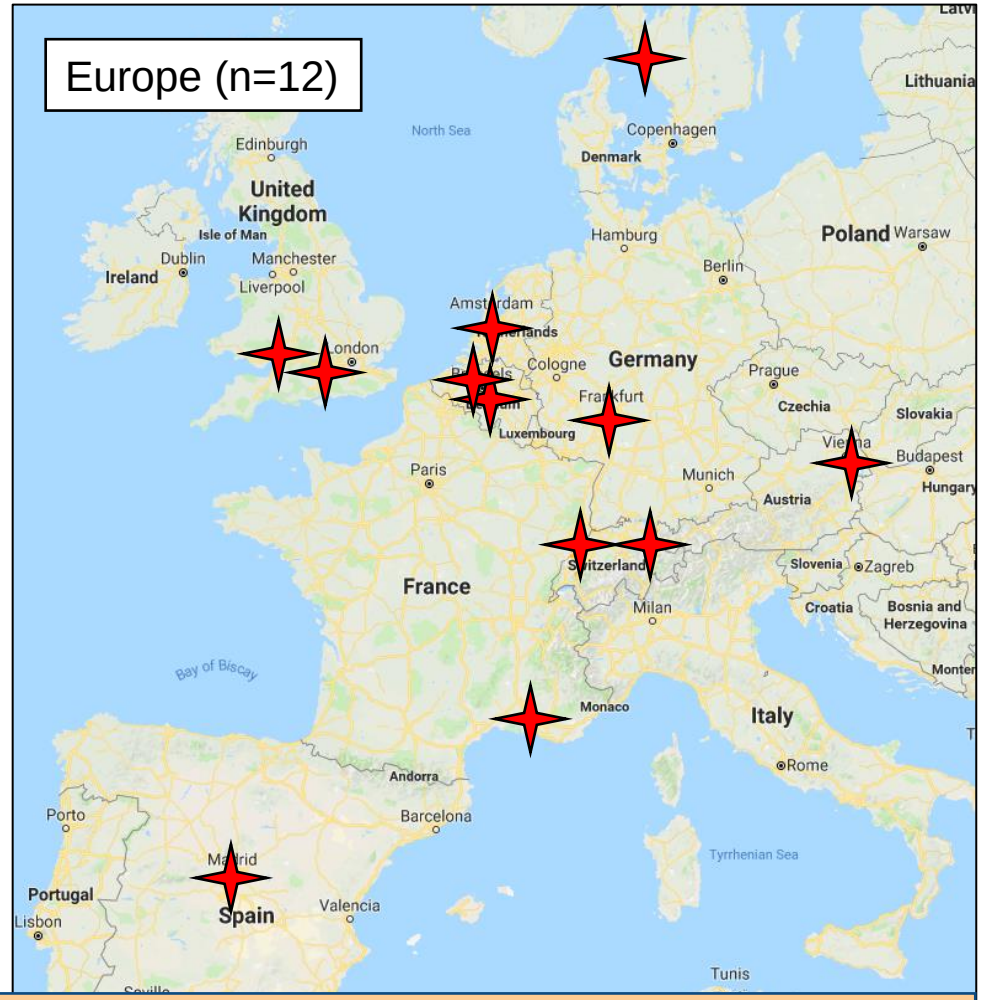
Staiger RD et al., ***Br J Surg*** *2019 Jan;106(1):59-64*

Step 1a: Identifying “best” bariatric centers

Inclusion criteria
1. ≥ 200 cases per year
2. Maintaining a prospective database
3. Previous publications (critically) reporting own outcomes
4. «Clinical excellence» or «National Reference Center»

Step 1a: Identifying “best” bariatric centers





19 participating centers from 12 countries and 3 continents

Step 1b: Identifying benchmark patients

Inclusion criteria	Exclusion criteria
1. Age 18-65 years	1. previous intra-abdominal surgery (incl. bariatric surgery)
2. Preoperative BMI ≤ 50 kg/m^2	2. cardiovascular disease (e.g. arrhythmia, stroke, CAD)
3. Laparoscopic primary RYGB or SG	3. history of thromboembolic events a/o therapeutic anticoagulation
4. FU of at least 90 d	4. Diabetes mellitus (Type 1 & 2) as defined by the ADA
5. ASA < IV	5. OSAS
	6. COPD (FEV1/FVC<0.7)
	7. Chronic kidney disease (eGFR <30ml/min/1.72 m^2)
	8. IBD
	9. Immunosuppressive medication
	10. Associated surgical procedures (i.e.: cholecystectomy, hiatoplasty)

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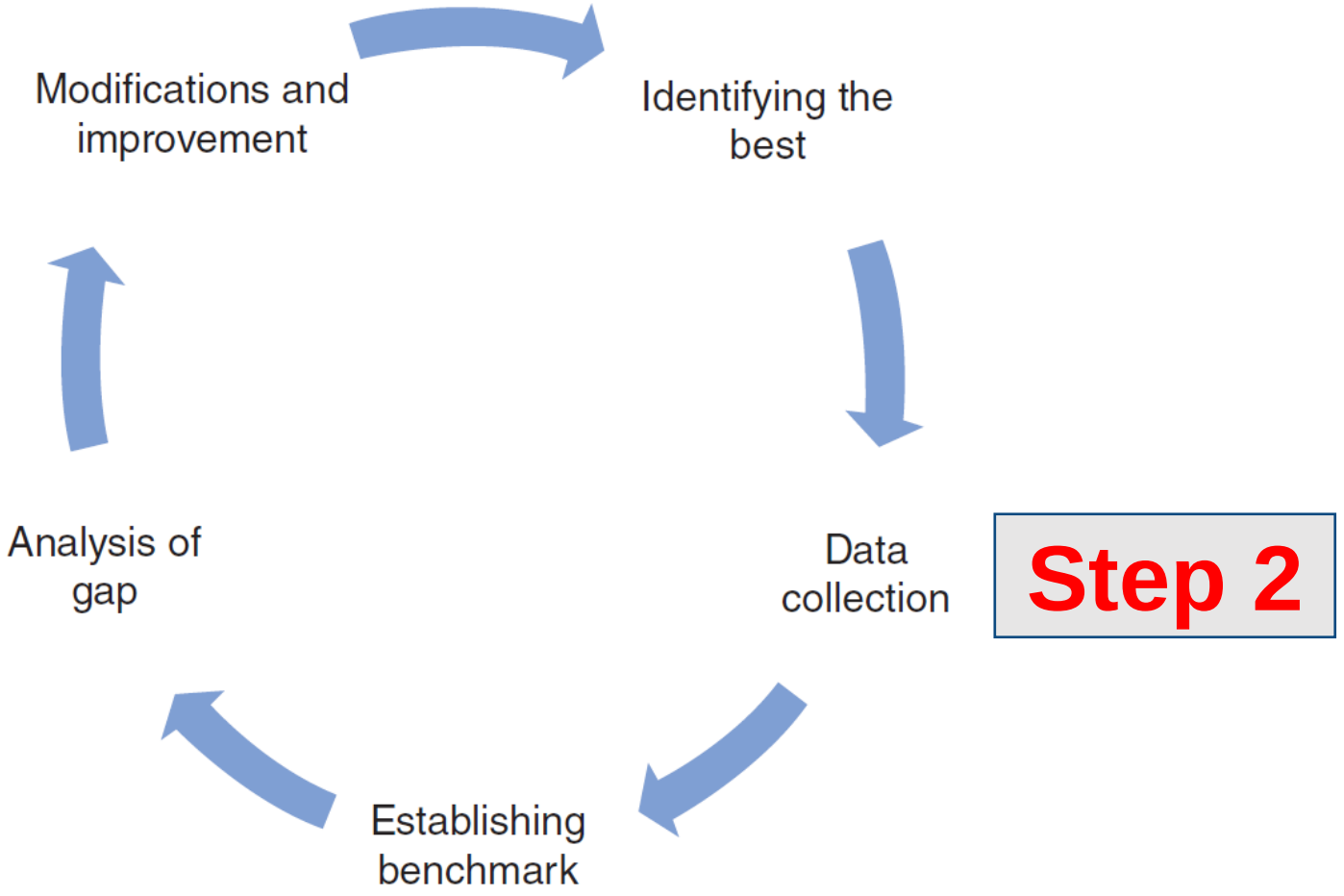
	8. IBD
	9. Immunosuppressive medication
	10. Associated surgical procedures (i.e.: cholecystectomy, hiatoplasty)

Criteria identified by literature review
&
chosen to minimize postoperative morbidity

Benchmark cycle



Step 2

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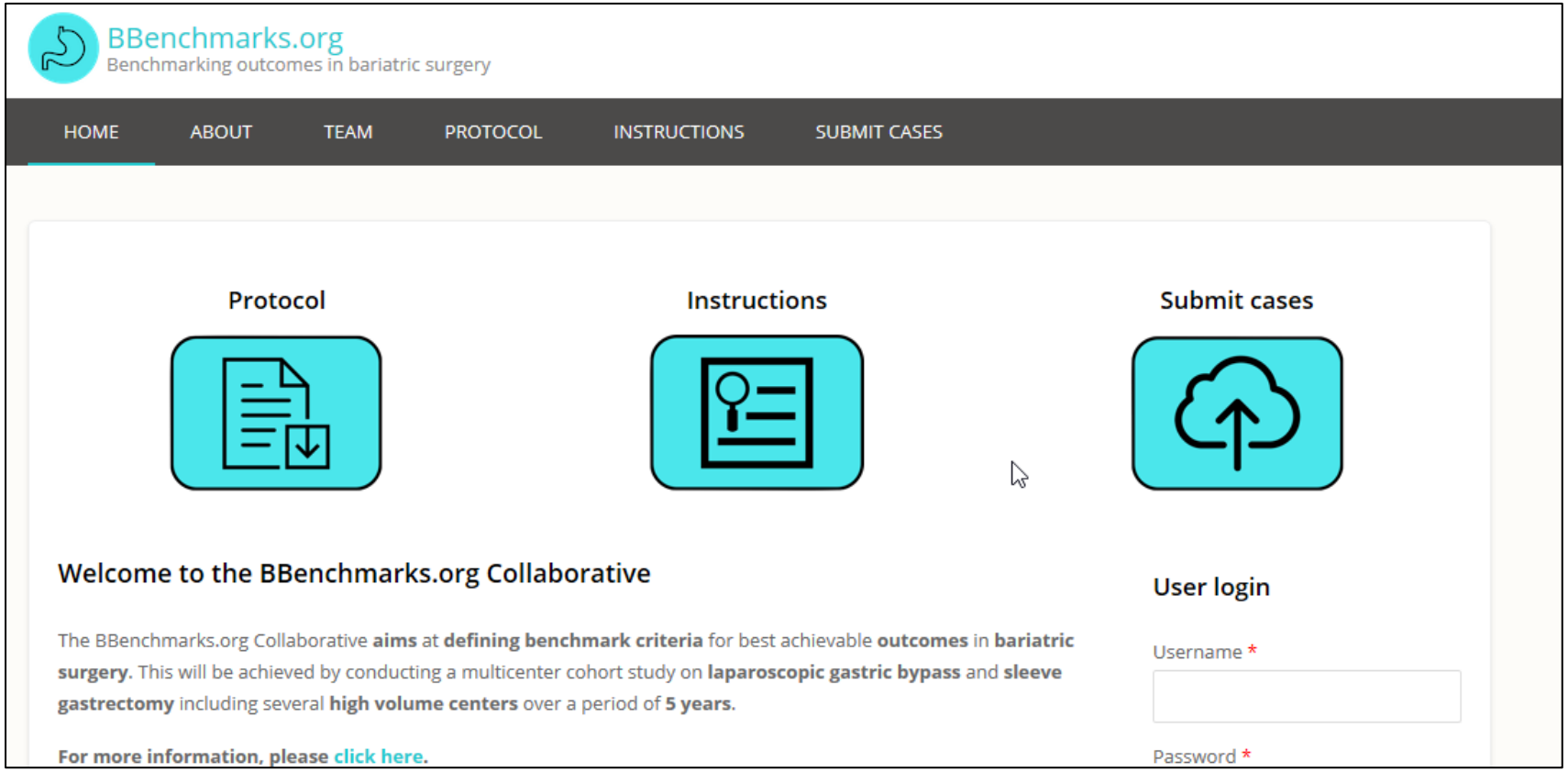
Step 2: Data collection

Secure and anonymized online platform (https://bbenchmarks.org)



U.S. National Library of Medicine
ClinicalTrials.gov

NCT03440138

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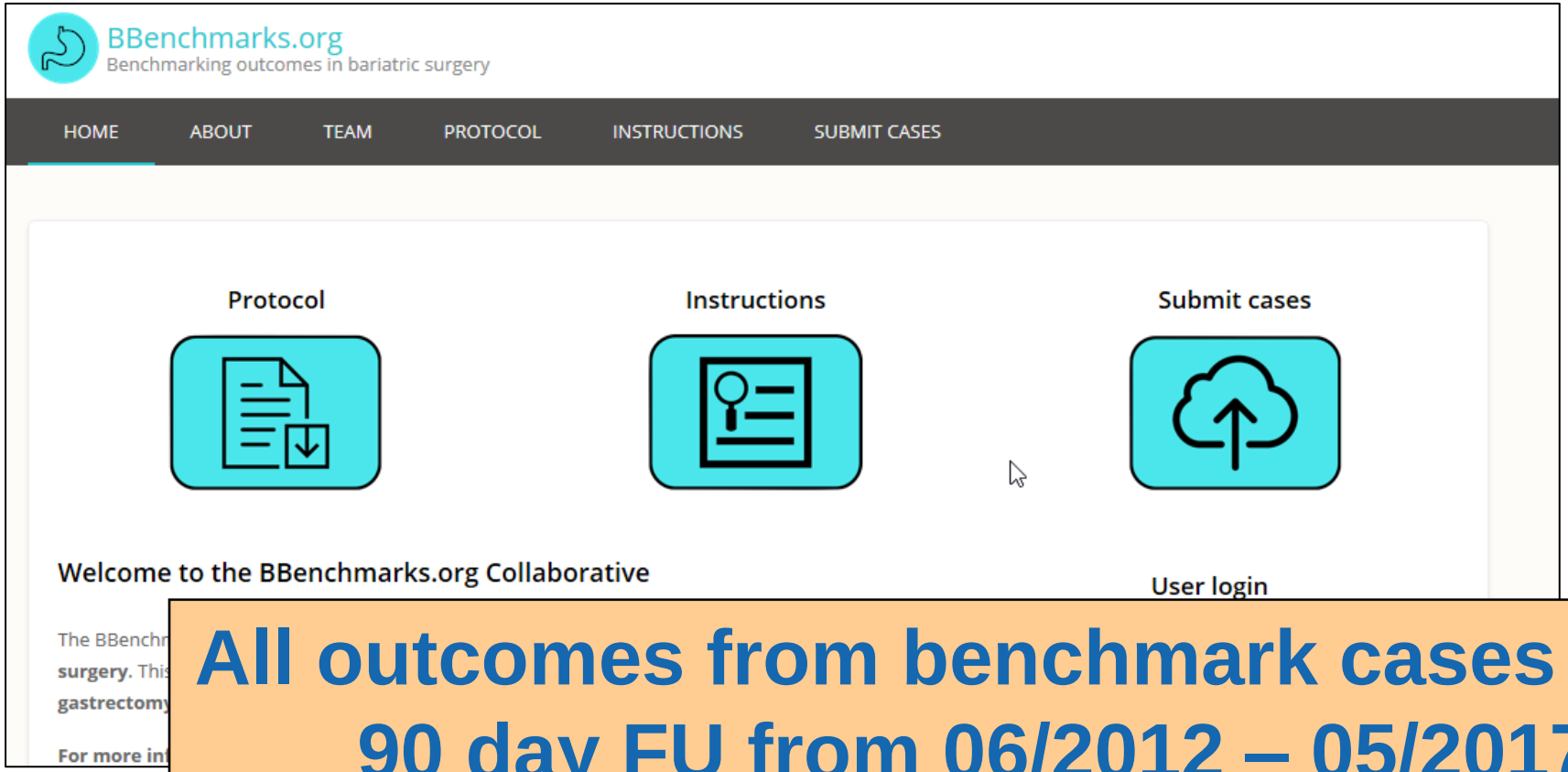

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NCT03440138

All outcomes from benchmark cases with 90 day FU from 06/2012 – 05/2017

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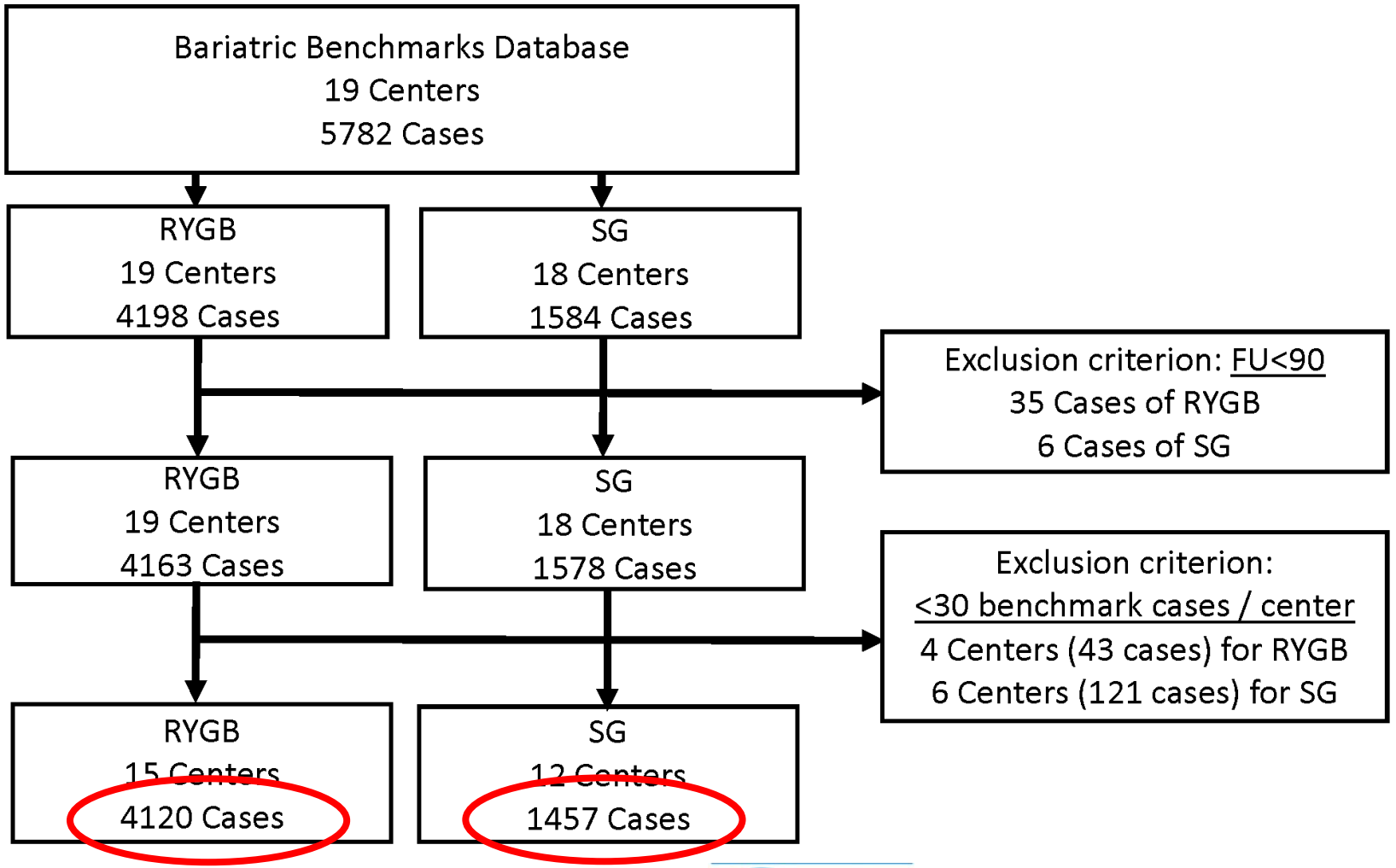
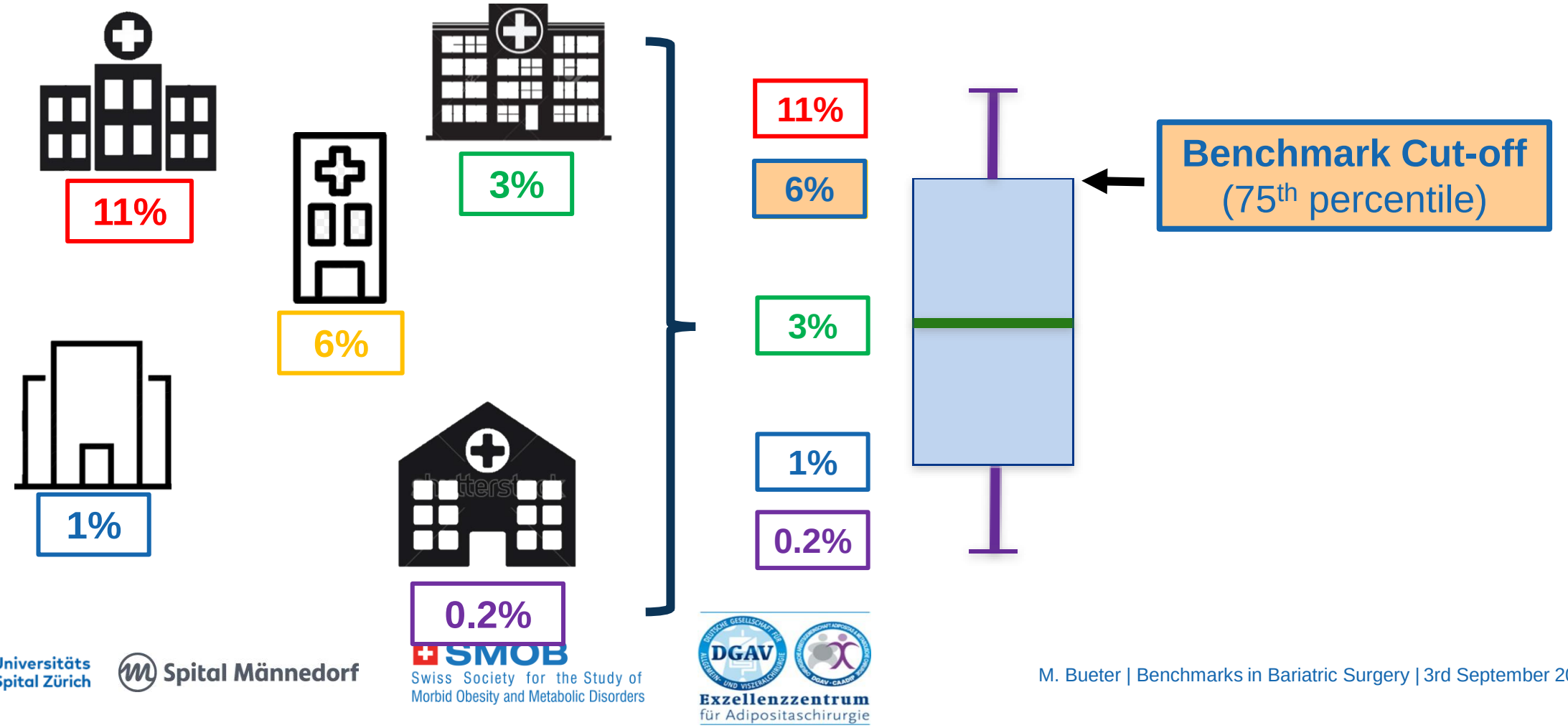
Step 2: Data collection

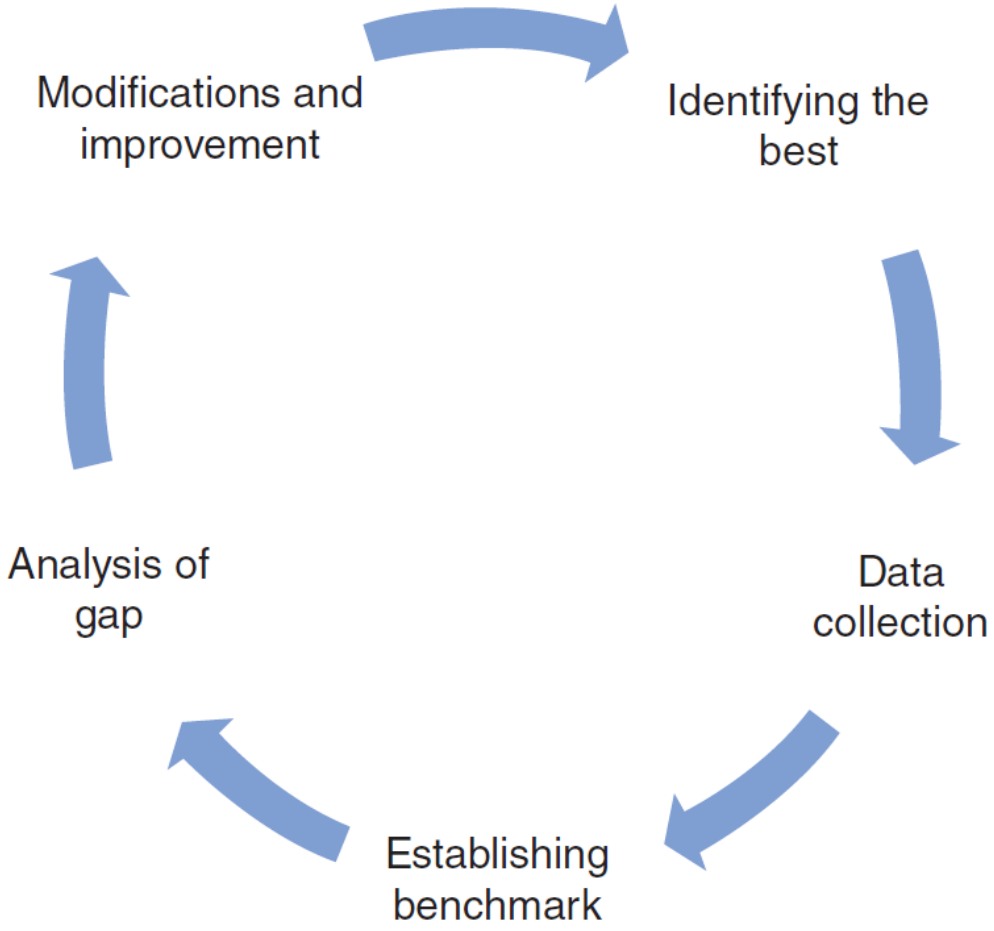


Step 2: Data analysis

(Fictitious) example: Anastomotic leak rate after RYGB within 90 d FU



Benchmark cycle



Step 3

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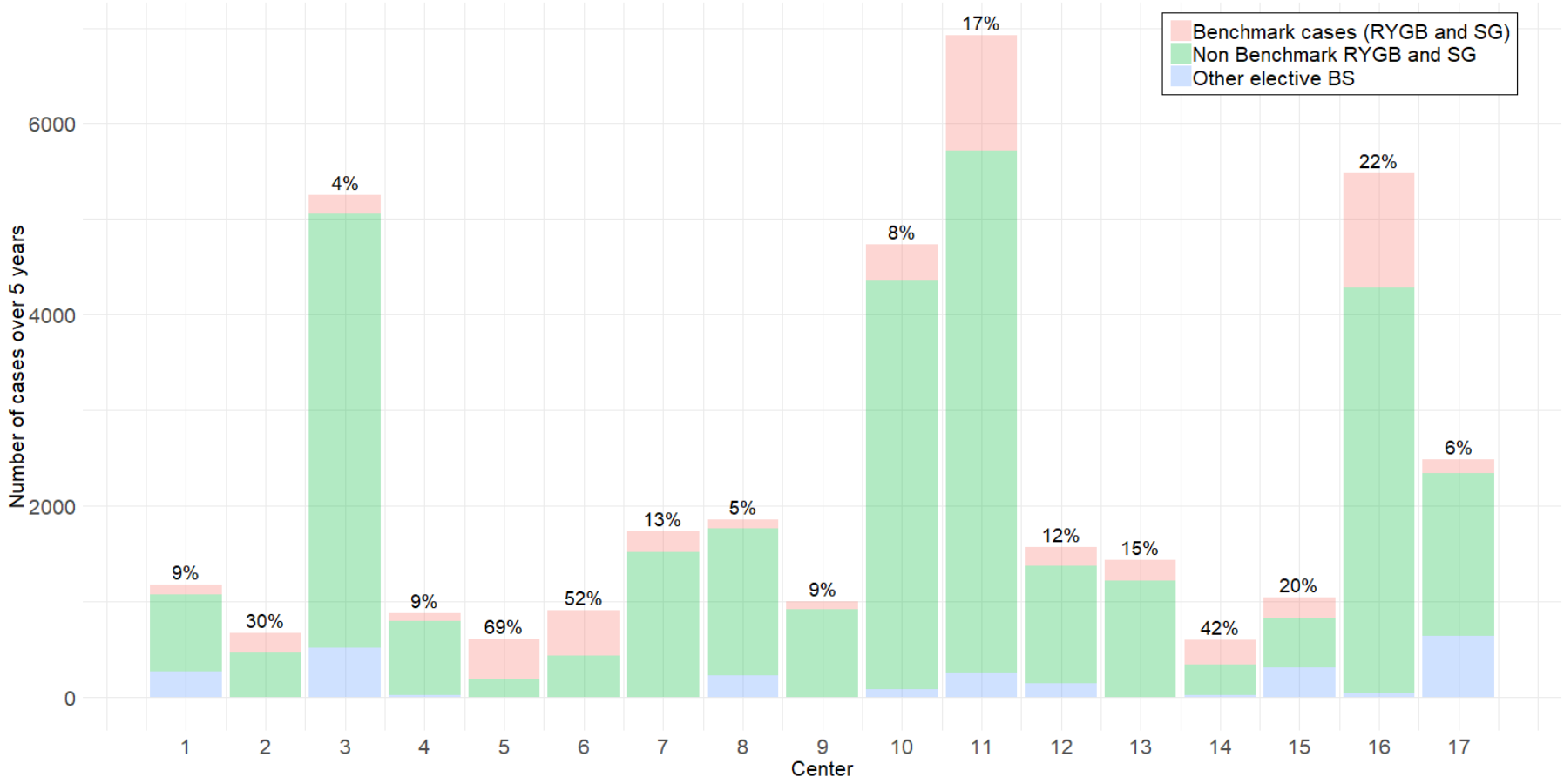
Distribution of benchmark cases in each center

Casemix of participating centers



Step 3: Establishing benchmark cut-offs

Best achievable outcome within **90 days** after RYGB (n=4120) and SG (n=1457)

	RYGB		SG	
	75th	Median	75th	Median
Reoperation (%)	≤ 4	≤ 1.7	≤ 3	≤ 1.4
CD Grade ≥ IIIa (%)	≤ 5.5	≤ 2.7	≤ 5.5	≤ 2.3
Anastomotic/staple line leak (%)	≤ 1.3	≤ 0.2	≤ 0.15	≤ 0

Step 3: Establishing benchmark cut-offs

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Mortality (%)	0	0	0	0

Step 3: Establishing benchmark cut-offs

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Anastomotic/staple line leak (%)	≤ 1.3	≤ 0.2	≤ 0.15	≤ 0
Mortality (%)	0	0	0	0

0.063% Overall Mortality

n=19 out of all RYGB & SG cases (benchmark & non-benchmark cases) from participating centers between 06/2012 & 05/2017 (n=30'643)

Step 3: Establishing benchmark cut-offs

Best achievable outcome within **90 days** after RYGB (n=4120) and SG (n=1457)

	RYGB		SG	
	75th	Median	75th	Median
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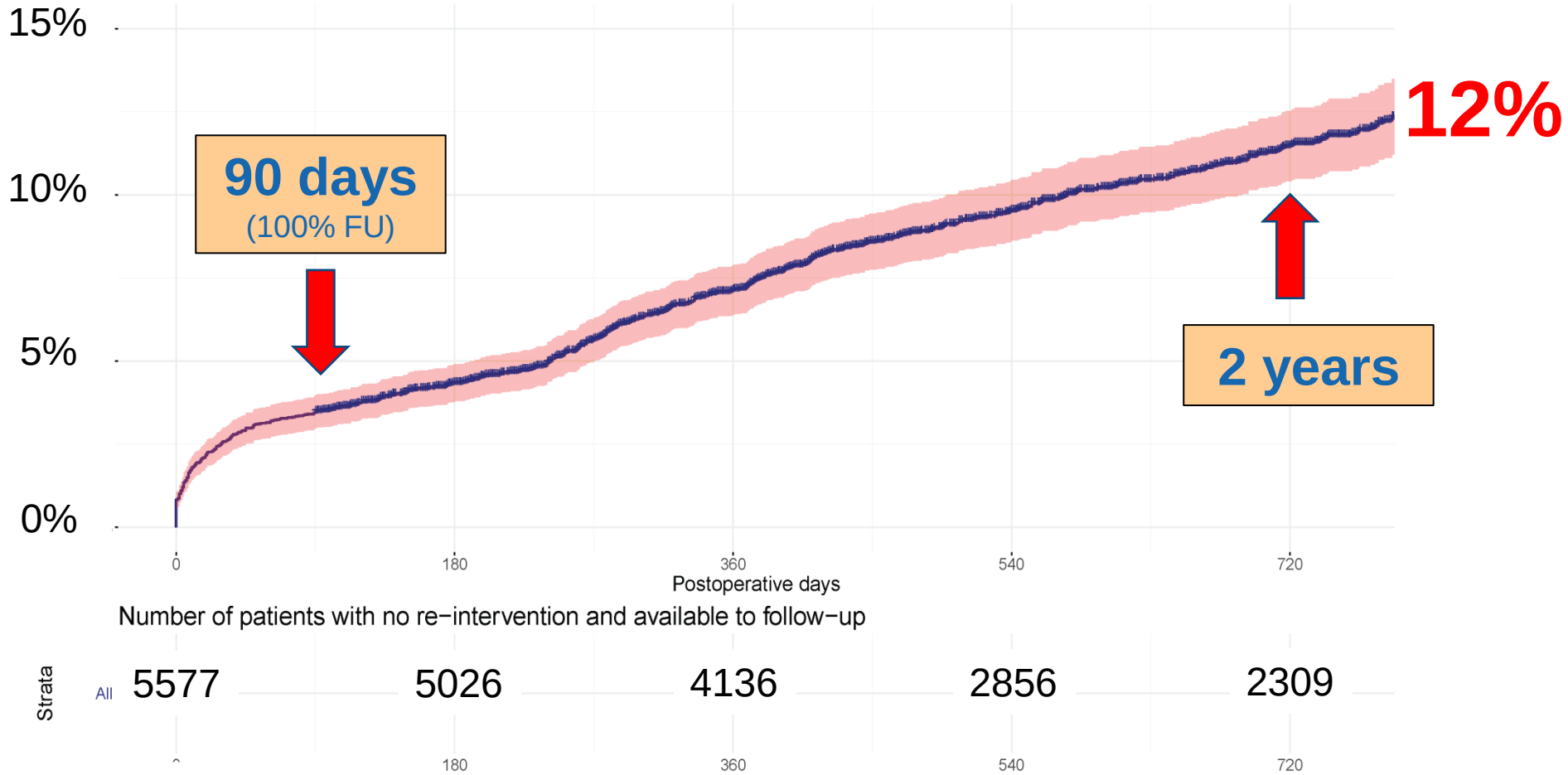
Anastomotic/staple line leak (%)	≤ 1.3	≤ 0.2	≤ 0.15	≤ 0
Mortality (%)	0	0	0	0

Mortality of limited value for benchmarking in low risk surgery (e.g. Bariatric Surgery)

Please note: Length of FU after Bariatric surgery matters

Cumulative hazard of CD Grade > II complications within 2 years



Please note: Length of FU after Bariatric surgery matters

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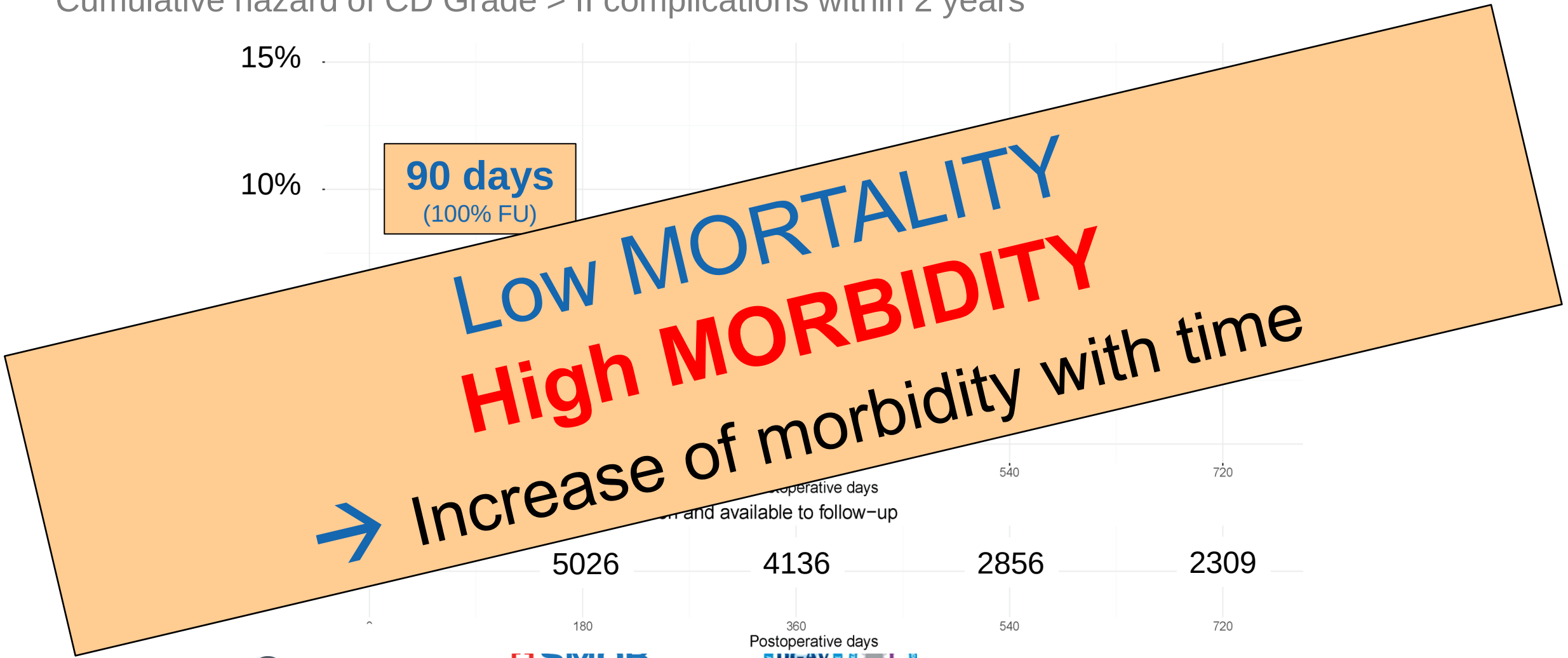

How to use benchmarks cut-offs?

How to use benchmarks cut-offs?

Fictitious example after RYGB

	Benchmark cut-off	Bariatric center XY
Reoperation (%)	≤ 4	7
Complication grade ≥ 3a (%)	≤ 5.5	8
Mortality (%)	0	0.1
Anastomotic leak (%)	≤ 1.3	3.3

How to use benchmarks cut-offs?

Fictitious example after RYGB

	Benchmark cut-off	Bariatric center XY
Reoperation (%)	≤ 4	**7**
Complication grade ≥ 3a (%)	≤ 5.5	**8**
Mortality (%)	0	**0.1**
Anastomotic leak (%)	≤ 1.3	**3.3**

Really poorer performance??

How to use benchmarks cut-offs?

Fictitious example after RYGB

	Benchmark cut-off	Bariatric center XY	
		benchmark patients	non-benchmark patients
Reoperation (%)	≤ 4	3	10
Complication grade ≥ 3a (%)	≤ 5.5	5	11
Mortality (%)	0	0	0.5
Anastomotic leak (%)	≤ 1.3	1	4

How to use benchmarks cut-offs?

Fictitious example after RYGB

	Benchmark cut-off	Bariatric center XY	
		benchmark patients	non-benchmark patients
Reoperation (%)	≤ 4	**3**	10
Complication grade ≥ 3a (%)	≤ 5.5	**5**	11
Mortality (%)	0	**0**	0.5
Anastomotic leak (%)	≤ 1.3	**1**	4

How to use benchmarks cut-offs?

Fictitious example after RYGB

	Benchmark cut-off	Bariatric center XY	
		benchmark patients	non-benchmark patients
Reoperation (%)	≤ 4	**3**	**10**
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How to use benchmarks cut-offs?

Fictitious example after RYGB

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		benchmark patients	non-benchmark patients
Reoperation (%)	≤ 4	**3**	**10**
Complication grade ≥ 3a (%)	≤ 5.5	**5**	**11**
Mortality (%)	0	**0**	**0.5**
Anastomotic leak (%)	≤ 1.3	**1**	**4**

Difference due to patient selection, but not surgical performance

Common question……

“What about revisional bariatric surgery?”

Publication #2 in 2021

ANNALS OF SURGERY
A Monthly Review of Surgical Science Since 1885

ESA PAPER

Defining Global Benchmarks in Elective Secondary Bariatric Surgery Comprising Conversional, Revisional, and Reversal Procedures

Daniel Gero, MD, PhD, Marie Vannijvel, MD,† Sietske Okkema, MD,‡ Ellen Deleus, MD,§ Aaron Lloyd, MPH,¶ Emanuele Lo Menzo, MD,|| George Tadros, MD,|| Ivana Raguz, MD,* Andres San Martin, MD,** Marko Kraljević, MD,†† Styliani Mantziari, MD, MSc,‡‡ Sebastien Frey, MD,§§ Lisa Gensthaler, MD,¶¶ Henna Sammalkorpi, MD, PhD,|||| José Luis Garcia-Galocha, MD,*** Amalia Zapata, MD,††† Talar Tatarian, MD,‡‡‡ Tom Wiggins, MBChB, PhD,§§§ Ekhlas Bardisi, MD,¶¶¶ Jean-Philippe Goreux, MD,|||||| Yosuke Seki, MD, PhD,**** René Vonlanthen, MD, MHA,* Jeannette Widmer, MD,* Andreas Thalheimer, MD,* Kazunori Kasama, MD,**** Jacques Himpens, MD, PhD,¶¶¶||||||†††† Marianne Hollyman, MBChB, PhD,§§§ Richard Welbourn, MD,§§§ Rajesh Aggarwal, MD,‡‡‡ Alec Beekley, MD,‡‡‡ Matias Sepulveda, MD,††† Antonio Torres, MD, PhD,*** Anne Juuti, MD, PhD,|||| Paulina Salminen, MD, PhD,‡‡‡‡ Gerhard Prager, MD,¶¶ Antonio Iannelli, MD, PhD,§§ Michel Suter, MD,‡‡§§§§ Ralph Peterli, MD, PhD,††¶¶¶¶ Camilo Boza, MD,** Raul Rosenthal, MD,|| Kelvin Higa, MD,¶ Matthias Lannoo, MD, PhD,§ Eric J. Hazebroek, MD, PhD,‡ Bruno Dillemans, MD,† Pierre-Alain Clavien, MD, PhD,* Milo Puhan, MD, PhD,|||||||| Dimitri A. Raptis, MD, MSc, PhD,***** and Marco Bueter, MD, PhD*✉*

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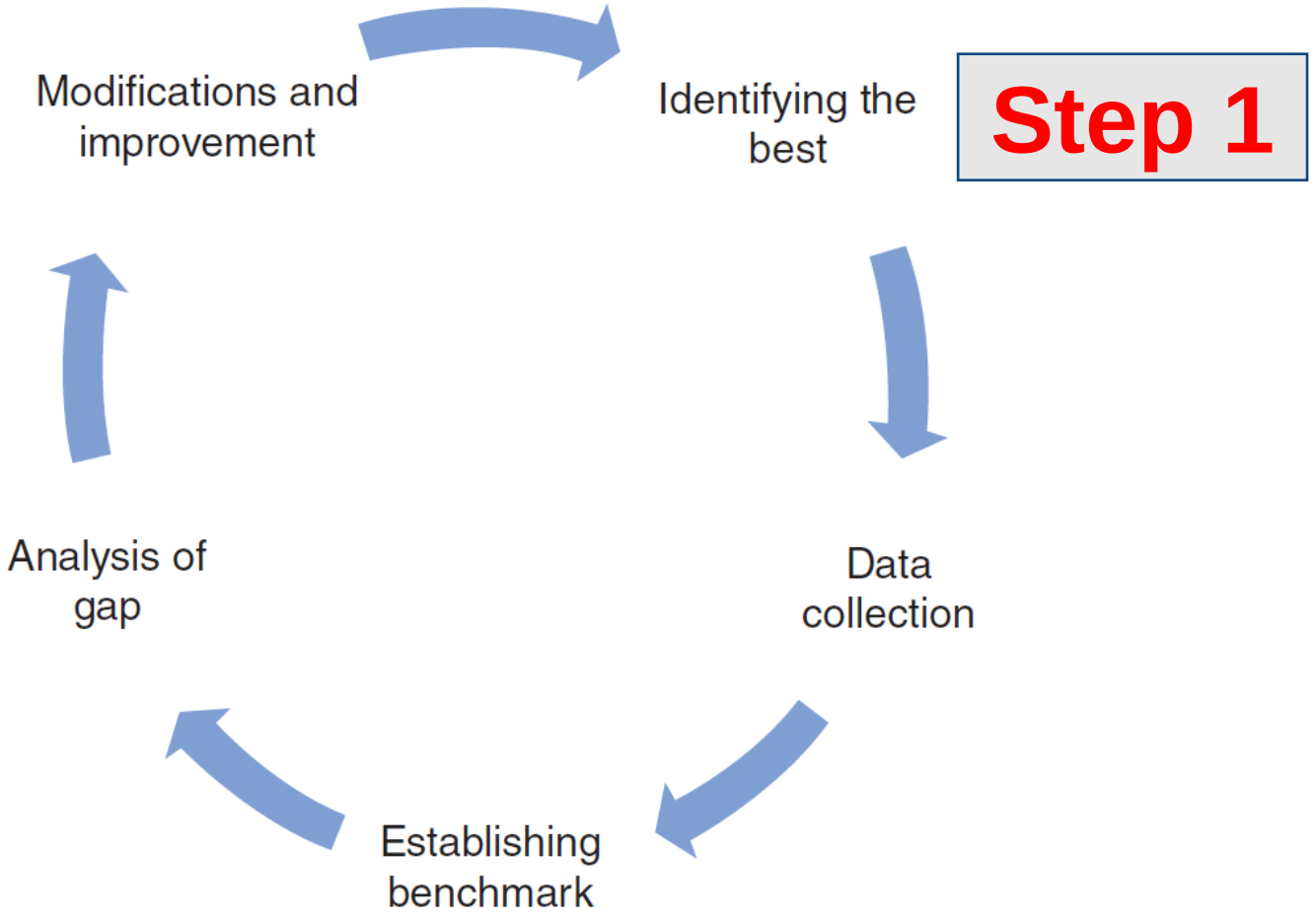
Benchmark cycle



Staiger RD et al., ***Br J Surg*** *2019 Jan;106(1):59-64*

Step 1a: Identifying “best” bariatric centers for Re-Do’s

18 participating centers from 12 countries and 4 continents

Step 1b: Identifying benchmark patients

Inclusion criteria	Exclusion criteria
1. Age 18-65 years	1. previous non-bariatric abdominal surgery
2. Preoperative BMI ≤ 50 kg/m^2	2. cardiovascular disease (e.g. arrhythmia, stroke, CAD)
3. Laparoscopic primary RYGB or SG	3. history of thromboembolic events a/o therapeutic anticoagulation
4. FU of at least 90 d	4. Diabetes mellitus (Type 1 & 2) as defined by the ADA
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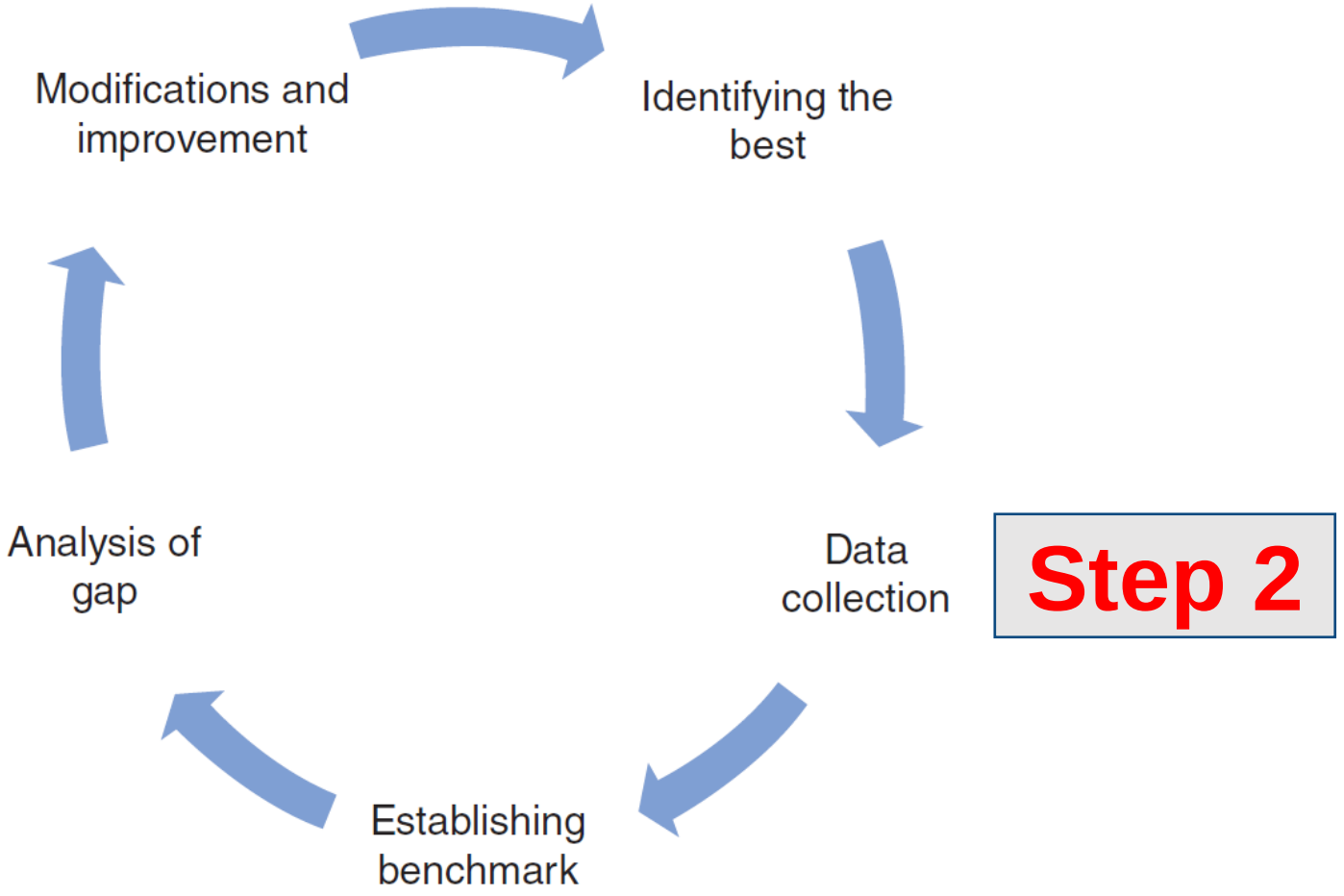
Benchmark cycle



Step 2

Staiger RD et al., ***Br J Surg*** *2019 Jan;106(1):59-64*

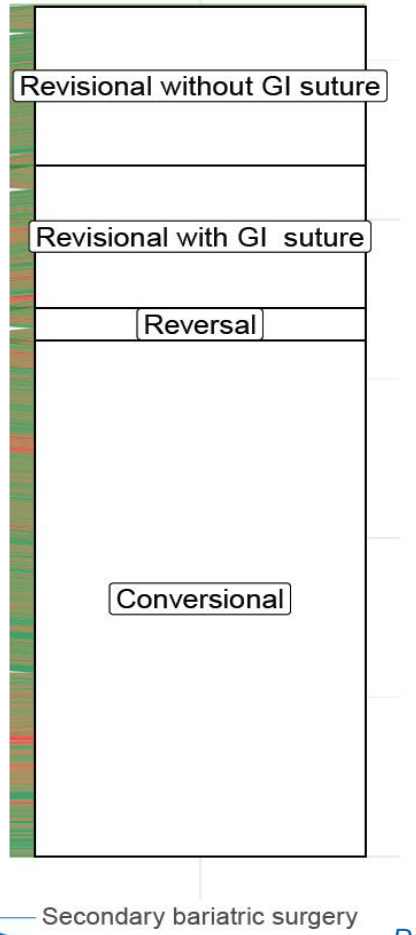
Step 2: Data collection

Outcomes from all secondary BS cases with at least 90 day FU from 06/2013 – 05/2019

- Total bariatric caseload: **44'884**
- Secondary BS cases: **5'349**
- Benchmark cases secondary BS: **3'143 (59%)**

Step 2: Data collection

Grouping of secondary bariatric surgery procedures



e.g. Mesenteric window

e.g. Pouch resizing

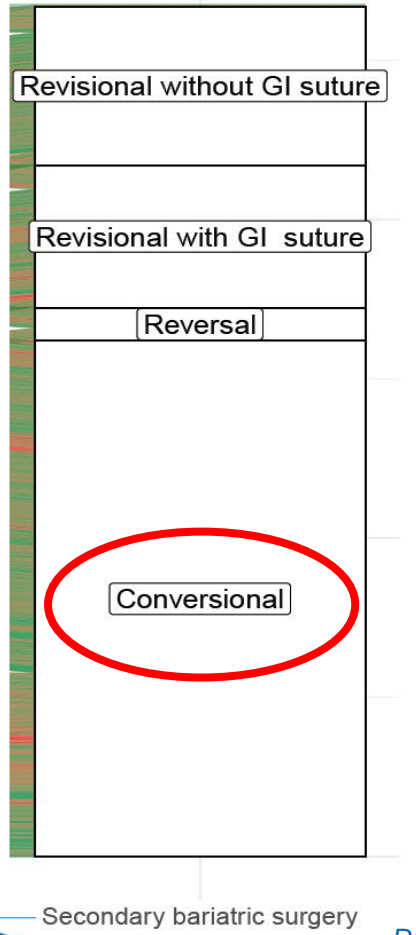
e.g. Normal anatomy

e.g. Band -> Bypass
e.g. Sleeve -> Bypass

*Patel S et al., **Obes Surg**. 2011 Aug;21(8):1209-19*

Step 2: Data collection

Grouping of secondary bariatric surgery procedures



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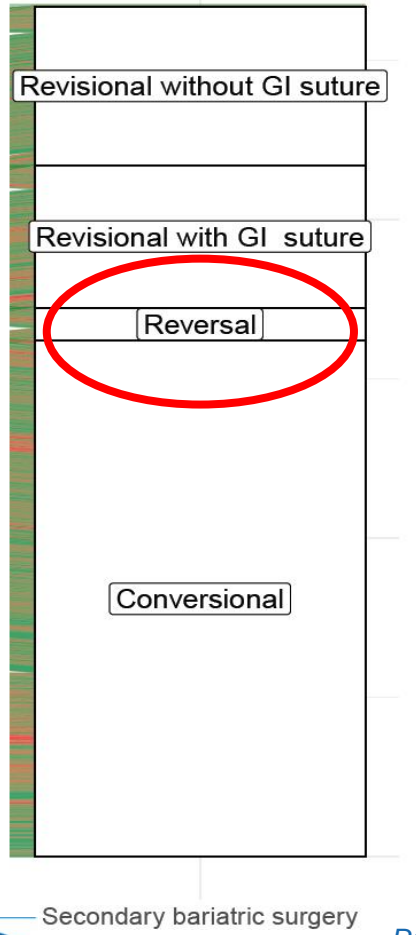

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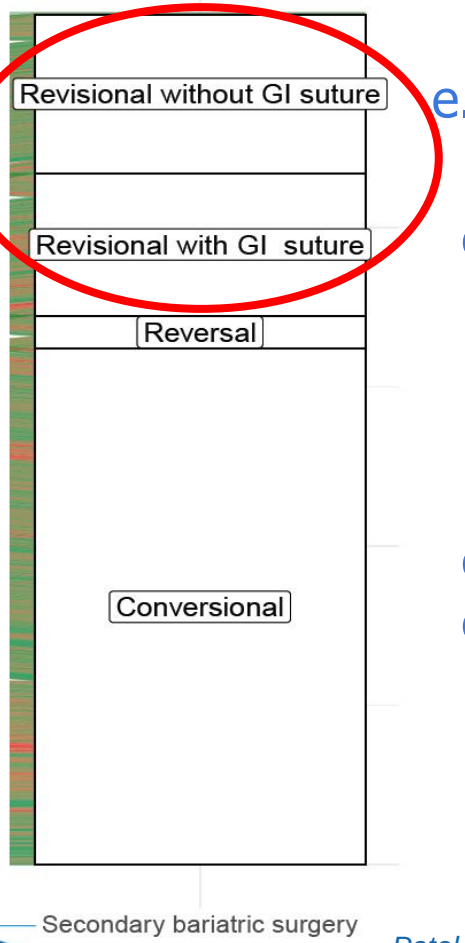

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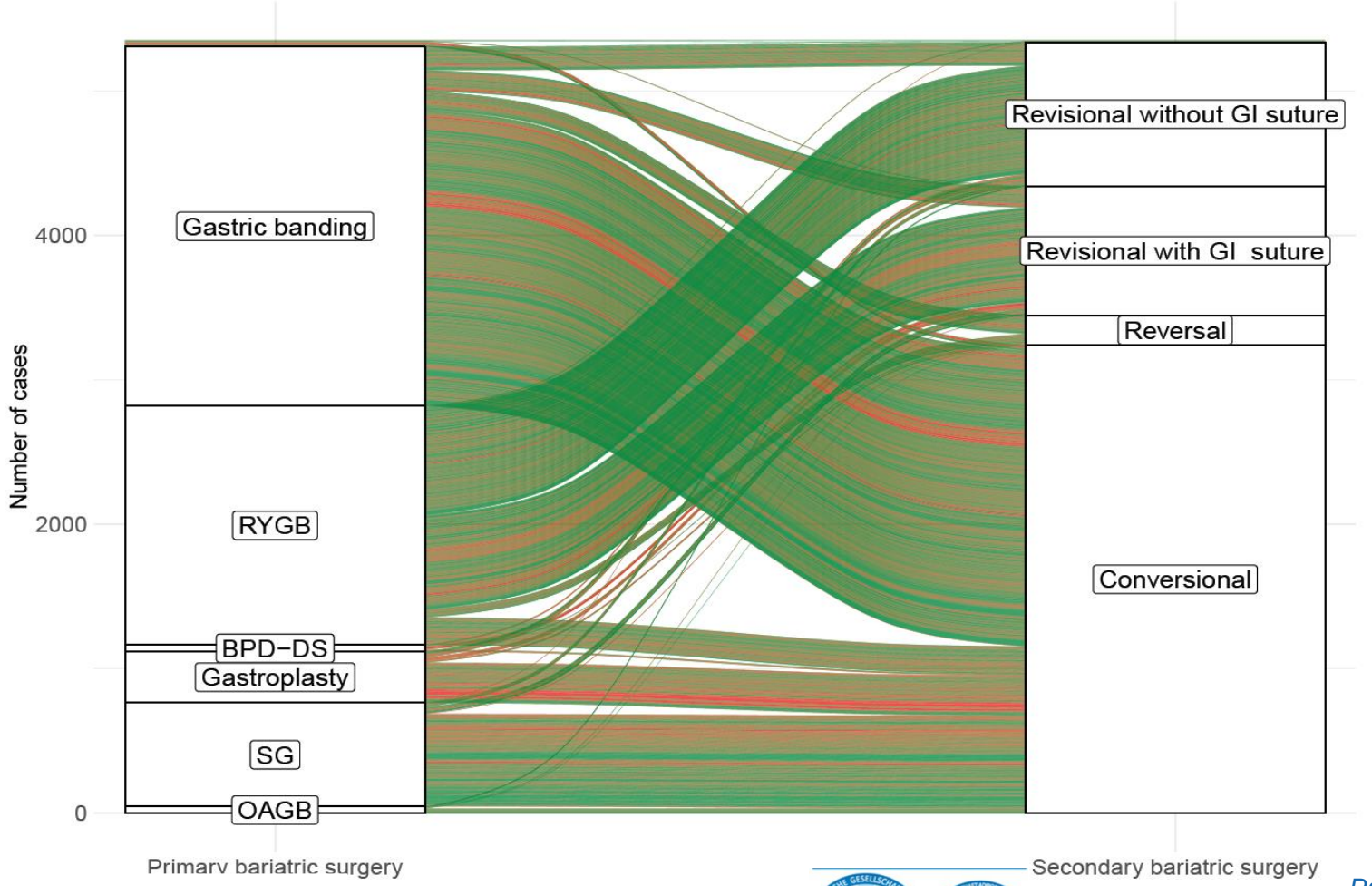

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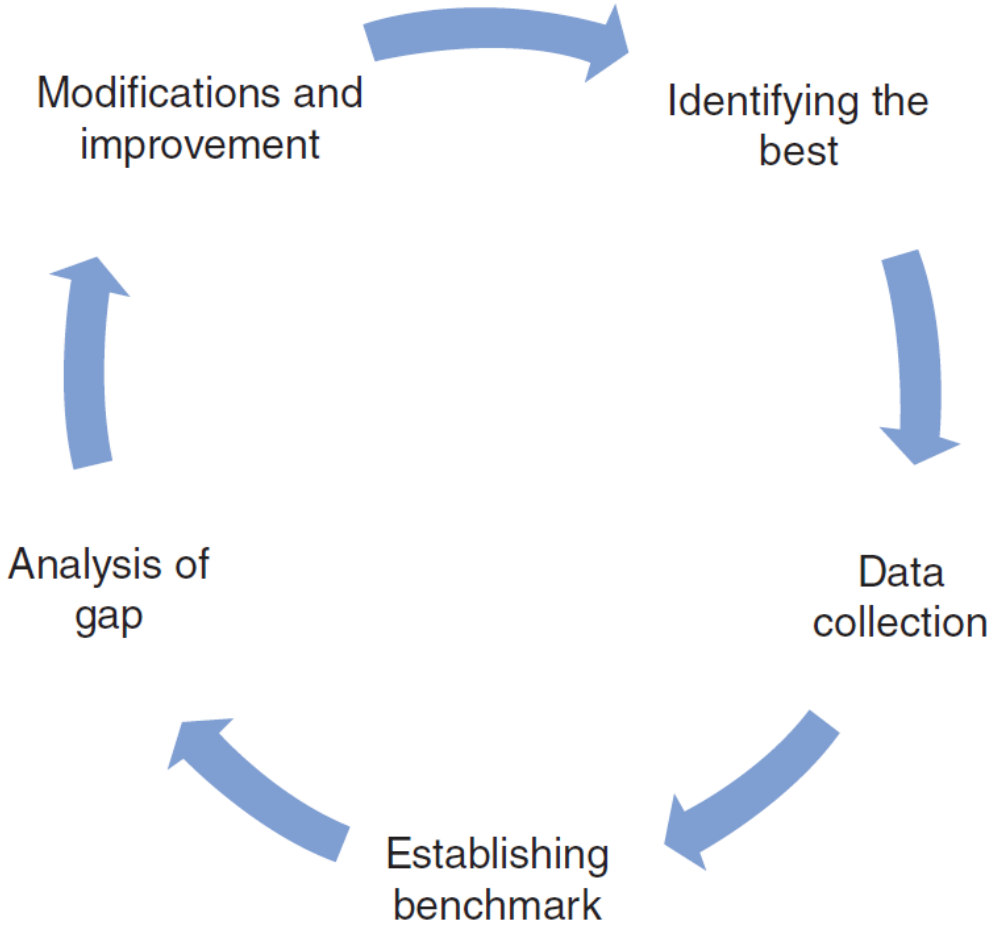
*Patel S et al., **Obes Surg**. 2011 Aug;21(8):1209-19*

Benchmark cycle



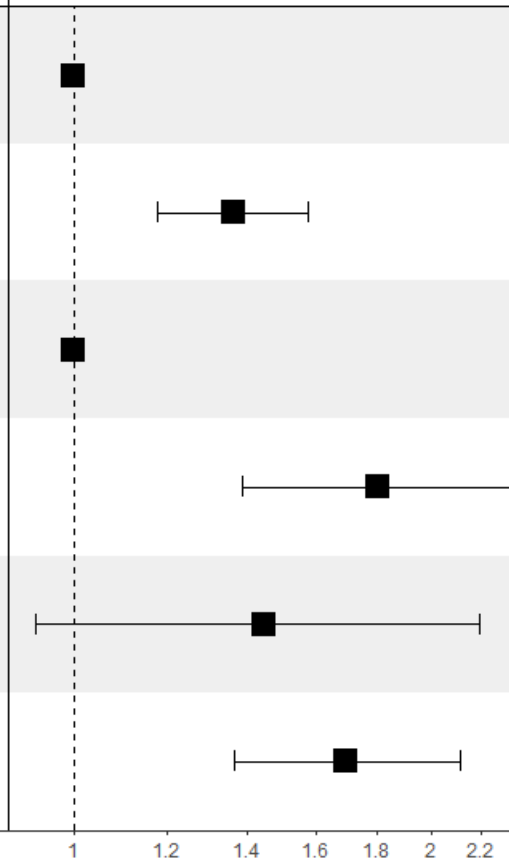
Step 3

Staiger RD et al., ***Br J Surg*** *2019 Jan;106(1):59-64*

Step 3: Establishing benchmark cut-offs

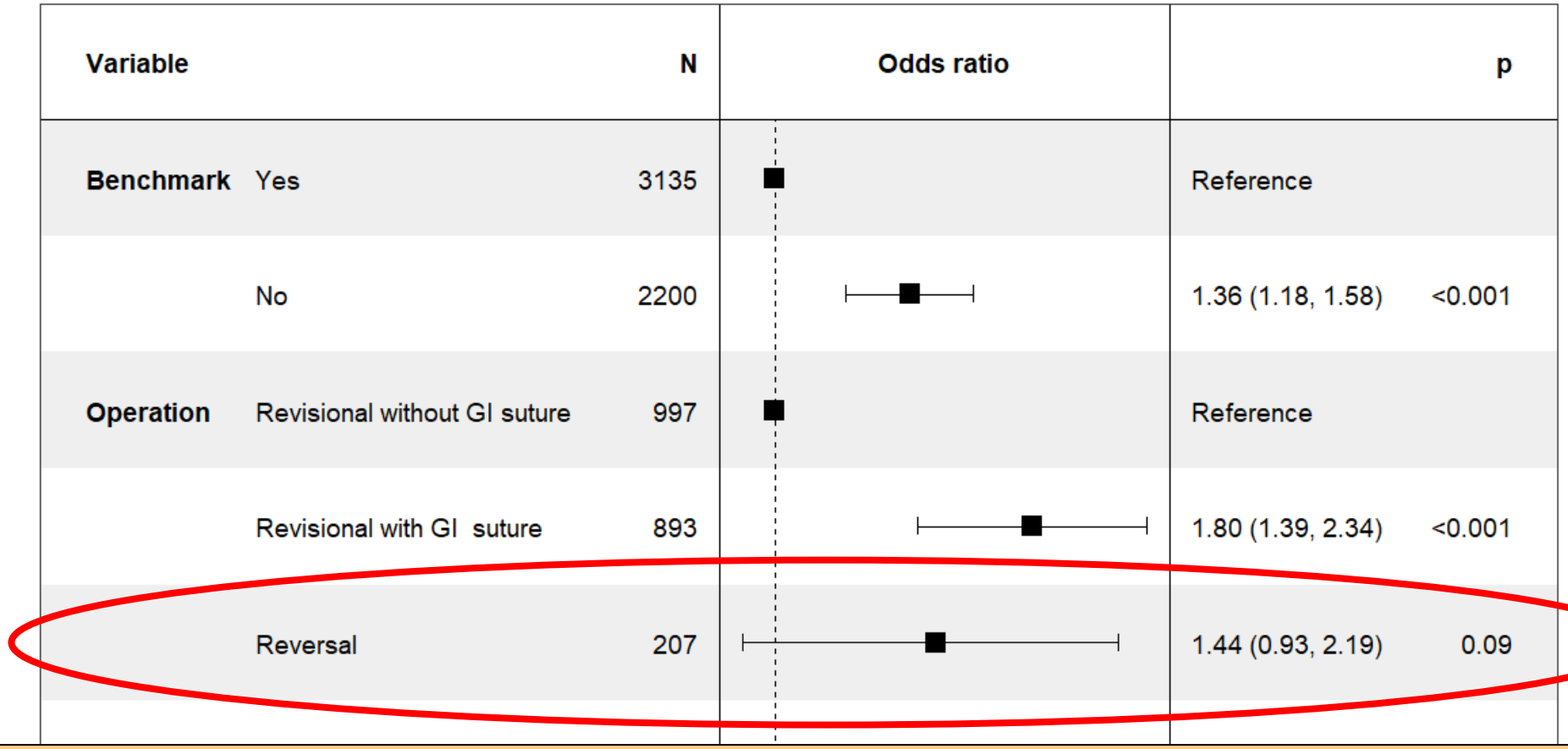
Proof of concept: Odds ratio any complication within 90-day

Variable		N	Odds ratio	p
Benchmark	Yes	3135		Reference
	No	2200	1.36 (1.18, 1.58)	<0.001
Operation	Revisional without GI suture	997		Reference
	Revisional with GI suture	893	1.80 (1.39, 2.34)	<0.001
	Reversal	207	1.44 (0.93, 2.19)	0.09
	Conversional	3238	1.69 (1.36, 2.11)	<0.001



Step 3: Establishing benchmark cut-offs

Proof of concept: Odds ratio any complication within 90-day



Variable		N	Odds ratio	p
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	Reversal	207		1.44 (0.93, 2.19) 0.09

heterogenous group (e.g. RYGB reversal, Band removal)

Step 3: Establishing benchmark cut-offs

Best achievable outcome within **90 days** after conversional BS (median, n=3238)

	Global benchmark cutoff	Primary RYGB
Operation duration (min)	≤ 140	
Hospital stay (days)	≤ 5	
Intraop. blood transfusions (%)	0	
Mortality (%)	0	

Step 3: Establishing benchmark cut-offs

Best achievable outcome within **90 days** after conversional BS (median, n=3238)

	Global benchmark cutoff	Primary RYGB
Operation duration (min)	≤ 140	≤ 120
Hospital stay (days)	≤ 5	≤ 4
Intraop. blood transfusions (%)	0	0
Mortality (%)	0	0

Step 3: Establishing benchmark cut-offs

Best achievable outcome within **90 days** after conversional BS (median, n=3238)

	Global benchmark cutoff	Primary RYGB
Postop ICU admission (%)	≤ 3.6	≤ 0.14%
Uneventful postop course at 90-days (%)	≥ 66	≥ 90%
Reoperation (>CD IIIa) (%)	≤ 8.3	≤ 4%
Anastomotic leak (%)	≤ 7.7	≤ 1.3%
Postoperative bleeding (%)	≤ 4	≤ 2.2%

Step 3: Establishing benchmark cut-offs

Best achievable outcome within **90 days** after conversional BS (median, n=3238)

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Secondary Bariatric Surgery belongs in the hands of experts/ Centers

Publication #3 in 2023

BJS

OXFORD

BJS, 2023, 1–9
https://doi.org/10.1093/bjs/znad374
Original Article

Global benchmarks in primary robotic bariatric surgery redefine quality standards for Roux-en-Y gastric bypass and sleeve gastrectomy

Guillaume Giudicelli[1], Daniel Gero[2], Lind Romulo[3], Vasu Chirumamilla[4], Pouya Iranmanesh[1,5], Christopher K. Owen[5], Wayne Bauerle[6], Amador Garcia[7], Lisa Lucas[8], Anne-Sophie Mehdorn[9,10], Dhananjay Pandey[11], Abdullah Almuttawa[12,13], Francisco Cabral[14], Abhishek Tiwari[15], Virginia Lambert[16], Beniamino Pascotto[17], Celine De Meyere[18], Marouan Yahyaoui[19], Thomas Haist[20], Oliver Scheffel[21], Maud Robert[19], Frederiek Nuytens[18], Santiago Azagra[17], Lilian Kow[16], Arun Prasad[15], Carlos Vaz[14], Michel Vix[12], Vivek Bindal[11], Jan H. Beckmann[9,10], David Soussi[8], Ramon Vilallonga[7], Maher El Chaar[6], Erik B. Wilson[5], Arif Ahmad[4], Andre Teixeira[3], Monika E. Hagen[1], Christian Toso[1], Pierre-Alain Clavien[2], Milo Puhan[22], Marco Bueter[2,*] and Minoa K. Jung[1]

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Establishing *robotic* benchmark cut-offs

rRYGB vs. LRYGB

Table 3 Benchmark cut-offs (75th percentile of centres' median) for low-risk (benchmark) and high-risk (non-benchmark) robotic Roux-en-Y gastric bypass compared with the previously established global benchmark cut-offs for laparoscopic Roux-en-Y gastric bypass[4]

Surgical approach	Robotic		Laparoscopic
Perioperative course	Low risk ($n = 895$)	High risk ($n = 2835$)	Low risk ($n = 4120$)
Operation duration (min)	≤162	≤167	≤120
Docking time (min)	≤13.5	≤10	–
Console time (min)	≤140	≤144	–
Conversion to laparoscopic or open surgery	0	≤0.04	0
Intraoperative or postoperative blood transfusions	0	≤1	≤2
Hospital stay (days)	≤2	≤2.2	≤4
Readmission until 90 days	≤5.6	≤7.4	≤5.5

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Establishing *robotic* benchmark cut-offs

rRYGB vs. LRYGB

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Longer operation time for robotic RYGB

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Establishing *robotic* benchmark cut-offs

rRYGB vs. LRYGB

Morbidity and mortality	Until discharge		Until 30 days		Until 90 days		
	Low risk ($n = 895$)	High risk ($n = 2835$)	Low risk ($n = 895$)	High risk ($n = 2835$)	Low risk ($n = 895$)	High risk ($n = 2835$)	Laparoscopic Low risk ($n = 4120$)
Uneventful postoperative course	>97.5	>93.5	>90.3	>84	>88.2	>80	>90
Any complication	≤2.5	≤6.5	≤9.7	≤16	≤11.8	≤20	≤10
Complication CD grade II	≤1.7	≤3.7	≤4.8	≤4.9	≤5	≤6	≤4.1
Complication CD grade ≥IIIa	≤1.4	≤3.2	≤4.2	≤5.3	≤5	≤6.7	≤5.5
Reoperation (CD grade IIIb)	≤1.4	≤1.4	≤2.5	≤3.2	≤4.3	≤4	≤4
ICU admission (CD grade IV)	≤0.8	≤1.1	≤0.8	≤1.2	≤0.9	≤1.2	0
Mortality (CD grade V)	0	0	0	0	0	0	0
CCI®	0	0	0	0	0	0	0
CCI® (in patients with ≥1 CD grade ≥II complication)	≤33.73	≤39.56	≤33.73	≤39.56	≤34.81	≤39.56	≤33.73
Complications							
Anastomotic leak	≤0.8	≤0.3	≤1.4	≤1.2	≤1.4	≤1.2	≤1.3
Motility disorder	0	0	≤0.9	≤2.2	≤1.9	≤3.5	–
Postoperative bleeding	≤0.9	≤1	≤1.3	≤1.5	≤1.3	≤1.5	≤2.2
Small bowel obstruction/internal hernia	0	≤0.4	≤0.9	≤1.6	≤2.5	≤1.9	≤2.1
Wound infection	0	≤0.2	≤0.8	≤0.7	≤0.9%	≤0.9	≤0.5
Dysphagia/gastro-oesophageal reflux disease/stenosis	0	0	≤1.4	≤1.4	≤2	≤2.8	–
Abdominal or osteo-articular pain	0	0	1.3	≤1	≤1.9	≤1.5	–
Deep-vein thrombosis/pulmonary embolism	0	0	≤0.6	≤0.6	≤0.7	≤0.7	–
Marginal ulcer	0	0	≤0.1	0	≤0.4	≤1	≤1.5

Values are % unless otherwise indicated. CD, Clavien–Dindo; CCI®, comprehensive complication index.

*Giudicelli G et al., **Br J Surg** 2024 Jan 3;111(1):znad374*

Establishing *robotic* benchmark cut-offs

rRYGB vs. LRYGB

Morbidity and mortality	Until discharge		Until 30 days		Until 90 days		
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Reoperation (CD grade IIIb)	≤1.4	≤1.4	≤2.5	≤3.2	≤4.3	≤4	≤4
ICU admission (CD grade IV)	≤0.8	≤1.1	≤0.8	≤1.2	≤0.9	≤1.2	0
Mortality (CD grade V)	0	0	0	0	0	0	0
CCI®	0	0	0	0	0	0	0
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Motility disorder	0	0	≤0.9	≤2.2	≤1.9	≤3.5	–
Postoperative bleeding	≤0.9	≤1	≤1.3	≤1.5	≤1.3	≤1.5	≤2.2
Small bowel obstruction/internal hernia	0	≤0.4	≤0.9	≤1.6	≤2.5	≤1.9	≤2.1
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Dysphagia/gastro-oesophageal reflux disease/stenosis	0	0	≤1.4	≤1.4	≤2	≤2.8	–
Abdominal or osteo-articular pain	0	0	1.3	≤1	≤1.9	≤1.5	–
Deep-vein thrombosis/pulmonary embolism	0	0	≤0.6	≤0.6	≤0.7	≤0.7	–
Marginal ulcer	0	0	≤0.1	0	≤0.4	≤1	≤1.5

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Reoperation (CD grade IIIb)	≤1.4	≤1.4	≤2.5	≤3.2	≤4.3	≤4	≤4
ICU admission (CD grade IV)	≤0.8	≤1.1	≤0.8	≤1.2	≤0.9	≤1.2	0
Mortality (CD grade V)	0	0	0	0	0	0	0
CCI®	0	0	0	0	0	0	0
CCI® (in patients with ≥1 CD grade ≥II complication)	≤33.73	≤39.56	≤33.73	≤39.56	≤34.81	≤39.56	≤33.73
Complications							
Anastomotic leak	≤0.8	≤0.3	≤1.4	≤1.2	≤1.4	≤1.2	≤1.3
Motility disorder	0	0	≤0.9	≤2.2	≤1.9	≤3.5	–
Postoperative bleeding	≤0.9	≤1	≤1.3	≤1.5	≤1.3	≤1.5	≤2.2
Small bowel obstruction/internal hernia	0	≤0.4	≤0.9	≤1.6	≤2.5	≤1.9	≤2.1
Wound infection	0	≤0.2	≤0.8	≤0.7	≤0.9%	≤0.9	≤0.5
Dysphagia/gastro-oesophageal reflux disease/stenosis	0	0	≤1.4	≤1.4	≤2	≤2.8	–
Abdominal or osteo-articular pain	0	0	1.3	≤1	≤1.9	≤1.5	–
Deep-vein thrombosis/pulmonary embolism	0	0	≤0.6	≤0.6	≤0.7	≤0.7	–
Marginal ulcer	0	0	≤0.1	0	≤0.4	≤1	≤1.5

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Establishing *robotic* benchmark cut-offs

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ICU admission (CD grade IV)	≤0.8	≤1.1	≤0.8	≤1.2	≤0.9	≤1.2	0
Mortality (CD grade V)	0	0	0	0	0	0	0
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Complications							
Anastomotic leak	≤0.8	≤0.3	≤1.4	≤1.2	≤1.4	≤1.2	≤1.3
Motility disorder	0	0	≤0.9	≤2.2	≤1.9	≤3.5	–
Postoperative bleeding	≤0.9	≤1	≤1.3	≤1.5	≤1.3	≤1.5	≤2.2
Small bowel obstruction/internal hernia	0	≤0.4	≤0.9	≤1.6	≤2.5	≤1.9	≤2.1
Wound infection	0	≤0.2	≤0.8	≤0.7	≤0.9%	≤0.9	≤0.5
Dysphagia/gastro-oesophageal reflux disease/stenosis	0	0	≤1.4	≤1.4	≤2	≤2.8	–
Abdominal or osteo-articular pain	0	0	1.3	≤1	≤1.9	≤1.5	–

Outcome of robotic RYGB is non-inferior to laparoscopic RYGB

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Establishing *robotic* benchmark cut-offs

rSG vs. LSG

Table 4 Benchmark cut-offs (75th percentile of centres' median) for low-risk (benchmark) and high-risk (non-benchmark) robotic sleeve gastrectomy compared with the previously established global benchmark cut-offs for laparoscopic Roux-en-Y gastric bypass[4]

Surgical approach	Robotic		Laparoscopic
Perioperative course	Low risk ($n = 1643$)	High risk ($n = 2590$)	Low risk ($n = 1457$)
Operation duration (min)	≤89.5	≤110	≤90
Docking time (min)	≤13	≤14.5	–
Console time (min)	≤64	≤71	–
Conversion to laparoscopic or open surgery	0	0	0
Intraoperative or postoperative blood transfusions	0	≤0.2	≤1.3
Hospital stay (days)	≤2	≤2	≤3
Readmission until 90 days	≤1.8	≤3.1	≤5.5

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Establishing *robotic* benchmark cut-offs

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Conversion to laparoscopic or open surgery	0	0	0
Intraoperative or postoperative blood transfusions	0	≤0.2	≤1.3
Hospital stay (days)	≤2	≤2	≤3
Readmission until 90 days	≤1.8	≤3.1	≤5.5

Operation time for robotic SG is similar to laparoscopic SG

Giudicelli G et al., ***Br J Surg*** *2024 Jan 3;111(1):znad374*

Establishing *robotic* benchmark cut-offs

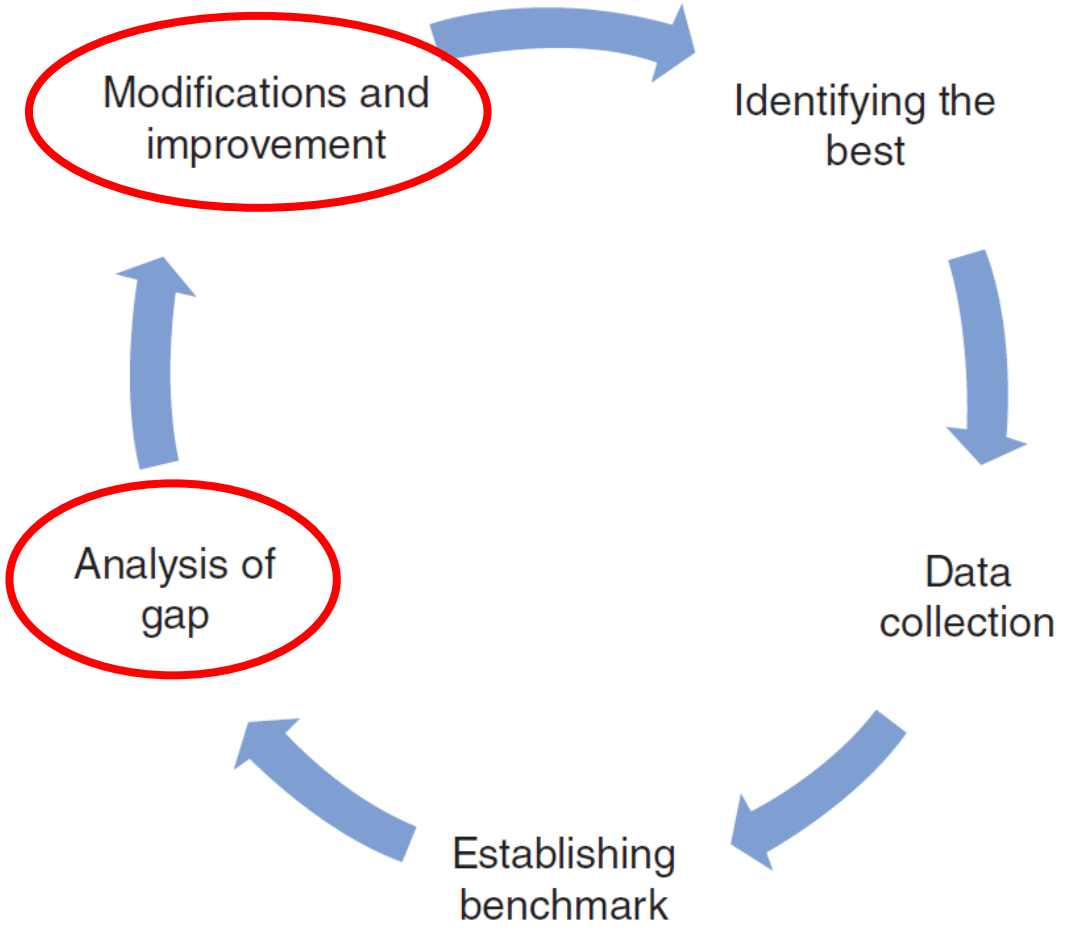
rSG vs. LSG

Morbidity and mortality	Until discharge		Until 30 days		Until 90 days		
	Low risk ($n = 1643$)	High risk ($n = 2582$)	Low risk ($n = 1643$)	High risk ($n = 2582$)	Low risk ($n = 1643$)	High risk ($n = 2582$)	Laparoscopic Low risk ($n = 1457$)
Uneventful postoperative course	>99	>96.8	>94.8	>90.8	>93.6	>90.8	>88
Any complication	≤1	≤3.2	≤5.2	≤9.2	≤6.4	≤9.2	≤12
Complication CD grade II	≤0.06	≤0.6	≤1.5	≤1.9	≤1.6	≤6.4	≤2.5
Complication CD grade ≥IIIa	≤0.06	≤0.2	≤0.4	≤2	≤1.3	≤2	≤5.5
Reoperation (CD grade IIIb)	≤0.06	≤0.08	≤0.12	≤0.8	≤1.2	≤1.7	≤3
ICU admission (CD grades IVa and IVb)	0	0	≤0.06	≤0.4	≤0.06	≤0.4	0
Mortality (CD grade V)	0	0	0	0	0	0	0
CCI®	0	0	0	0	0	0	0
CCI® (in patients with ≥1 CD grade ≥II complication)	≤36.71	≤31.85	≤36.71	≤31.85	≤36.71	≤31.85	≤33.73
Complications							
Leak at the staple line	0	0	0	≤0.7	0	≤0.8	≤0.15
Motility disorder	0	0	≤0.5	≤0.6	≤0.6	≤0.6	–
Postoperative bleeding	0	≤0.2	≤0.2	≤0.4	≤0.2	≤0.4	≤1.7
Small bowel obstruction/internal hernia	0	0	0	0	0	0	0
Wound infection	0	0	≤0.5	≤0.1	≤0.6	≤0.3	0
Dysphagia/gastro-oesophageal reflux disease/ stenosis	0	0	0	≤1.6	0	≤2.5	≤0.27

Outcome of robotic SG is non-inferior to laparoscopic SG

*Giudicelli G et al., **Br J Surg** 2024 Jan 3;111(1):znad374*

Benchmark Cycle: Future steps



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How to use benchmarks cut-offs?

Other applications

M&M conferences

Teaching cases

Summary & Conclusion

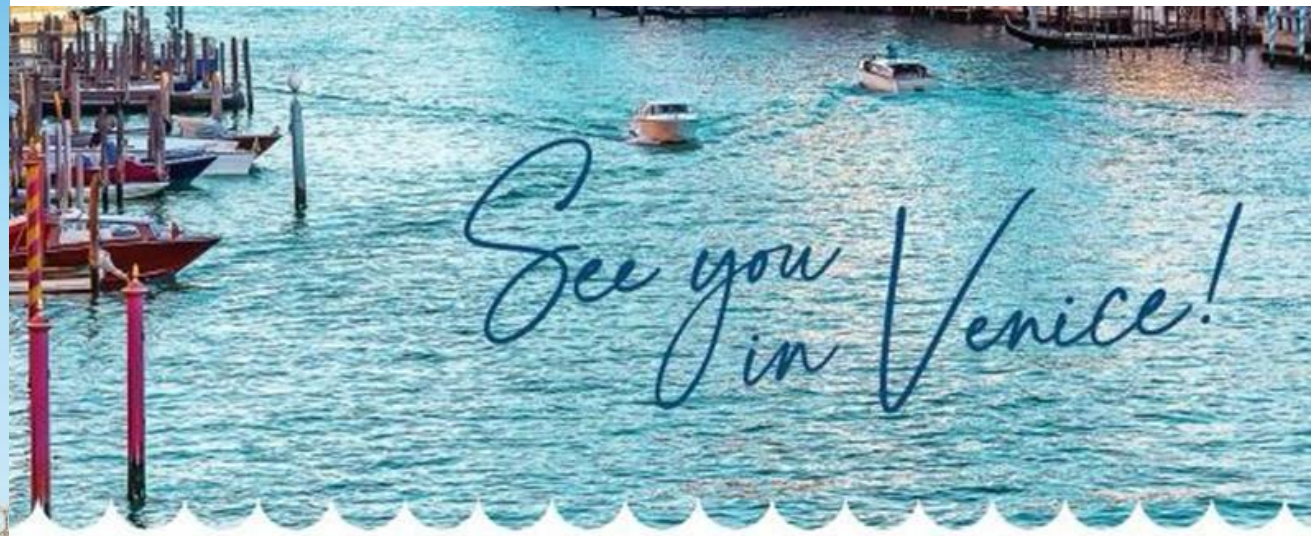
The concept of Benchmarking

- can be applied in primary & revisional, laparoscopic and robotic Bariatric Surgery
- identifies best achievable results in primary and revisional Bariatric Surgery in a well-defined low risk population
- allows to rate and compare surgical performance between surgeons, centers & techniques

IFSO

13th Congress of the International Federation for the Surgery of Obesity (IFSO) European Chapter

15-17 May 2025 | Venice, Italy



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Thank you very much!