# Validation of the SF-BARI Score

## With registry data from Northern-Europe

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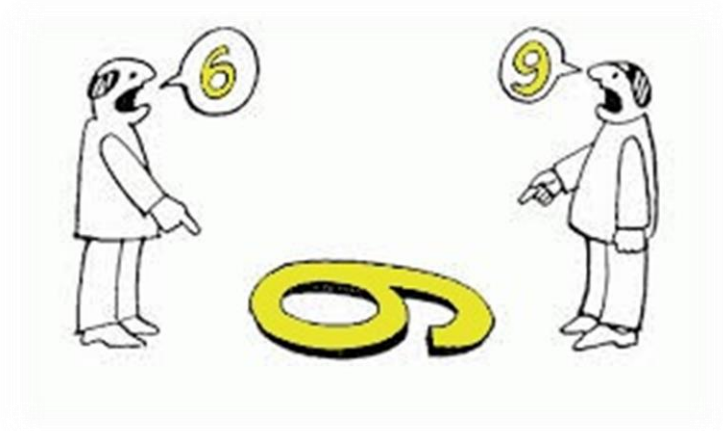
### Categorization of score

| Response | SF-BARI Score | SF-BARI Score QOL |
|---|---|---|
| Excellent | ≥ 135 | ≥ 150 |
| Very good | 110 to <135 | 125 to <150 |
| Good | 70 to < 110 | 75 to <125 |
| Fair | 35 to < 70 | 40 to <75 |
| Suboptimal | < 35 | < 40 |

**No conflicts of interest**



# Background

- A need to compare results
- Many important outcomes after MBS
- High weight loss ≠ best procedure
- BAROS score?
  - Old (1998)
  - %EWL (categorized)
  - Unclear definitions

NOT FEASIBLE

**BAROS Score**

| Weight Loss<br>% of Excess Wt.<br>or<br>% of Excess BMI<br>(POINTS) | Medical Conditions (POINTS) | Moorehead-Ardelt<br>QUALITY OF LIFE QUESTIONNAIRE II |
|---|---|---|
| Weight Gain (-1) | Aggravated (-1) | MOOREHEAD - ARDELT QUALITY OF LIFE QUESTIONNAIRE<br>SELF ESTEEM, AND ACTIVITY LEVELS<br>*Please make a check in the box provided to show your answer.*<br>1. Usually I Feel... (Very Badly About Myself / Very Good About Myself)<br>2. I Enjoy Physical Activities... (Not At All / Very Much)<br>3. I Have Satisfactory Social Contacts... (None / Very Many)<br>4. I Am Able to Work... (Not At All / Very Much)<br>5. The Pleasure I get Out Of Sex Is... (Not At All / Very Much)<br>6. The Way I Approach Food Is... (I Live to Eat / I Eat to Live) |
| 0 – 24 (0) | Unchanged (0) | |
| 25 – [illegible] (1) | Improv[illegible] (1) | |
| [illegible] – 74 (2) | [illegible]najor resolved<br>Others improved (2) | |
| 75 – 100 (3) | All major resolved<br>Others improved (3) | |
| SUB TOTAL | SUB TOTAL | SUB TOTAL |

COMPLICATIONS:
Minor: Deduct 0.2 point
Major: Deduct 1 point

REOPERATION:
Deduct 1 point

TOTAL SCORE

OUTCOMES GROUP SCORING

| | |
|---|---|
| Failure | ≤ 1 |
| Fair | > 1 to 3 points |
| Good | > 3 to 5 points |
| Very Good | > 5 to 7 points |
| Excellent | > 7 to 9 points |

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# Background

Research

JAMA Surgery | Original Investigation

## Standardized Assessment of Metabolic Bariatric Surgery Outcomes
Secondary Analysis of 2 Randomized Clinical Trials

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# Background (SF-BARI Score)

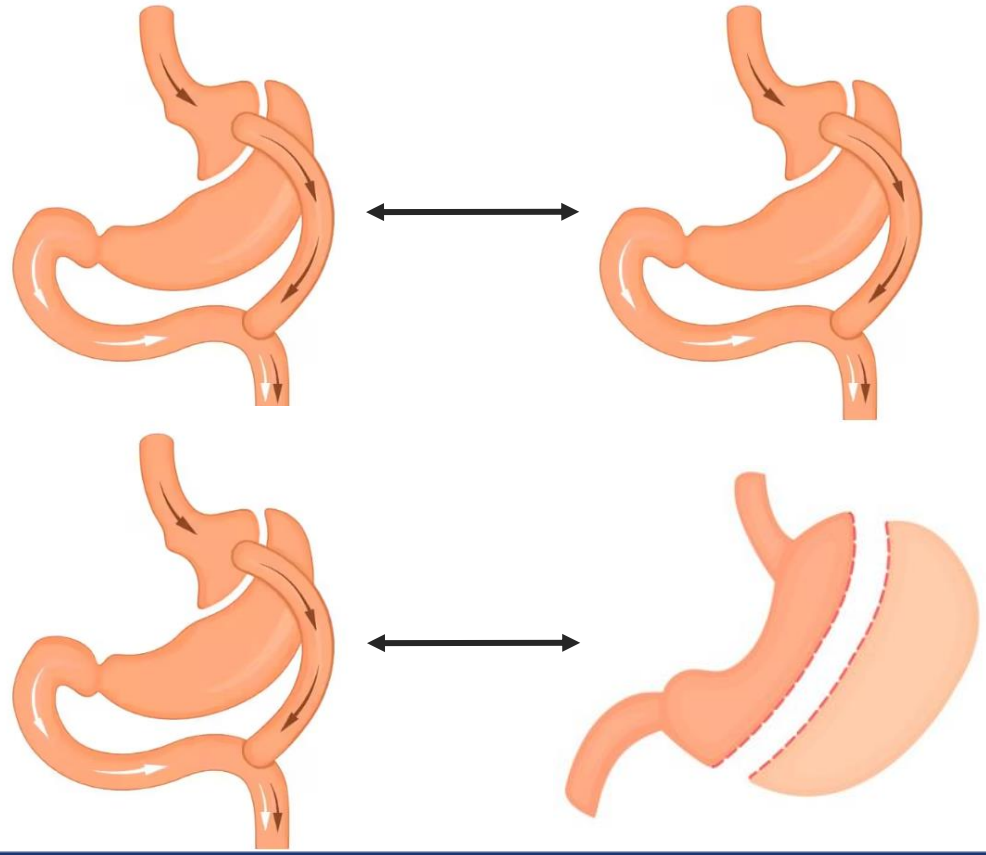
- **Composite Outcome measure**
  - %TWL
  - Comorbidity improvement
  - Complications
  - Quality of life (optional)
- Based on results from SLEEVEPASS and SM-BOSS

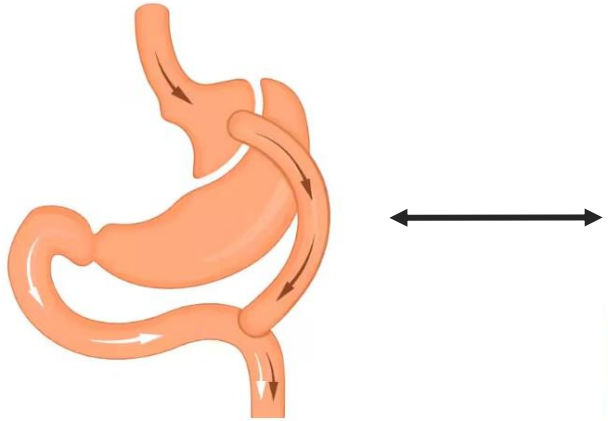
Table 2. Range of Scores by Main Outcome Areas and Categories of SF-BARI Score and SF-BARI Score QOL

| Outcome | Score range |
|---|---|
| SF-BARI Score | |
| Weight loss | −20 to 130 |
| Comorbidities | −30 to 70 |
| Complications | −50 to 0 |
| QOL | −30 to 30 |
| Total score | −100 to 200 |
| Response | |
| Excellent response | ≥135 |
| Very good response | 110 to <135 |
| Good response | 70 to <110 |
| Fair response | 35 to <70 |
| Suboptimal response | <35 |

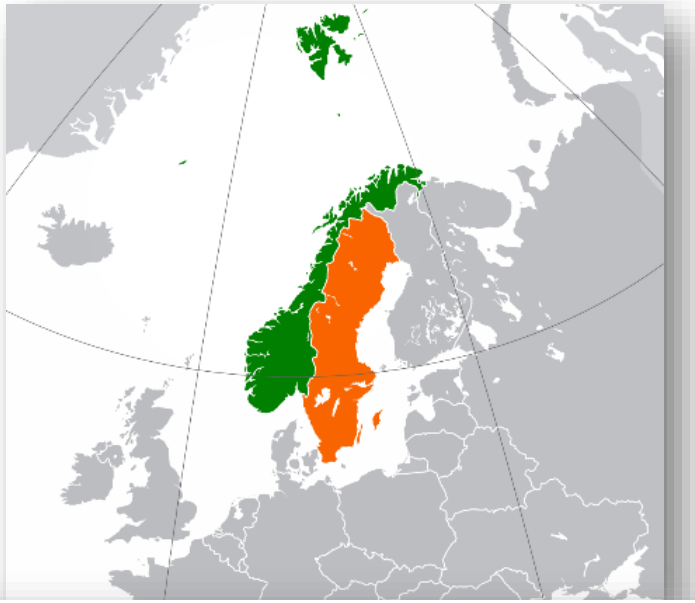
# Background

> Comparison between different treatment strategies





# Patient selection

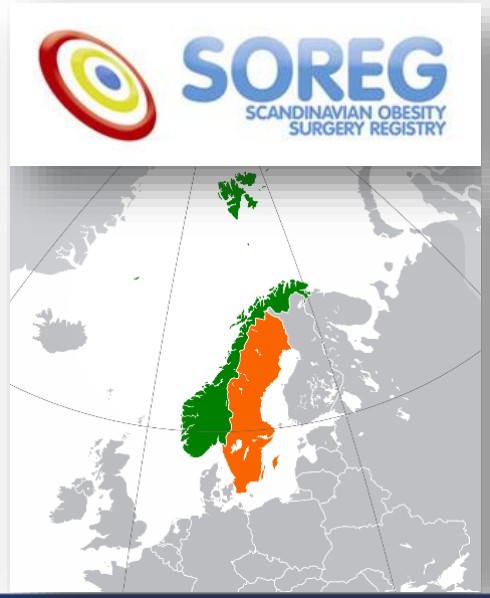



SOREG
SCANDINAVIAN OBESITY SURGERY REGISTRY

DICA DATO
Dutch Audit for Treatment of Obesity

# Patient selection

- Primary surgery
- Registered weight at 1 and 5 years
- Availability of all baseline characteristics incl. comorbidity status
- Availability of comorbidity status during follow-up (1 and 5 years)




- **SOReg-S** (Sweden)
  - N = 10,662
- **SOReg-N** (Norway)
  - N = 3,834

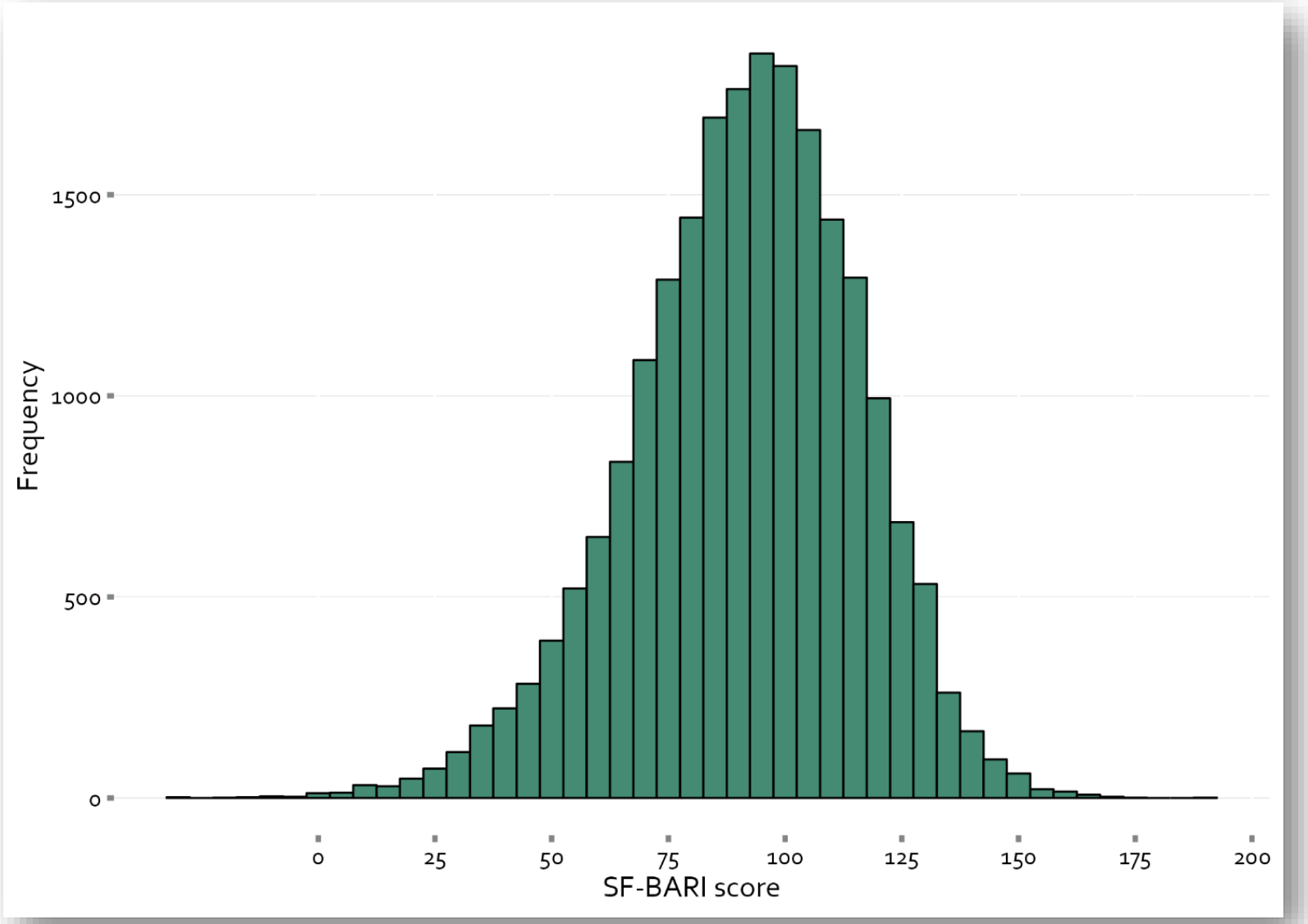

- **DATO** (the Netherlands)
  - N = 7,109

# Baseline characteristics

| | | Merged registries | Merged RCTs |
|---|---|---|---|
| n | | 21,605 | 457 |
| Age (mean (SD)) | | 43.7 (11.1) | 45.6 (10.7) |
| Sex (n, %) | Male | 4,514 (20.9) | 134 (29.3) |
| | Female | 17,091 (79.1) | 323 (70.7) |
| Operation (n, %) | Sleeve gastrectomy | 4,528 (21.0) | 228 (49.9) |
| | Roux-en-Y GB | 16,071 (74.4) | 229 (50.1) |
| | Other | 1,006 (4.7) | na |
| Weight (mean (SD)) | | 121.1 (19.7) | 131.6 (23.5) |
| BMI (mean (SD)) | | 42.3 (5.2) | 46.0 (6.6) |
| Diabetes baseline (n, %) | | 3,604 (16.7) | 155 (33.9) |
| Hypertension baseline (n, %) | | 6,577 (30.4) | 293 (64.1) |
| Dyslipidemia baseline (n, %) | | 2,962 (13.7) | 208 (45.5) |
| OSAS baseline (n, %) | | 2,599 (12.0) | 161 (35.2) |

x2!!

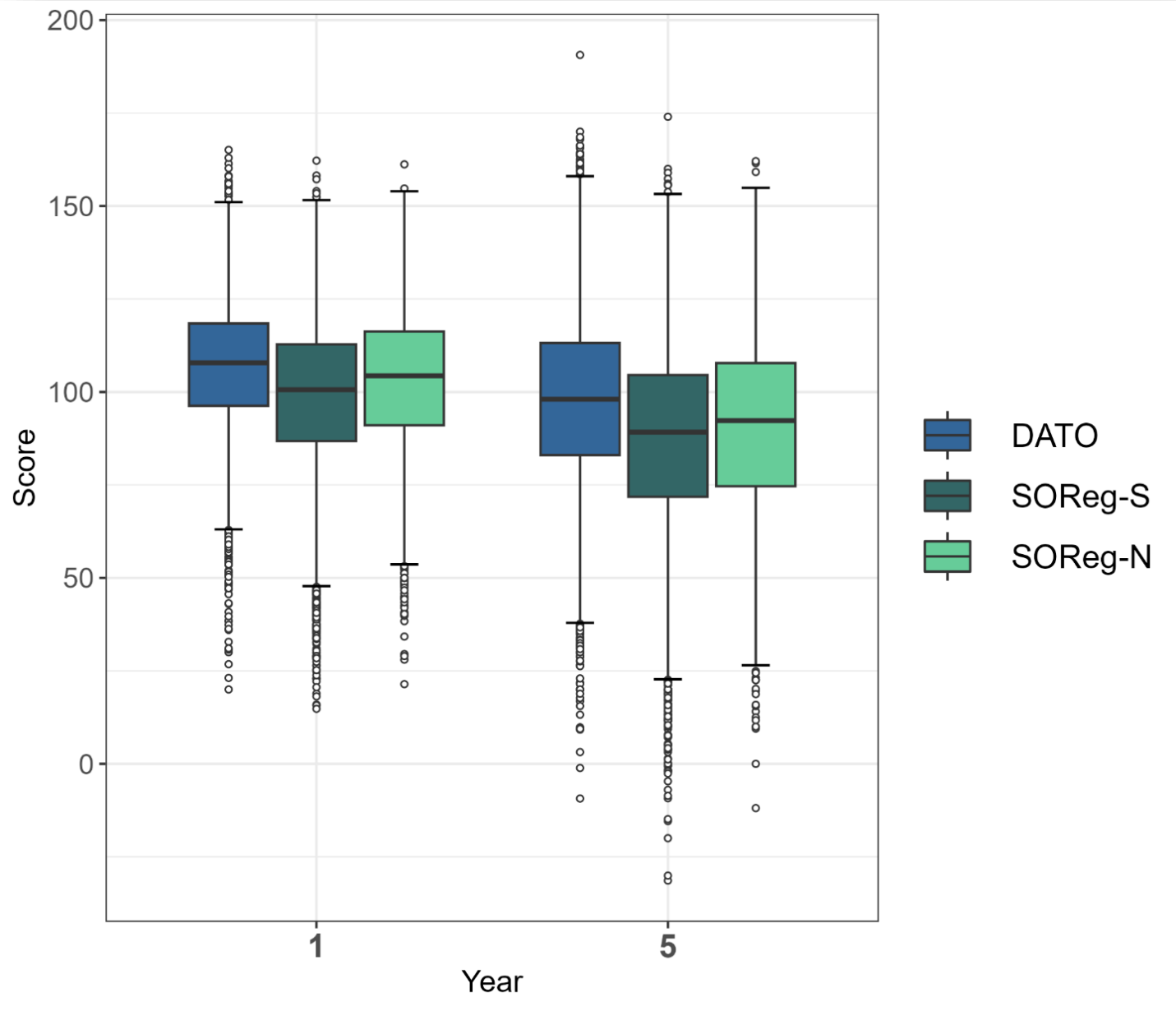
# Results


1500
1000
500
0
Frequency
0
25
50
75
100
125
150
175
200
SF-BARI score

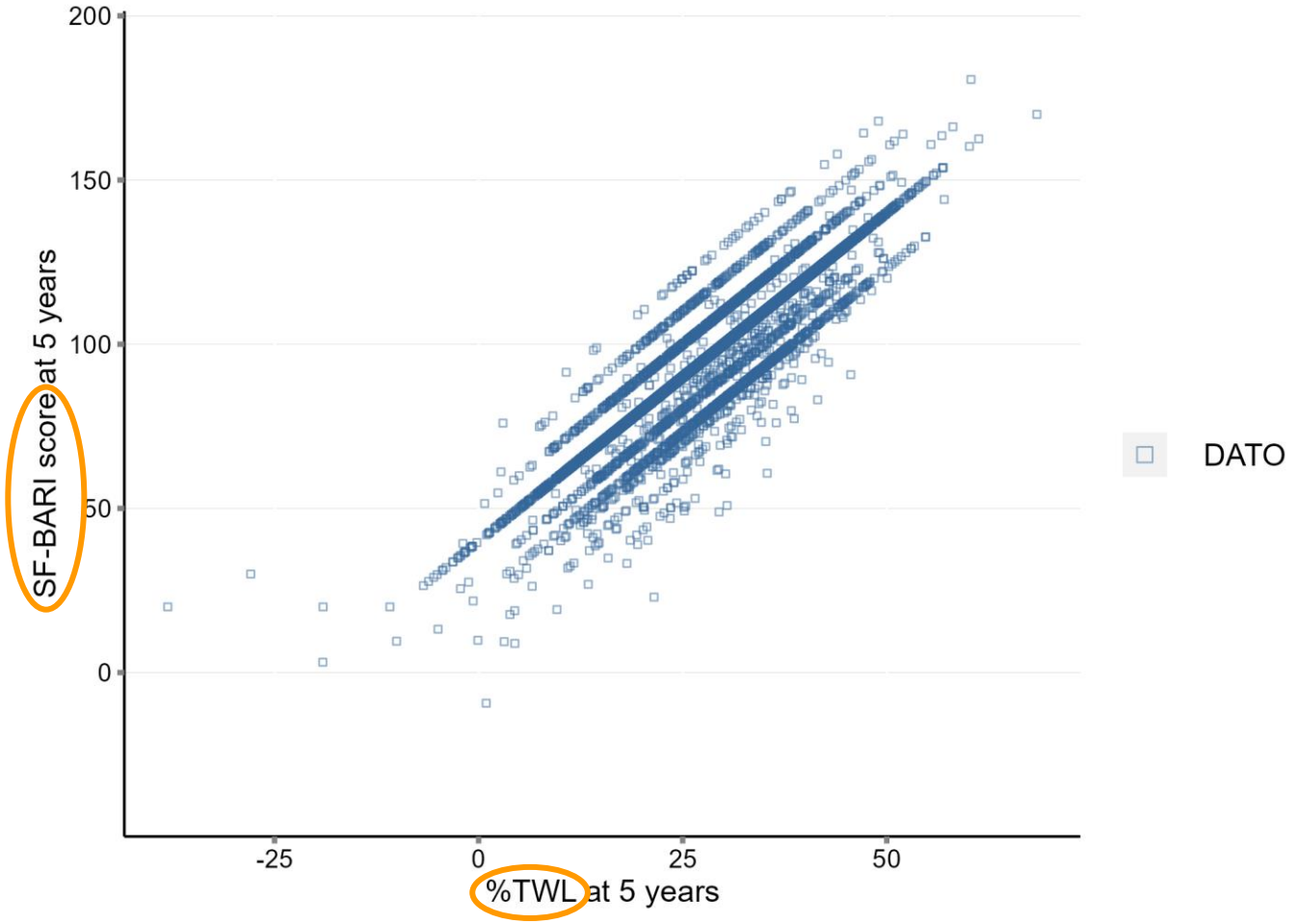
# Results

| | Merged registries | | Merged RCTs | |
|---|---|---|---|---|
| | 1 year | 5 years | 1 year | 5 years |
| n | 21,605 | 21,605 | 435 | 398 |
| SF-BARI Score (mean (SD)) | 101.9 (19.1) | 90.9 (24.1) | 93.0 (21.9) | 89.1 (29.0) |
| Category (n, %) | | | | |
| Suboptimal (<35) | 54 (0.2) | **415 (1.9)** | 6 (1.4) | **20 (5.0)** |
| Fair (35 to <70) | 1,215 (5.6) | **3,529 (16.3)** | 58 (13.3) | **81 (20.4)** |
| Good (70 to <110) | 12,569 (58.2) | **12,965 (60.0)** | 276 (63.5) | **194 (48.7)** |
| Very good (110 to <135) | 7,229 (33.5) | **4,253 (19.7)** | 85 (19.5) | **84 (21.1)** |
| Excellent (≥135) | 538 (2.5) | **443 (2.1)** | 10 (2.3) | **19 (4.8)** |
| Percentiles (%) | | | | |
| 5th | 67.8 | **48.3** | 55.1 | **35.0** |
| 25th | 90.6 | **76.0** | 79.0 | **69.9** |
| 75th | 115.2 | **107.6** | 107.0 | **110.6** |
| 95th | 130.0 | **127.5** | 127.0 | **134.8** |
| %TWL (mean (SD)) | 32.0 (7.7) | 27.7 (9.9) | 29.7 (8.0) | 25.8 (10.7) |

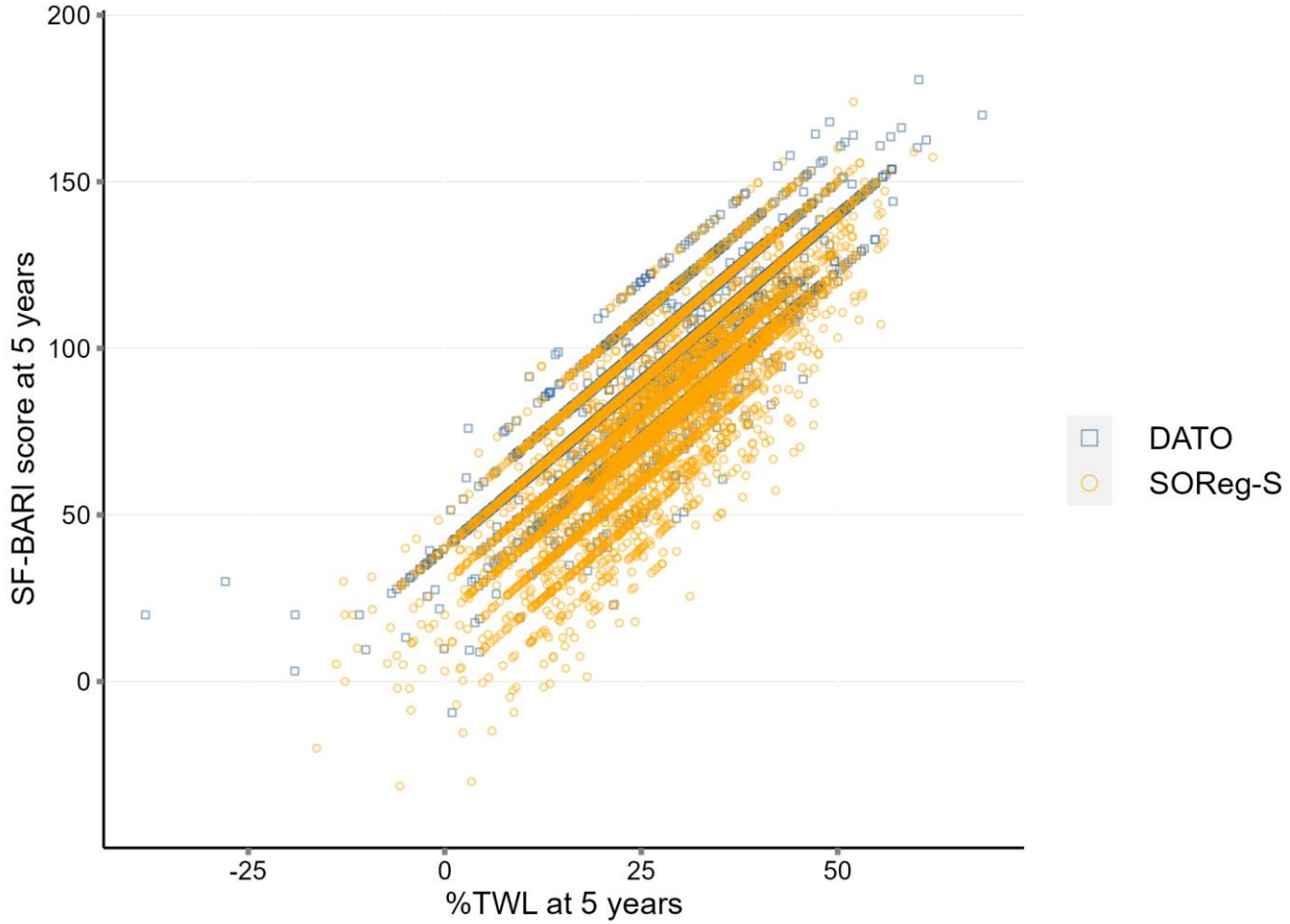
# Results



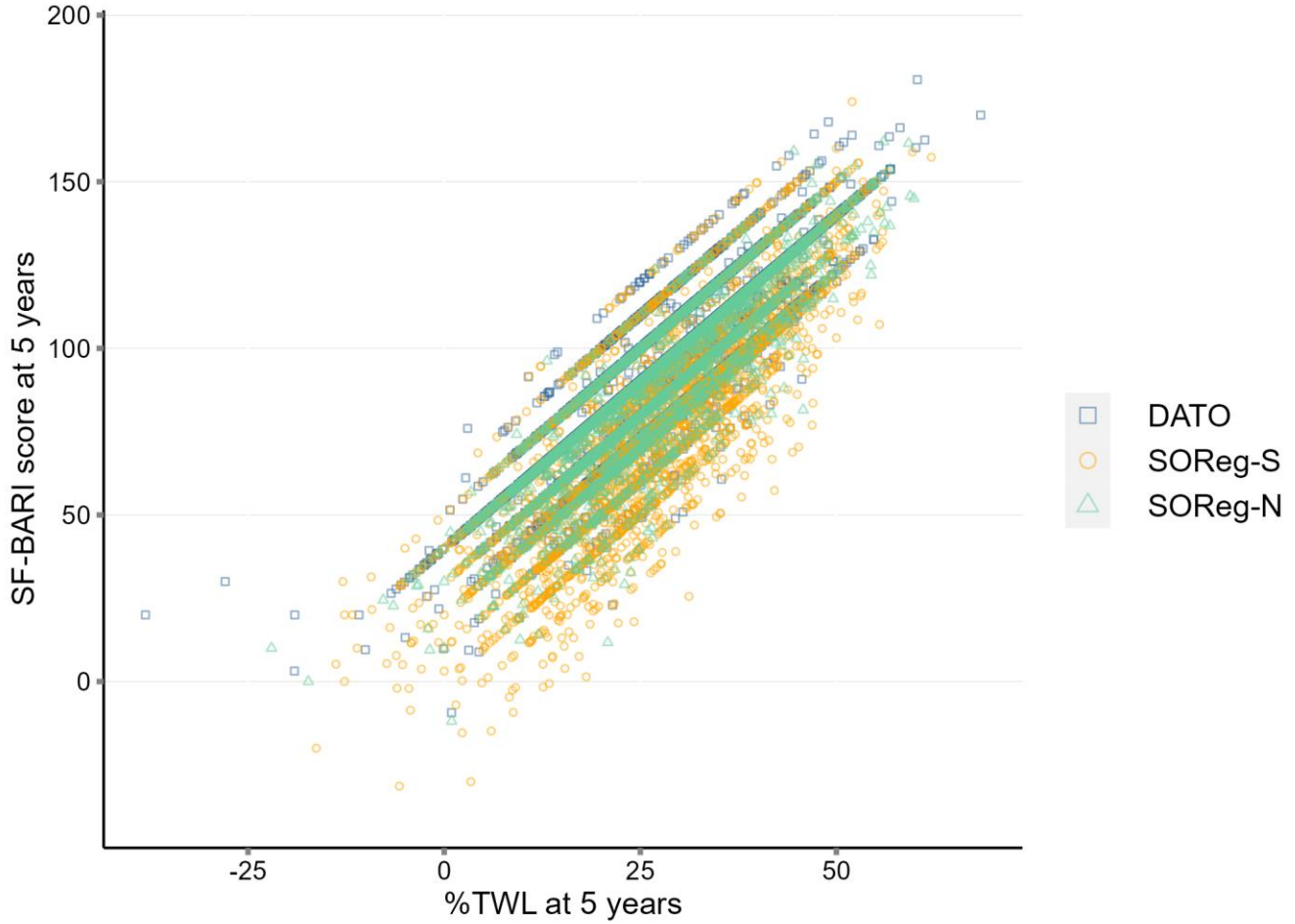
# Results


200
150
100
50
0
SF-BARI score at 5 years
-25
0
25
50
%TWL at 5 years
DATO

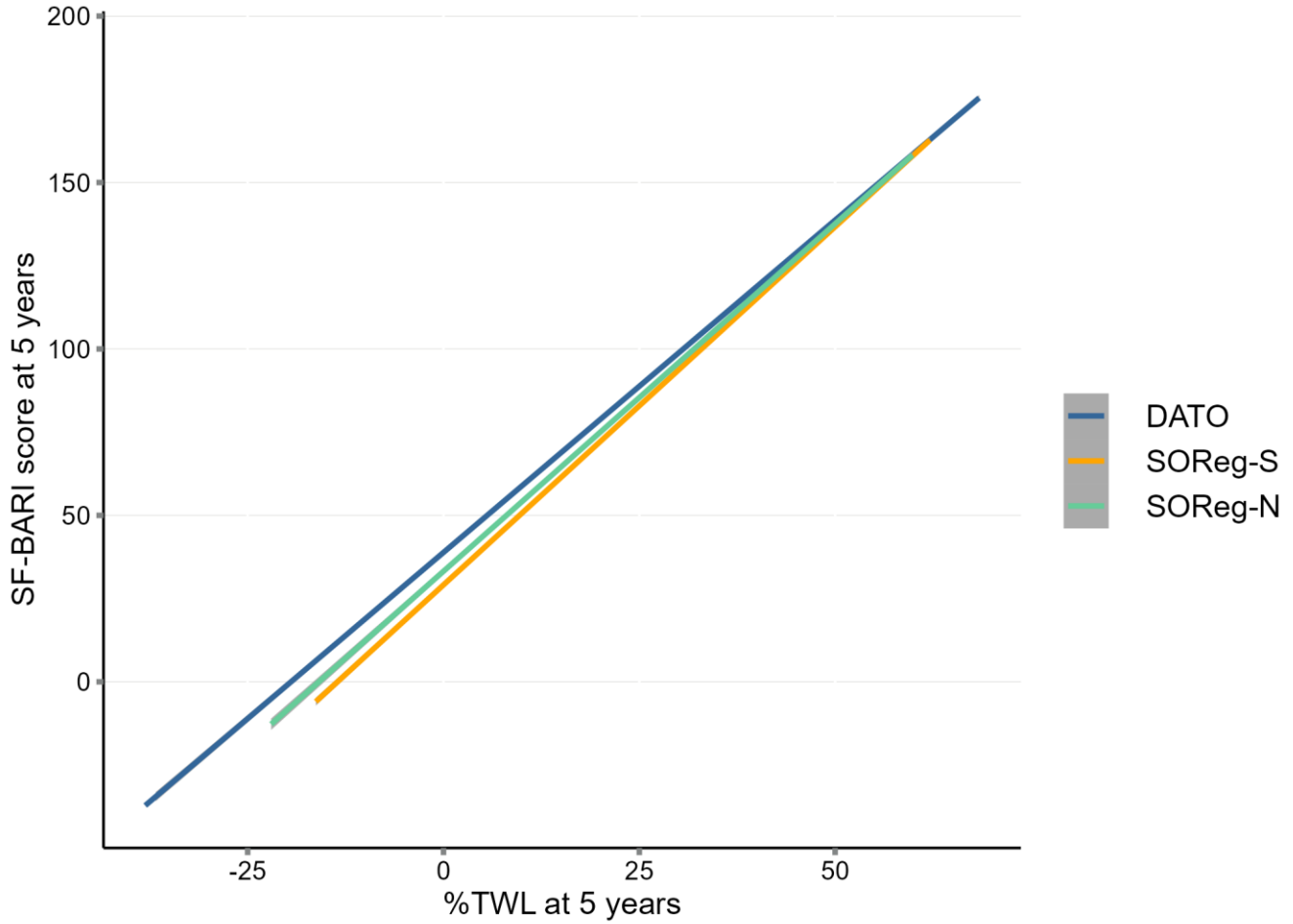
# Results


200
150
100
50
0
SF-BARI score at 5 years
-25
0
25
50
%TWL at 5 years
DATO
SOReg-S

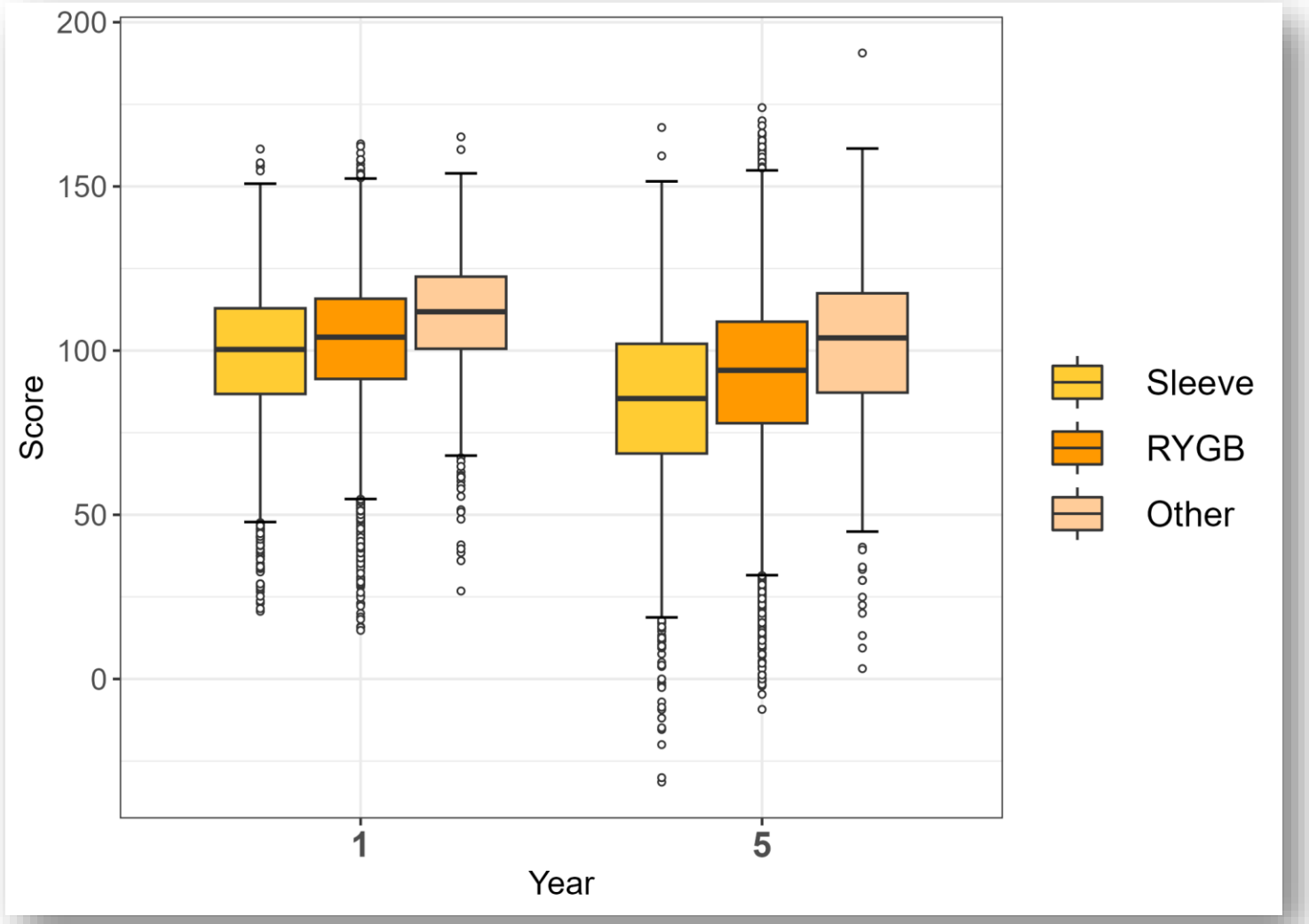
# Results


200
150
100
50
0
SF-BARI score at 5 years
-25
0
25
50
%TWL at 5 years
DATO
SOReg-S
SOReg-N

# Results


200
150
100
50
0
SF-BARI score at 5 years
-25
0
25
50
%TWL at 5 years
DATO
SOReg-S
SOReg-N

# Type of surgery



# Multivariable linear regression analysis

| | | Beta | 95% CI | p-value |
|---|---|---|---|---|
| **Registry** | | | | |
| | *DATO* | ***Ref.*** | | *< 0.01* |
| | *SOReg-S* | **-8.7** | -9.4, -7.9 | |
| | *SOReg-N* | **-1.6** | -2.5, -0.62 | |
| **Operation** | | | | |
| | *Sleeve* | ***Ref.*** | | *< 0.01* |
| | *RYGB* | **12** | 11, 12 | |
| | *Other* | **15** | 13, 16 | |
| **Sex** | | | | |
| | *Male* | ***Ref.*** | | *< 0.01* |
| | *Female* | **4.0** | 3.2, 4.8 | |
| **Age** | | **-0.21** | -0.24, -0.18 | *< 0.01* |
| **BMI** | | **0.53** | 0.47, 0.59 | *< 0.01* |
| **T2D** | | **-5.5** | -6.4, -4.5 | *< 0.01* |
| **Hypertension** | | **0.7** | -0.1, 1.5 | *0.09* |
| **Dyslipidemia** | | **-1.4** | -2.5, -0.4 | *0.01* |
| **OSAS** | | **-3.3** | -4.3, -2.3 | *< 0.01* |

# Discussion

**Conclusion**:

- Validation showed comparable distribution of SF-BARI Score in external cohort
  → the RCT-based score is applicable to real-world data

- SF-BARI Score is only slightly influenced by baseline characteristics and therefore applicable in all patients

# Discussion

**Next step**:

- Inclusion of PROMs in next validation (SF-BARI Score QoL)

**Take home message**:

- Research: → Reporting the SF-BARI Score in MBS research would aid in comparing outcomes
  → Also between different treatment modalities
- Clinical setting: → Positive reinforcement for patients who are not satisfied with their outcome

→ **Start implementing the SF-BARI Score**

# SF-BARI Score

Swiss-Finnish Bariatric Metabolic Outcome Score

**Special thanks to the contributors**

Erik Stenberg
Johan Ottosson
Villy Våge
Hannu Sakari Lyyjynen
Simon Nienhuijs
Ronald Liem
Ralph Peterli
Marco Bueter
Paulina Salminen
Saija Hurme
Sofia Grönroos
Floris Bruinsma
And many more...

https://sites.utu.fi/sfbariscore/

# Appendix

# Supplement

| | | DATO | SOReg-S | SOReg-N | *P-value* |
|---|---|---|---|---|---|
| **n** | | **7,109** | **10,662** | **3,834** | |
| **Age (mean (SD))** | | 43.6 (11.1) | 44.0 (11.1) | 43.1 (10.9) | *< 0.01* |
| **Sex (n, %)** | **Male** | 1,144 (16.1) | 2,472 (23.2) | 898 (23.4) | *< 0.01* |
| | **Female** | 5,965 (83.9) | 8,190 (76.8) | 2,936 (76.6) | |
| **Type of surgery (n, %)** | **Sleeve gastrectomy** | 1,376 (19.4) | 1,144 (10.7) | 2,008 (52.4) | *< 0.01* |
| | **Roux-en-Y GB** | 4,855 (68.3) | 9,518 (89.3) | 1,698 (44.3) | |
| | **Other** | 878 (12.4) | 0 (0.0) | 128 (3.3) | |
| **Weight (mean (SD))** | | 123.1 (18.8) | 118.8 (19.9) | 123.8 (20.3) | *< 0.01* |
| **BMI (mean (SD))** | | 43.1 (5.1) | 41.7 (5.1) | 42.9 (5.3) | *< 0.01* |
| **Diabetes baseline (n, %)** | | 734 (10.3) | 2,329 (21.8) | 541 (14.1) | *< 0.01* |
| **Hypertension baseline (n, %)** | | 1,367 (19.2) | 4,049 (38.0) | 1,161 (30.3) | *< 0.01* |
| **Dyslipidemia baseline (n, %)** | | 569 (8.0) | 1,848 (17.3) | 545 (14.2) | *< 0.01* |
| **OSAS baseline (n, %)** | | 493 (6.9) | 1,440 (13.5) | 666 (17.4) | *< 0.01* |

# Supplement – Clavien-Dindo modification

**eTable 1. The Clavien-Dindo Classification – modified for complications / adverse events after use of anti-obesity medications (AOMs, e.g., GLP-1R analogues)**

The basis of this classification is the required therapy used to correct the specific complication / adverse event in order to rank the complication / adverse event in an objective and reproducible manner comparable to the Clavien-Dindo classification for surgical complications.

It consists of 7 grades (I, II, IIIa, IIIb, IVa, IVb and V). The introduction of the subclasses a and b allows a contraction of the classification into 5 grades (I, II, III, IV and V) depending on the size of the population observed or the of the focus of a study.

| Grade | Definition |
|---|---|
| **Grade I** | Any deviation from the normal course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions. Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics and electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside.<br><br>**EXAMPLE:** ***Gastrointestinal disorders symptoms, e.g., nausea, diarrhea, vomiting, constipation, abdominal pain, and dyspepsia[1] or headache[2].*** |
| **Grade II** | Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.<br><br>**EXAMPLE(S):** ***(1) anaphylactic reactions or skin side effects at the injection site such as pruritus, urticaria, and angioneurotic edema requiring systemic antihistamine treatment[a] (2) antibiotic treatment due to upper respiratory and urinary tract infections such as nasopharyngitis, influenza, cystitis, and viral infection[a,b,c]*** |
| **Grade III** | Requiring surgical, endoscopic or radiological intervention |
| **IIIa** | Intervention not under general anesthesia<br><br>**EXAMPLE:** ***ERCP due to cholangitis/ common bile duct stones due to AOM induced sudden weight loss[3]*** |
| **IIIb** | Intervention under general anesthesia<br><br>**EXAMPLE(S):** ***(1) cholecystectomy due to acute cholecystitis following gallstones due to AOM induced sudden weight loss[3], (2) necrosectomy due severe acute pancreatitis caused by either AOM or biliary pancreatitis due to common bile duct stones after AOM induced sudden weight loss[4]*** |

# Supplement – Clavien-Dindo modification

| Grade | Definition |
|---|---|
| IVa | single organ dysfunction (including dialysis) |
| | **EXAMPLE:** ***acute kidney injury/ pre-renal acute failure due to AOM induced nausea and vomiting, decreased fluid intake, and significant loss of fluids***[5,6] |
| IVb | Multiorgandysfunction |
| | **EXAMPLE:** ***septic shock due to severe acute necrotic pancreatitis with pulmonary, hepatic and kidney failure requiring organ—replacement therapy*** |
| Grade V | Death of a patient |
| | **No example needed.** |

# ICHOM core set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# ICHOM core set

Completed

The ICHOM Set of Patient-Centered Outcome Measures for Adults living with Obesity is the result of hard work by a group of leading physicians, measurement experts and patients. It is our recommendation of the outcomes that matter most to patients living with Obesity. We urge all providers around the world to start measuring these outcomes to better understand how to improve the lives of their patients.

1. The EQ-5D-5L measuring generic quality of life, mental health, pain, energy levels, and daily function.
2. The BODY-Q Obesity Modules measuring social function, dietary behavior, sexual function, physical function, and psychological function.
3. The STOP-BANG Questionnaire measuring sleep
4. Cardiometabolic Risk including blood pressure, glycemic control, lipids, hepatic parameters, and renal function
5. Anthropometrics including height, weight, and waist circumference
6. Nutritional Status including Vitamin D, Vitamin B12, Ferritin, and Folic Acid
7. Sarcopenia measured with grip strength via a hand dynamometer
8. Surgical Complications captured with the Clavien-Dindo Classification System
9. Obstetric & Gynecological Outcomes including fertility, menstruation irregularities, and pregnancy-related outcomes