Establishing a prediction model for perioperative complications of single-port laparoscopic sleeve gastrectomy (SPLSG)

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No Disclosure

2024年

Worldwide trends in underweight and obesity from 1990 to 2022: a pooled analysis of 3663 population-representative studies with 222 million children, adolescents, and adults

*NCD Risk Factor Collaboration (NCD-RisC)**

THE LANCET

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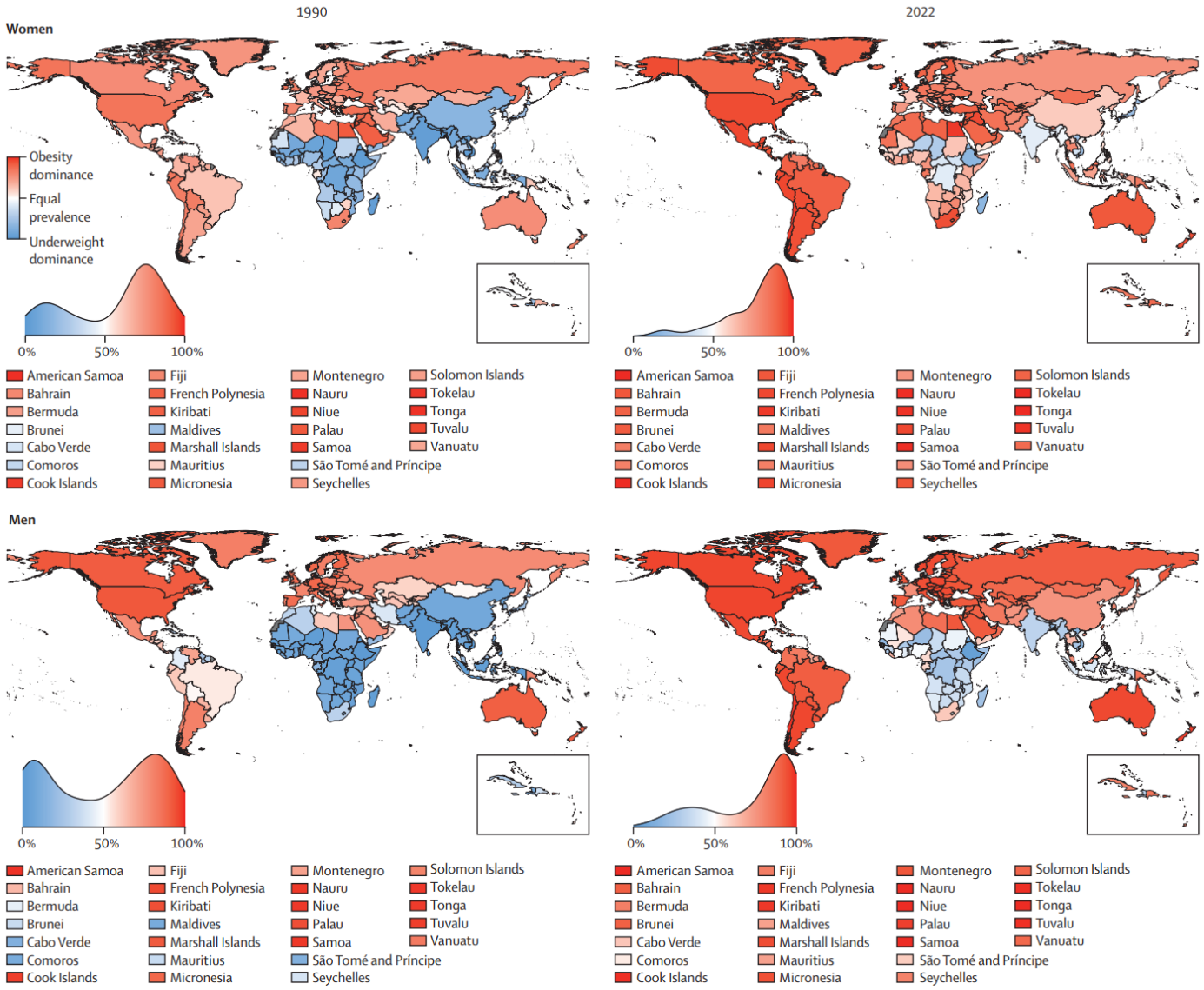
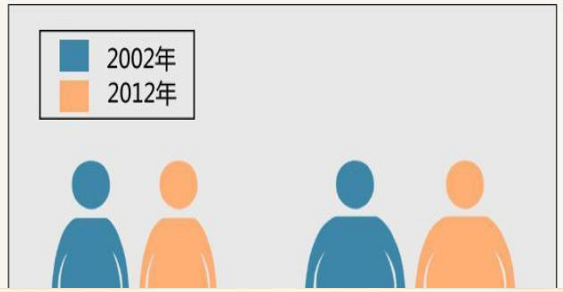


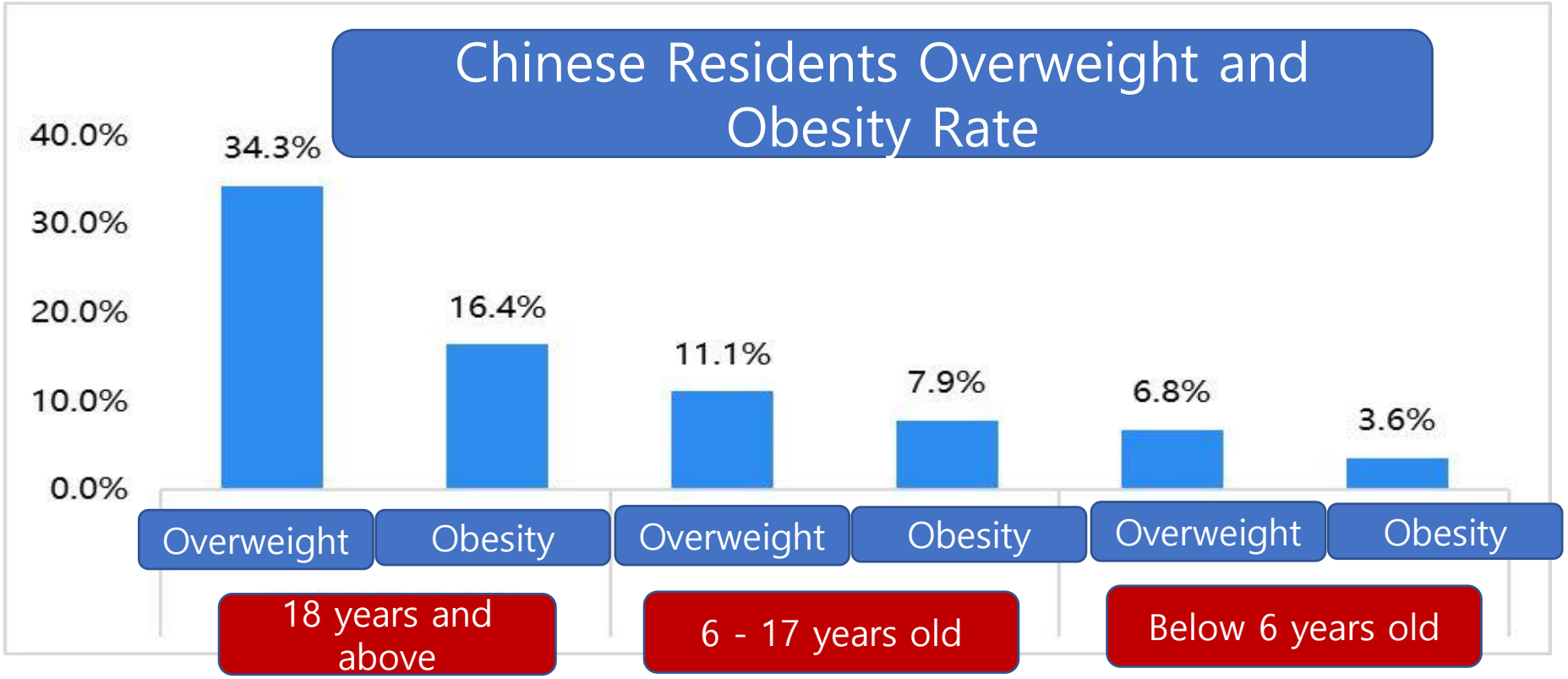
《中国居民营养与慢性病状况报告》
(2020)



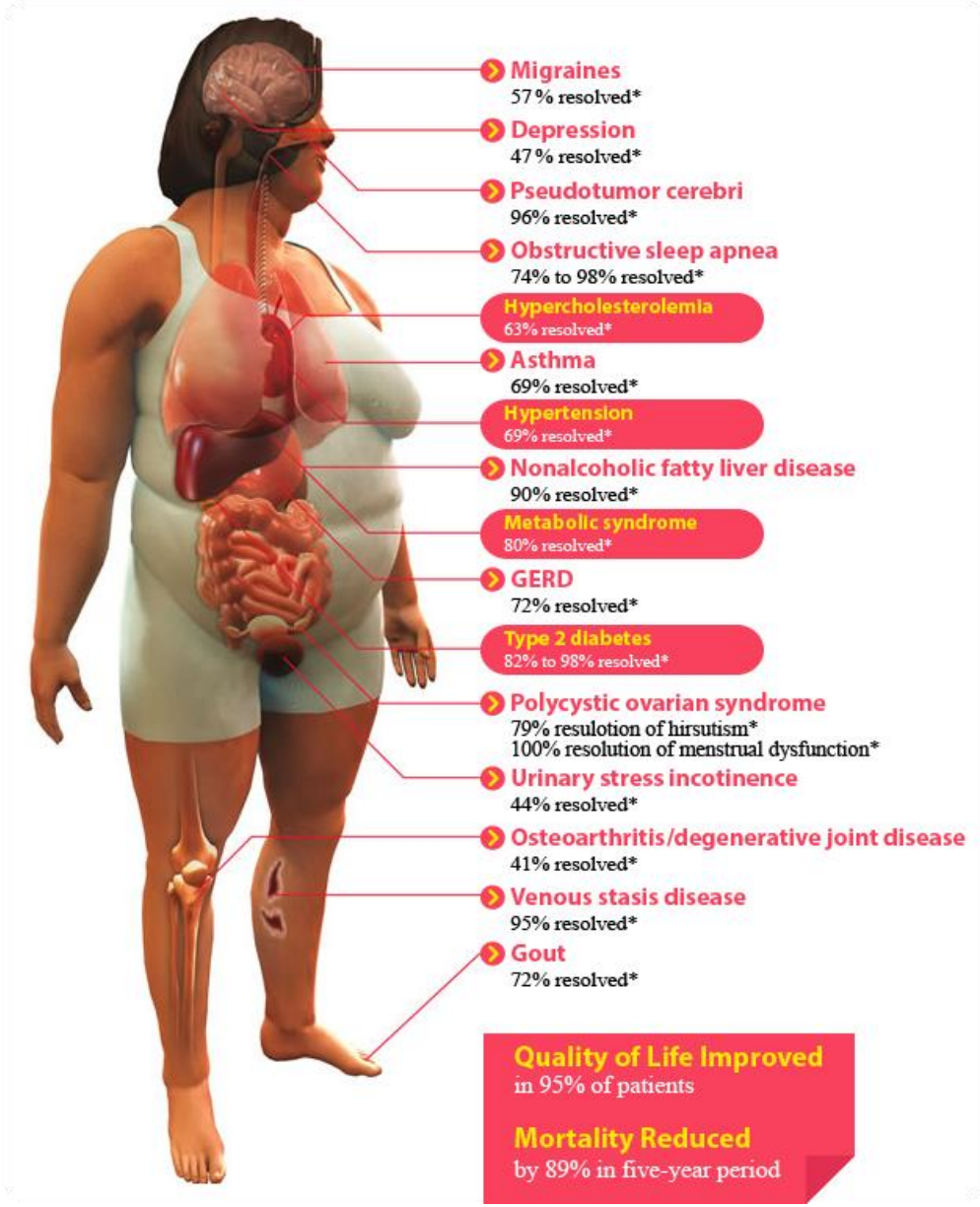
China

Report on the Nutrition Status of Chinese Residents (2020)

Chinese Residents Overweight and Obesity Rate

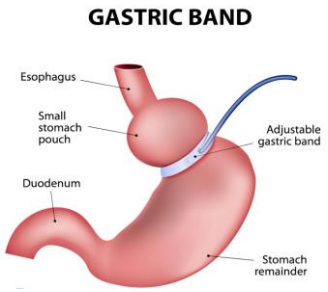


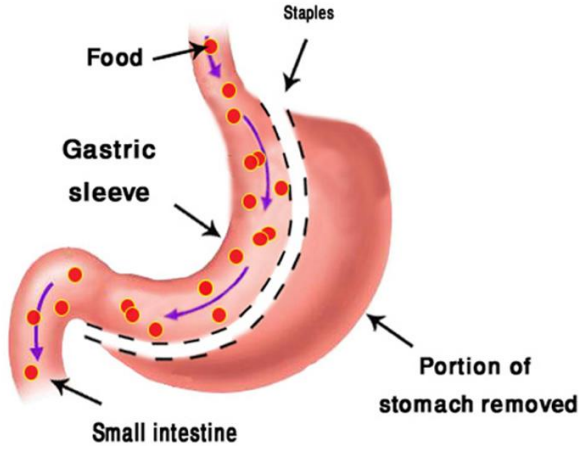
Pan XF, Wang LM, Pan A. Epidemiology and determinants of obesity in China. Lancet Diabetes Endocrinol,2021,9(6):373-392.

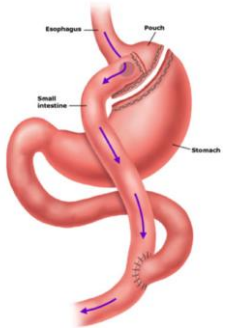


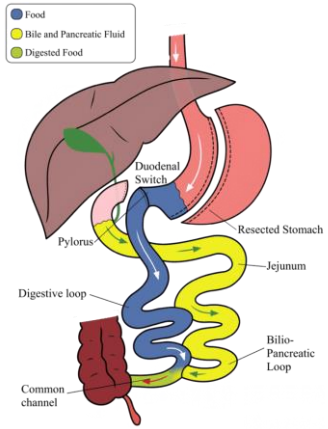
Metabolic and Bariatric Surgery

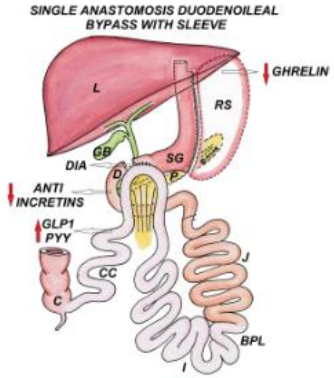
CSMBS approved procedures

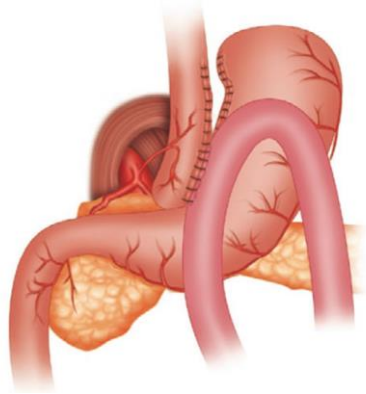




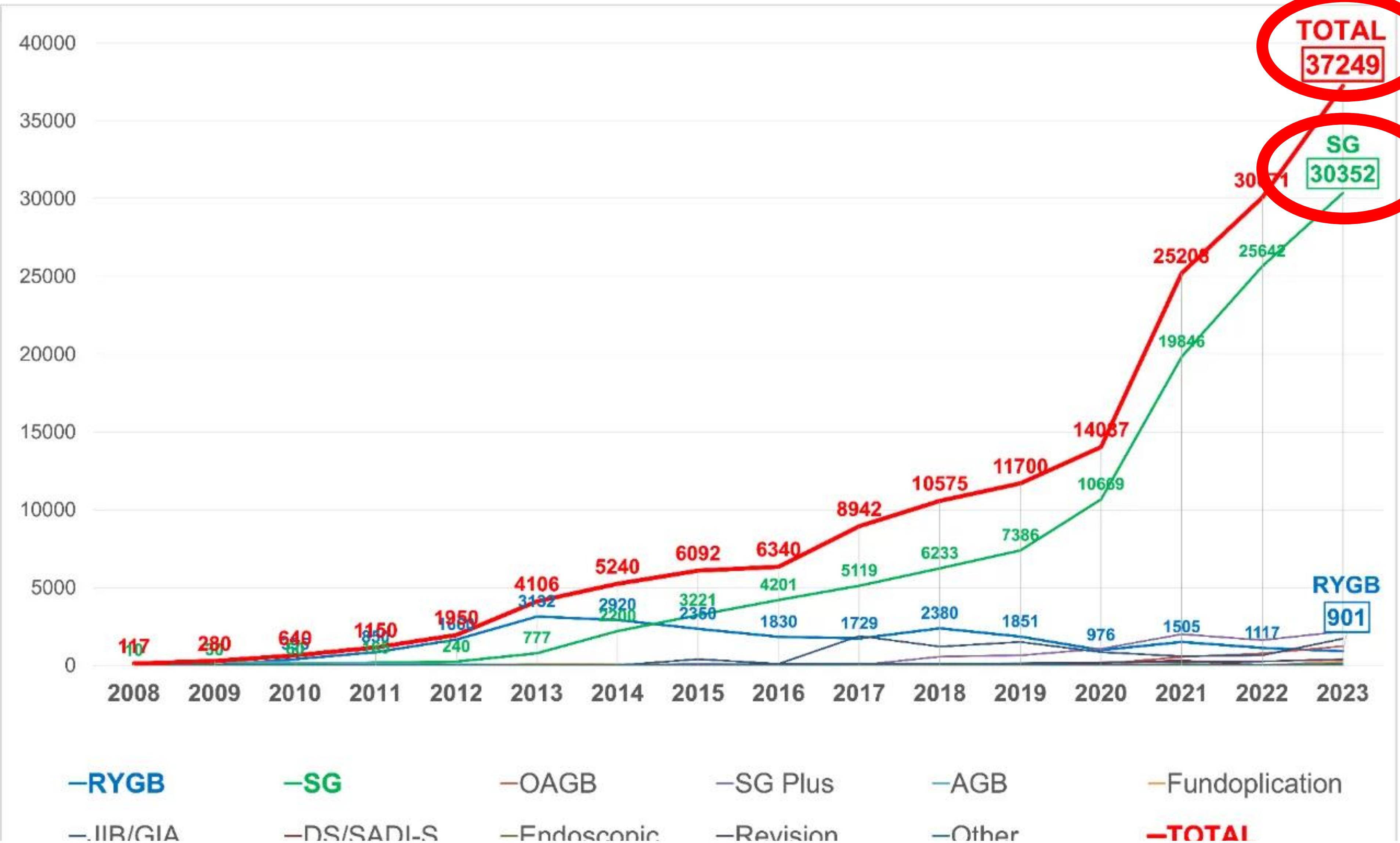




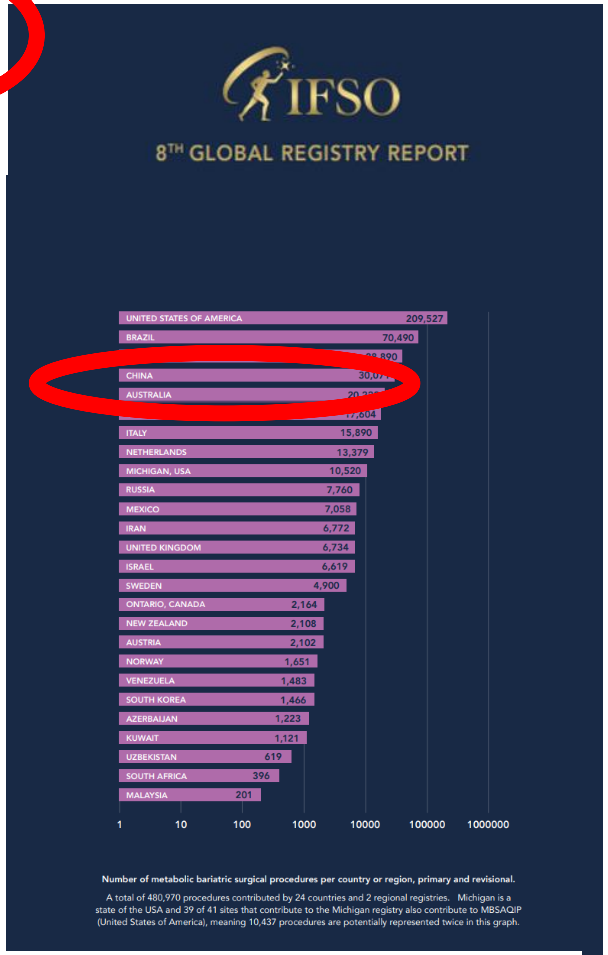




One anastomosis gastric by-pass (OAGB)



TOTAL
37249
SG
30352
RYGB
901
40000
35000
30000
25000
20000
15000
10000
5000
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
117
280
640
1150
1950
4106
5240
6092
6340
8942
10575
11700
25208
240
777
2200
2360
4201
5119
6233
7386
10669
19846
25642
3132
2920
3221
1830
1729
2380
1851
976
1505
1117
—RYGB
—SG
—OAGB
—SG Plus
—AGB
—Fundoplication
—JIB/GIA
—DS/SADI-S
—Endoscopic
—Revision
—Other
—TOTAL



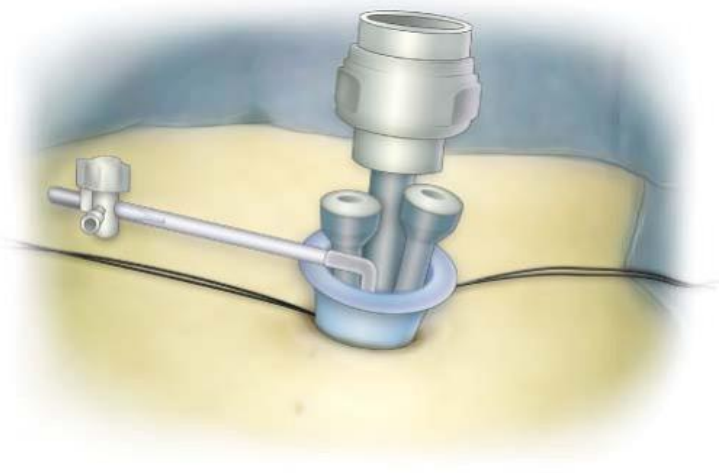
IFSO
8TH GLOBAL REGISTRY REPORT
UNITED STATES OF AMERICA 209,527
BRAZIL 70,490
CHINA
AUSTRALIA
ITALY 15,890
NETHERLANDS 13,379
MICHIGAN, USA 10,520
RUSSIA 7,760
MEXICO 7,058
IRAN 6,772
UNITED KINGDOM 6,734
ISRAEL 6,619
SWEDEN 4,900
ONTARIO, CANADA 2,164
NEW ZEALAND 2,108
AUSTRIA 2,102
NORWAY 1,651
VENEZUELA 1,483
SOUTH KOREA 1,466
AZERBAIJAN 1,223
KUWAIT 1,121
UZBEKISTAN 619
SOUTH AFRICA 396
MALAYSIA 201
1
10
100
1000
10000
100000
1000000
Number of metabolic bariatric surgical procedures per country or region, primary and revisional.
A total of 480,970 procedures contributed by 24 countries and 2 regional registries. Michigan is a state of the USA and 39 of 41 sites that contribute to the Michigan registry also contribute to MBSAQIP (United States of America), meaning 10,437 procedures are potentially represented twice in this graph.

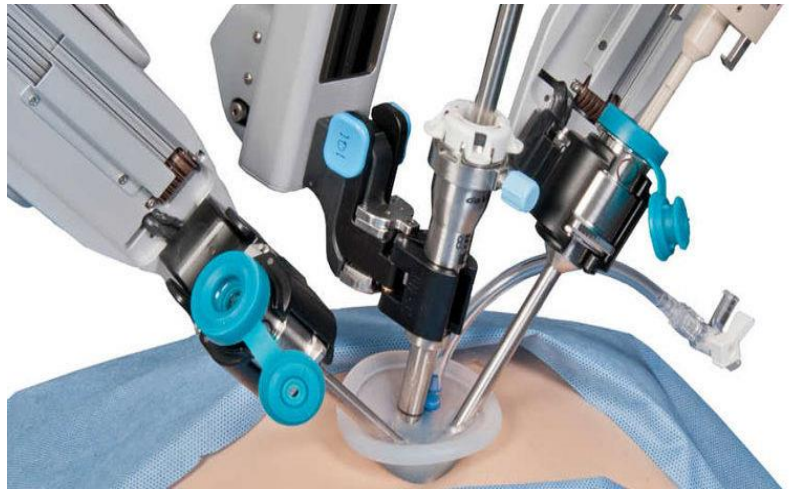
手术量最多的三种术式

Types of MBS: Top 3

SG	OAGB	RYGB
30352	1228	908
81.5%	3.3%	2.4%

Single-port sleeve gastrectomy (SPSG)



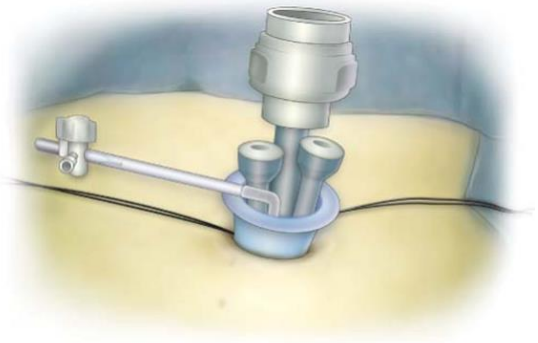


Characteristics of MBS patients in China

- The proportion of female patients: 71.1%
- Median age: 32 (10, 72) years
- The patients' median BMI: 37.9

Requirment for single-port sleeve gastrectomy (SPSG) increased

Greater China metabolic and bariatric surgery database registry report（2023）



It seems that not all patients deemed practical to underwent single port procedure.

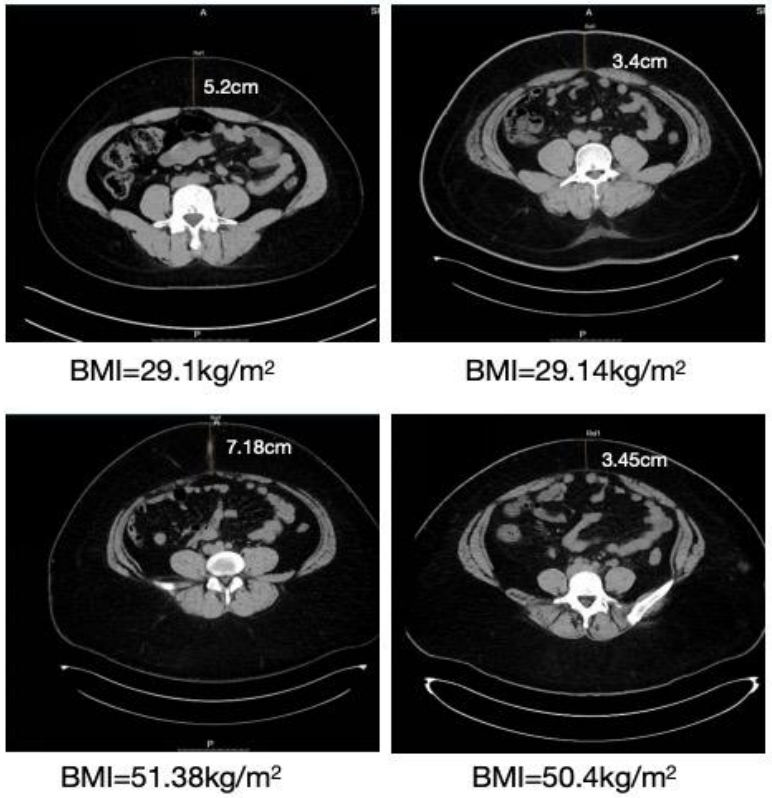
Identifying important factors to understand better which patients suitable for SPLSG is crucial

Purpose of this study

- **To investigate the risk factors for perioperative complications of SPLSG and try to establish a prediction model**

Methods

- 161 patients with obesity were analyzed retrospectively
  - BMI<50
  - Height<180cm
  - No previous abdominal surgery
  - No drug abuse
  - No sever GERD or Barrett disease
- Age, gender, BMI, abdominal subcutaneous fat thickness …were collected
- Logistic regression analysis was used to analyze the risk factors for perioperative complications and a nomogram prediction model was drawn and validated



abdominal subcutaneous fat thickness

Results

Baseline characteristics of patients undergoing SPLSG

	Without Complications (n=153)	With Complications (n=8)	P 值
Male	30/19.6%	4/50%	0.107
Female	123/80.4%	4/50%	-
Age [M(IQR)，y]	31.0 [27.0, 39.0]	41.0 [37.0, 43.5]	0.019
BMI [M(IQR)，kg/m²]	35.4 [32.2, 40.5]	42.1 [41.1, 45.3]	0.003
Waist Circumference [M(IQR)，cm]	113.0 [106. 0, 126.5]	120.0 [112.5, 124.5]	0.405
Hip Circumference [M(IQR)，cm]	120.0 [114.0, 131.0]	128.0 [119.0, 132.5]	0.206
Abdomen subcutaneous fat thickness [M(IQR)，cm]	3.63 [3.07, 4.69]	5.50 [5.13, 6.02]	0.000
Visceral fat content [M(IQR)，cm²]	177.38[133.47, 212.99]	162.14[133.99,262.76]	0.833
	-	-	-
Metabolic Associated Steatohepatitis[n/%]			
With	98/64.05	5/62.50	1.000
Without	55/35.95	3/37.50	-
	-	-	-
Hypertension [n/%]			
With	43/28.10	3/37.50	0.863
Without	110 /71.90	5/62.50	-
	-	-	-
Hyperlipidemia [n/%]			
With	119/77.78	6/75.00	1.000
Without	34/22.22	2/25.00	-
	-	-	-
Diabetes Mellitus [n/%]			
With	18/11.76	2/25.00	0.577
Without	135/88.24	6/75.00	-
Fasting Blood Glucose [M(IQR)，mmol/L]	5.6[5.0, 6.4]	5.3 [5.1, 6.4]	0.740
HbA1c [M(IQR)，%]	5.8 [5.5, 6.5]	5.7 [5.6, 5.9]	0.954
Fasting C-peptide [M(IQR)，ng/ml]	4.6 [3.3, 5.8]	4.3 [3.7, 5.2]	0.541
Fasting Insulin [M(IQR)，pmol/L]	24.2 [16.6, 39.9]	21.0 [16.8, 30.2]	0.343

Results

- **Eight patients (5.0%) had perioperative complications**

Type of Complications	No. of Cases	Clavien-Dindo Classification					
		Grade 1	Grade 2	Grade 3a	Grade 3b	Grade 4	Grade 5
Incisional Hernia	3	-	-	-	3	-	-
Leak	2	-	1	-	1	-	-
Mesenteric venous embolism	1	-	1	-	-	-	-
Surgical Site Infection	1	-	1	-	-	-	-
Pneumonia	1	-	1	-	-	-	-

Results

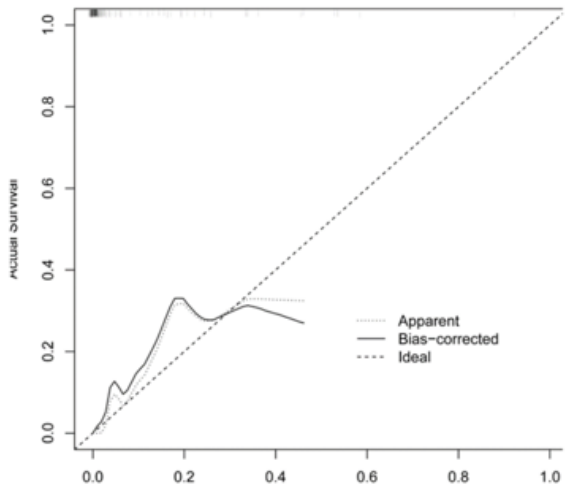
- **Univariate analysis**
  - Age, BMI, and abdominal subcutaneous fat thick ness were related to perioperative complications of SPLSG (P<0.05)

- **Multivariate logistic regression analysis**
  - Age, BMI, and abdominal subcutaneous fat thickness were independent risk factors for perioperative complications of SPLSG

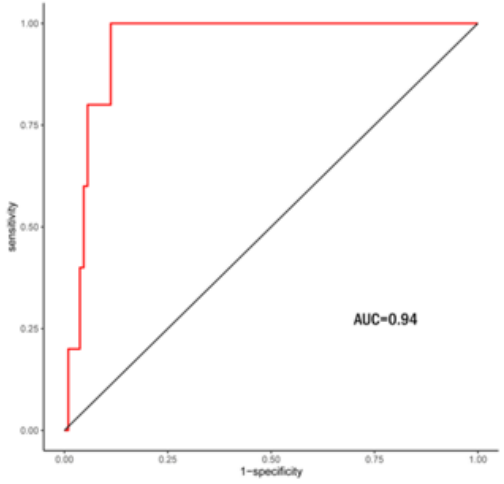
	Univariate logistic		Multivariate logistic	
	OR（95%CI）	P-value	OR（95%CI）	P-value
Gender	4.1(0.97-17.34)	0.055	-	-
Age	1.08(1.01-1.16)	0.034	1.20(1.06-1.35)	0.003
BMI	1.12(1.03-1.23)	0.007	1.18(1.02-1.36)	0.028
Waist Circumference	1.02(0.98-1.07)	0.336	-	-
Hip Circumference	1.03(0.98-1.08)	0.187	-	-
Abdomen subcutaneous fat thickness	3.82(1.72-8.49)	0.001	4.02(1.41-11.49)	0.009
Visceral Fat	1.00(0.99-1.01)	0.677	-	-
Metabolic Associated Steatohepatitis	0.94(0.22-4.06)	0.929	-	-
Hypertension	1.53(0.35-6.70)	0.569	-	-
Hyperlipidemia	0.86(0.17-4.44)	0.854	-	-
Diabetes Mellitus	2.50(0.47-13.34)	0.283	-	-
Fasting Blood Glucose	1.00(0.80-1.24)	0.977	-	-
HbA1c	1.19(0.70-2.03)	0.525	-	-
Fasting C-Peptide	0.84(0.56-1.26)	0.392	-	-
Fasting Insulin	0.97(0.92-1.02)	0.256	-	-

Results

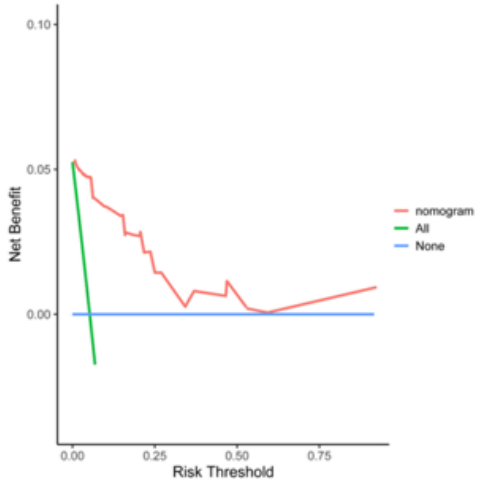
- **Nomogram prediction model** constructed based on the results show good accuracy and predictive ability, with an area under the ROC curve of 0.94



Nanogram predict survival



Receiver Operating Characteristic, ROC



Decision curve analysis, DCA

Conclutions

- Age, BMI, and abdominal subcutaneous fat thickness are independent risk factors for perioperative complications of SPLSG

- The prediction model established in this study may provide reference for SPLSG decision making

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