Safety Outcomes and 5-year Healthcare Utilisation After Bariatric Surgery And Other Elective Surgical Treatments (General Surgery)

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Disclosures

Research/Educational Grants: Medtronic, Ethicon, Novo Nordisk

Scientific Advisory Board/DSMB: Keyron, GT Metabolic Solution Inc

Speaking honoraria: Medtronic, Ethicon, Novo Nordisk

This study was supported by an investigator-initiated grant from Johnson & Johnson

"The Curious Case of Bariatric Surgery"

Major, Sustained Weight Loss

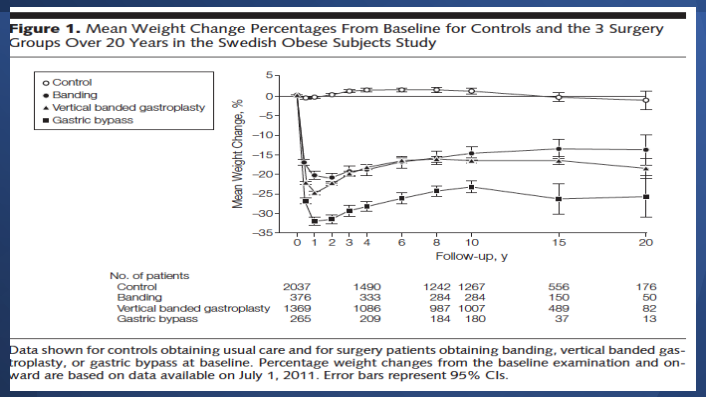
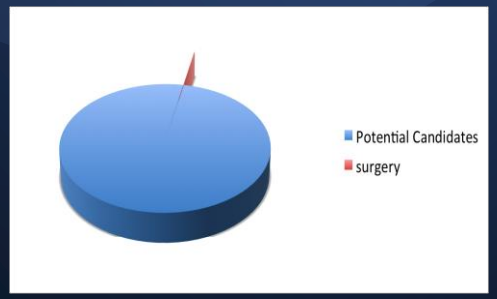


Figure 1. Mean Weight Change Percentages From Baseline for Controls and the 3 Surgery Groups Over 20 Years in the Swedish Obese Subjects Study

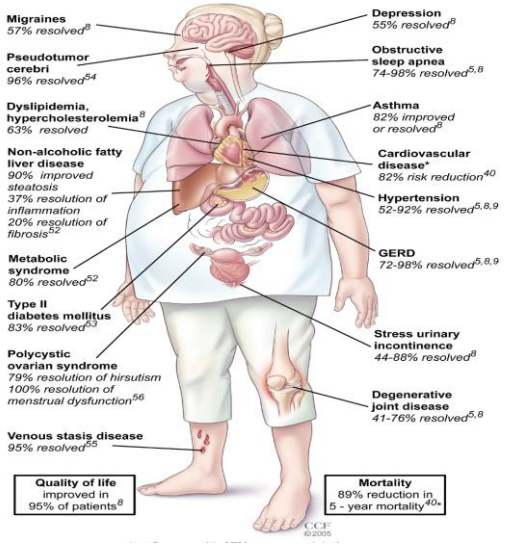
No. of patients						
Control	2037	1490	1242	1267	556	176
Banding	376	333	284	284	150	50
Vertical banded gastroplasty	1369	1086	987	1007	489	82
Gastric bypass	265	209	184	180	37	13

Data shown for controls obtaining usual care and for surgery patients obtaining banding, vertical banded gastroplasty, or gastric bypass at baseline. Percentage weight changes from the baseline examination and onward are based on data available on July 1, 2011. Error bars represent 95% CIs.

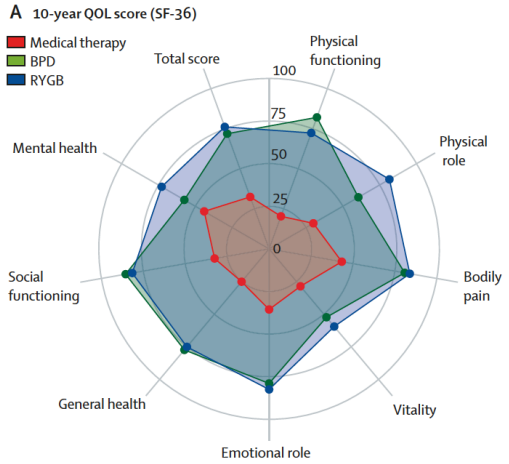
Worldwide Mean: 0.82%



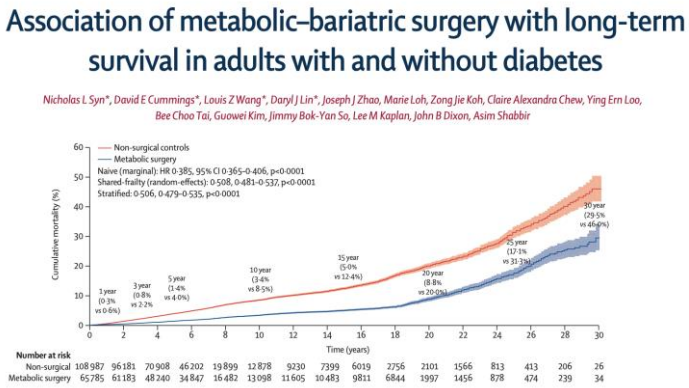
Improvement/Resolution Obesity-Related Morbidities



Improved Quality of Life (QoL)



Reduction All Cause-Mortality



Association of metabolic–bariatric surgery with long-term survival in adults with and without diabetes

Nicholas L Syn*, David E Cummings*, Louis Z Wang*, Daryl J Lin*, Joseph J Zhao, Marie Loh, Zong Jie Koh, Claire Alexandra Chew, Ying Ern Loo, Bee Choo Tai, Guowei Kim, Jimmy Bok-Yan So, Lee M Kaplan, John B Dixon, Asim Shabbir

Cost-effectiveness

COST/QALY for Bariatric Surgery is $3,200-$6,500 vs the $50,000 deemed appropriate for coverage

Bariatric/Metabolic Surgery is safe

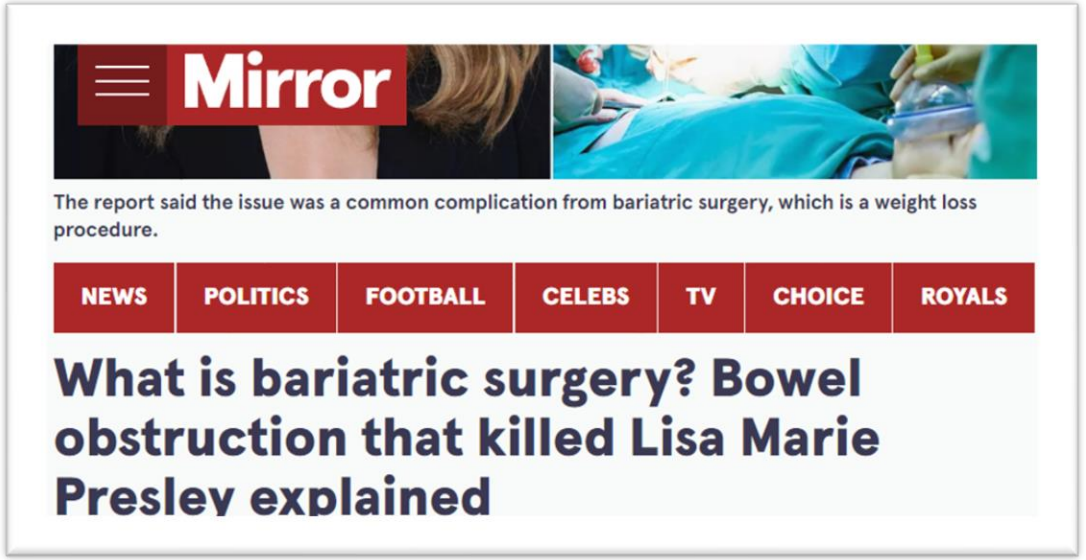
- Mortality range between 0·1–0·8% - Similar to a cholecystectomy
- Risk of major complications ranges between 1-4%

Robertson AGN, Wiggins T, Robertson FP, *et al.* Perioperative mortality in bariatric surgery: meta-analysis. *Br J Surg* 2021; **108**: 892–7.
Perioperative Safety in the Longitudinal Assessment of Bariatric Surgery. *N Engl J Med* 2009; **361**: 445–54.

Perception of Bariatric/Metabolic Surgery

Apprehensions about risks and costs

- “Risky”
- “Drastic”
- “Dangerous”



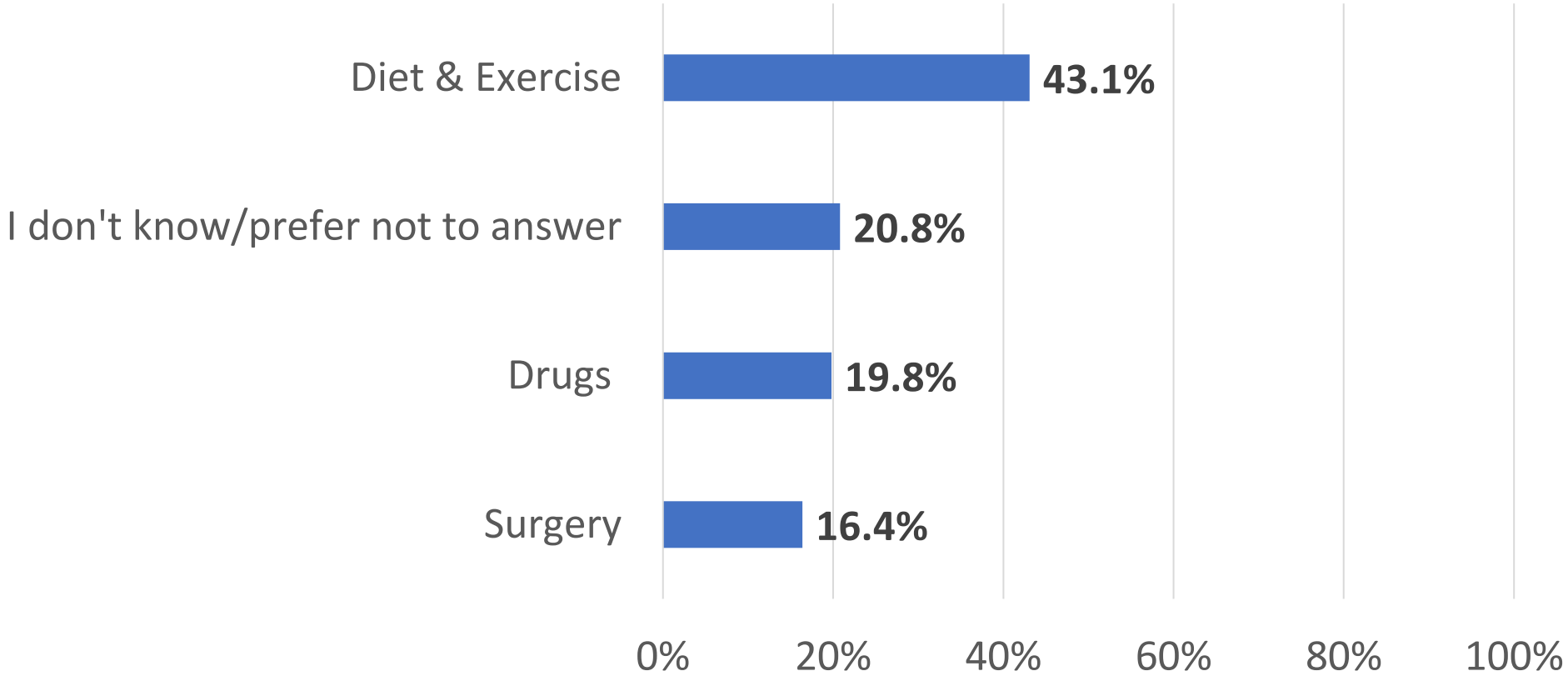
Low referral rate from GPs/PCPs

Studies show that **concerns about safety** undermine:

- Physicians' referral
- Patients' acceptance of **BMS**

Stolberg CR, Hepp N, Juhl AJA, B.C D, Juhl CB. Primary care physician decision making regarding referral for bariatric surgery: a national survey. *Surg Obes Relat Dis* 2017; **13**: 807–13.
Sarwer DB, Ritter S, Wadden TA, Spitzer JC, Vetter ML, Moore RH. Physicians' attitudes about referring their type 2 diabetes patients for bariatric surgery. *Surg Obes Relat Dis* 2012; **8**: 381–6.
Tork S, Meister KM, Uebele AL, *et al.* Factors Influencing Primary Care Physicians' Referral for Bariatric Surgery. *JSLS* 2015; **19**: e2015.00046.

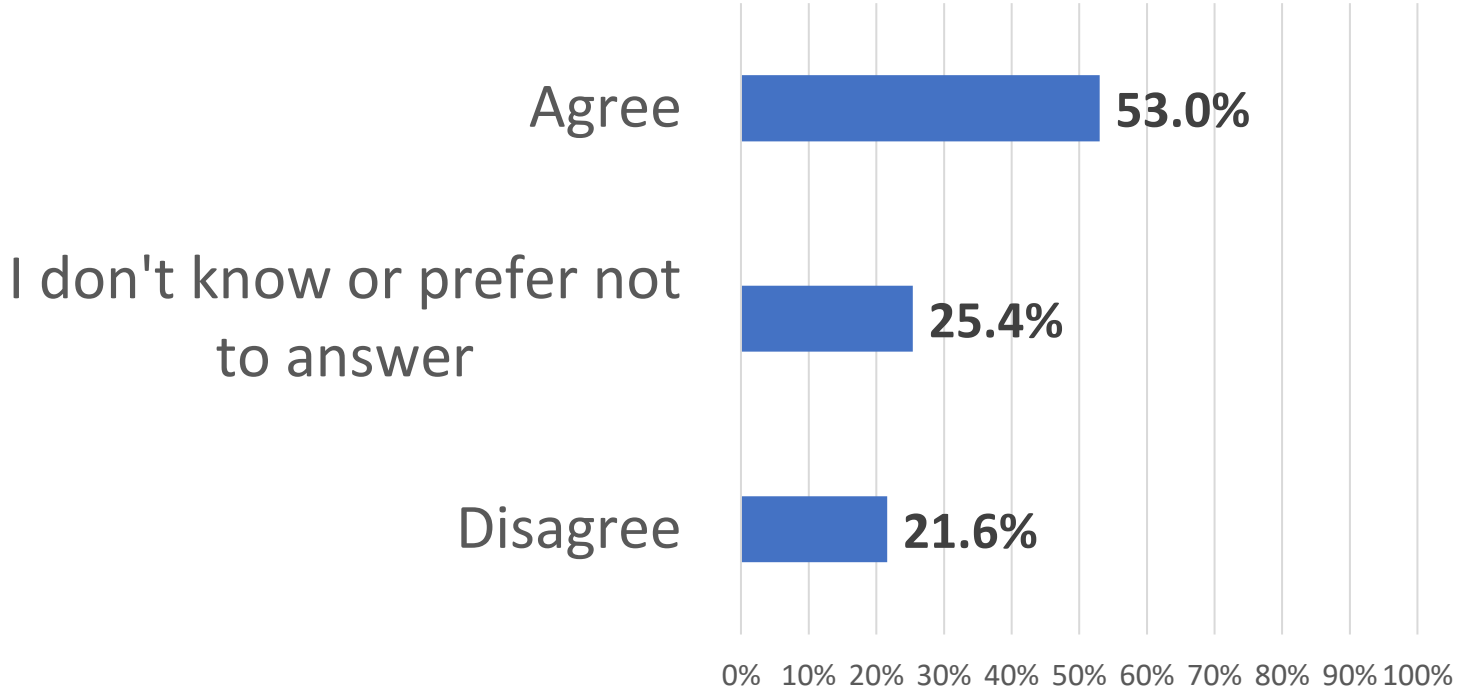
Which one of the following interventions would be best for someone like you as a treatment for severe obesity (BMI>35kg/m2)? (Select one.)



Metabolic Health Institute

Misperception of Risks of Bariatric Surgery

Do you agree or disagree with the following statement? "Weight loss surgery (also known as bariatric or metabolic surgery) is too risky."



Metabolic Health Institute

High cost – Short/Long-term?

- Multiple studies show that BMS is cost-effective and improves patients' QoL

However, patients, policy makers and healthcare providers believe BMS is a "highly costly" intervention:

- Upfront costs of surgery
- Concerns about long-term complications and associated costs
- An extra burden on Healthcare systems

Padwal R, Klarenbach S, Wiebe N, *et al.* Bariatric Surgery: A Systematic Review of the Clinical and Economic Evidence. *J Gen Intern Med* 2011; **26**: 1183–94.
Hoerger TJ, Zhang P, Segel JE, Kahn HS, Barker LE, Couper S. Cost-Effectiveness of Bariatric Surgery for Severely Obese Adults With Diabetes. *Diabetes Care* 2010; **33**: 1933–9.

No Similar Apprehensions for Other Types of Surgical Treatments

Bariatric Surgery

Elective General Surgery
Cholecystectomy, Hernia Surgery, Reflux Surgery, Colorectal (benign)

Aim of Our study

To compare bariatric surgery and other common elective surgical treatments in terms of

- Safety
- Cost
- Healthcare Utilization

Manuscript under peer-review

7 general surgery sub-specialties

- Adrenal surgery
- Gastro-Esophageal Junction surgery
- **Bariatric/Metabolic surgery**
- *In-patient Cholecystectomy*
- *Out-patient Cholecystectomy*
- Colorectal procedures
- Hernia surgery
- Neck-endocrine surgery (NES).

Manuscript under peer-review

Methods

- Elective, benign diseases/conditions

- 100 patients for each type of surgical treatment
  - To reflect usual clinical practice: equal number of unselected, consecutive patients who underwent any type of standard procedure for each surgical subspecialty
  - Total of 800 patients

Manuscript under peer-review

Outcome Measures

- Peri-operative safety (inpatient and 30-day outcomes) and 5-year HU and costs:
  - Hospital admissions
  - Outpatient visits
  - A&E visits

- **Captured <u>Nationwide</u> using data from NHS Digital**
  - Data over 5 years from time of surgery

Methods

- Each encounter was then analysed based on the diagnosis recorded

- Two consultant surgeons from each specialty assessed each code description and adjudicated if readmissions were
  - “Procedure related”
  - “ Not Procedure related”

- Blinded patient identity

Results

Demographics and Peri-Operative Outcomes

Table 1. Patient demographics and operative outcomes

	Bariatric	Adrenal	GEJ	Colorectal	Inpatient Cholecystectomy	Lap Hernia	Neck Surgery	Outpatient Cholecystectomy
Female gender (%)	75	59	55 *	49 **	68	48 **	87	87
Age (years)	47 ± 3	53 ± 3 **	54 ± 3 **	49 ± 3	54 ± 3 *	59 ± 3 **	53 ± 3 *	45 ± 3
Number of comorbidities	3	2 *	2 **	2 **	2 **	2 **	2 **	1 **
ASA score	3	2 **	2 **	2 **	2 **	2 **	2 **	1 **
Operative time (min)	129 ± 8	129 ± 11	135 ± 10	227 ± 28 **	90 ± 7 **	91 ± 8 **	90 ± 5 **	92 ± 8 **
Length of stay (days)	2.3 ± 0.3	3.9 ± 0.6 **	4.2 ± 1.4	12.2 ± 1.9 **	2.4 ± 1.9 *	1.9 ± 0.3 *	2.7 ± 1.4 **	0.4 ± 0.3 **
Inpatient major complications (%)	0	1	7 **	8 **	4	1	1	1

Data are represented as means ± 95% confidence intervals, or percentages. ASA, American Society of Anaesthesiologists. **denotes different from bariatric surgery, $P < 0.01$; *denotes different from bariatric surgery, $P < 0.05$.

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30-Day Post-operative Outcomes

Table 2. 30-day outcomes and cost

		Bariatric	Adrenal	GEJ	Colorectal	Inpatient Cholecystectomy	Lap Hernia	Neck	Outpatient Cholecystectomy
Morbidity	Major morbidity (%)	0	1	8 **	6 *	2	1	1	1
	Reoperation rate (%)	0	0	3	4	1	1	1	1
Readmission rate	All causes (%)	7	26 *	13	21 *	10	7	8	8
	Procedure-related (%)	4	14 *	7	15 *	7	3	2	5
Readmissions Length of stay	All causes (days)	0.3 ± 0.4	1.1 ± 1.0	1.9 ± 1.0 **	2.6 ± 1.9**	1.9 ± 1.1 **	1.8 ± 2.5	5.1 ± 2.3 **	1.1 ± 1.1
	Procedure-related (days)	1.0 ± 1.2	1.0 ± 0.9	2.4 ± 1.5	3.6 ± 2.6	2.4 ± 1.2	1.0 ± 0.8	3.7 ± 3.8	1.7 ± 1.8
Total cost for all re-admissions	All causes (£)	10,067	64,651	25,624	51,186	16,599	16,212	40,618	12,954
	Procedure-related (£)	9,405	39,345	15,980	41,027	14,142	10,532	2,180	6,681
Cost per re-admission	All causes (£)	719 ± 734	1,658 ± 351**	1,602 ± 657**	1,765 ± 523**	1,037 ± 256**	1,474 ± 664*	2,389 ± 664**	1,295 ± 504*
	Procedure-related (£)	2,351 ± 2,236	1,874 ± 570	1,776 ± 968	2,051 ± 703	1,088 ± 312	1,505 ± 593	1,090 ± 6,772	1,114 ± 706

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Length of stay	Procedure-related (days)	1.0 ± 1.2	1.0 ± 0.9	2.4 ± 1.5	3.6 ± 2.6	2.4 ± 1.2	1.0 ± 0.8	3.7 ± 3.8	1.7 ± 1.8

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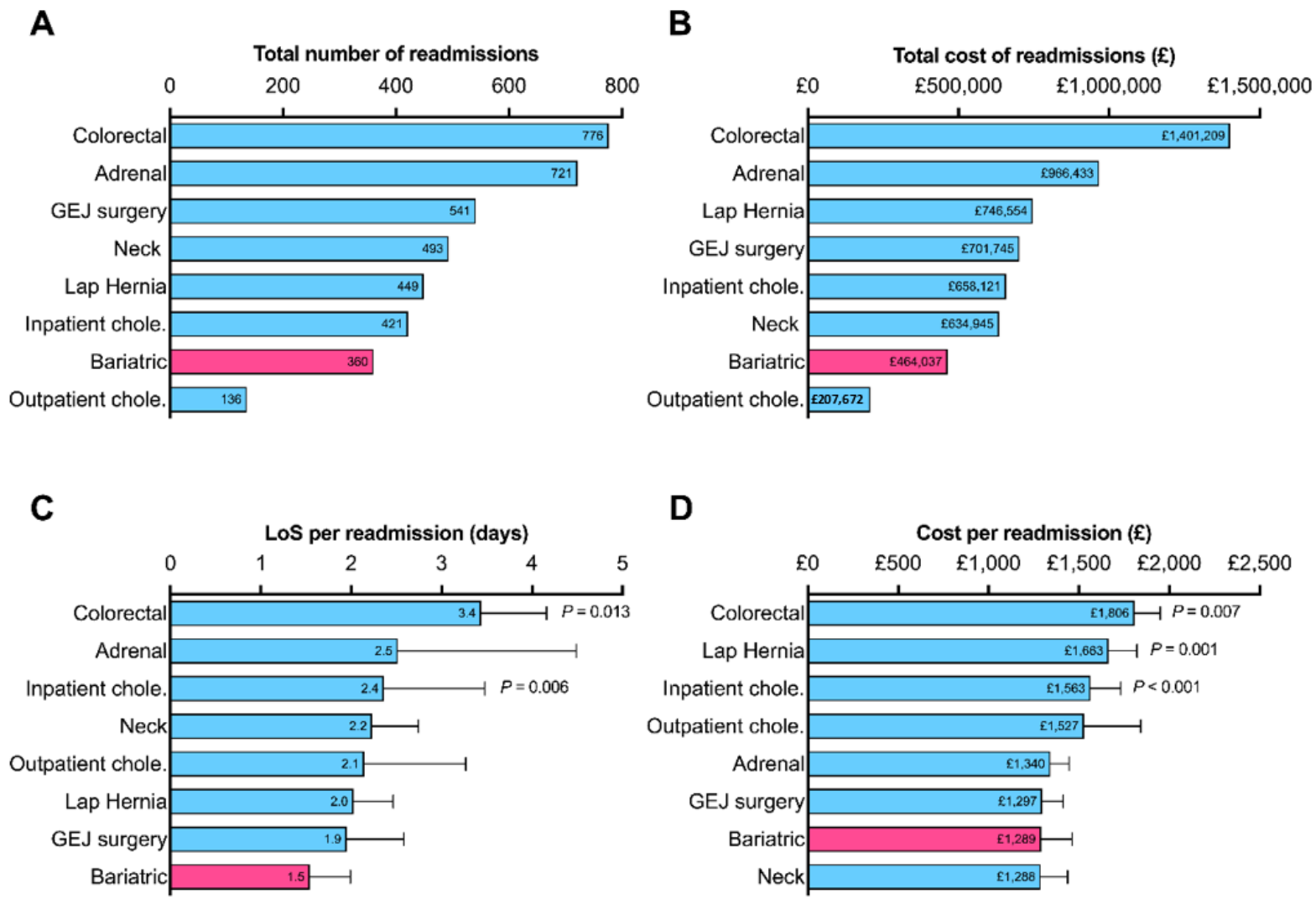
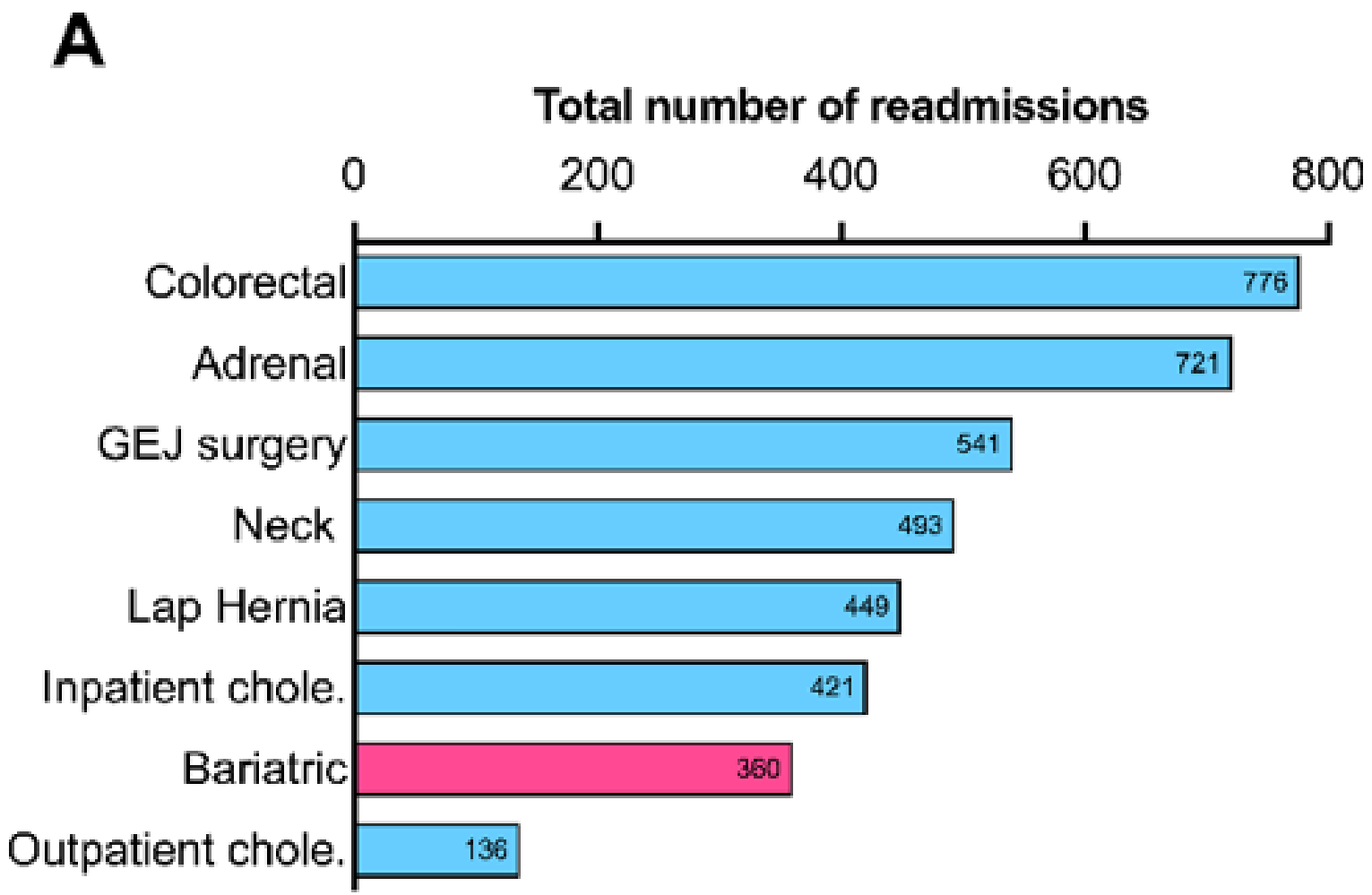
5-year post-surgery outcomes

Total n. of admissions and costs


A
Total number of readmissions
0
200
400
600
800
Colorectal
776
Adrenal
721
GEJ surgery
541
Neck
493
Lap Hernia
449
Inpatient chole.
421
Bariatric
360
Outpatient chole.
136
B
Total cost of readmissions (£)
£0
£500,000
£1,000,000
£1,500,000
Colorectal
£1,401,209
Adrenal
£966,433
Lap Hernia
£746,554
GEJ surgery
£701,745
Inpatient chole.
£658,121
Neck
£634,945
Bariatric
£464,037
Outpatient chole.
£207,672
C
LoS per readmission (days)
0
1
2
3
4
5
Colorectal
3.4
P = 0.013
Adrenal
2.5
Inpatient chole.
2.4
P = 0.006
Neck
2.2
Outpatient chole.
2.1
Lap Hernia
2.0
GEJ surgery
1.9
Bariatric
1.5
D
Cost per readmission (£)
£0
£500
£1,000
£1,500
£2,000
£2,500
Colorectal
£1,806
P = 0.007
Lap Hernia
£1,663
P = 0.001
Inpatient chole.
£1,563
P < 0.001
Outpatient chole.
£1,527
Adrenal
£1,340
GEJ surgery
£1,297
Bariatric
£1,289
Neck
£1,288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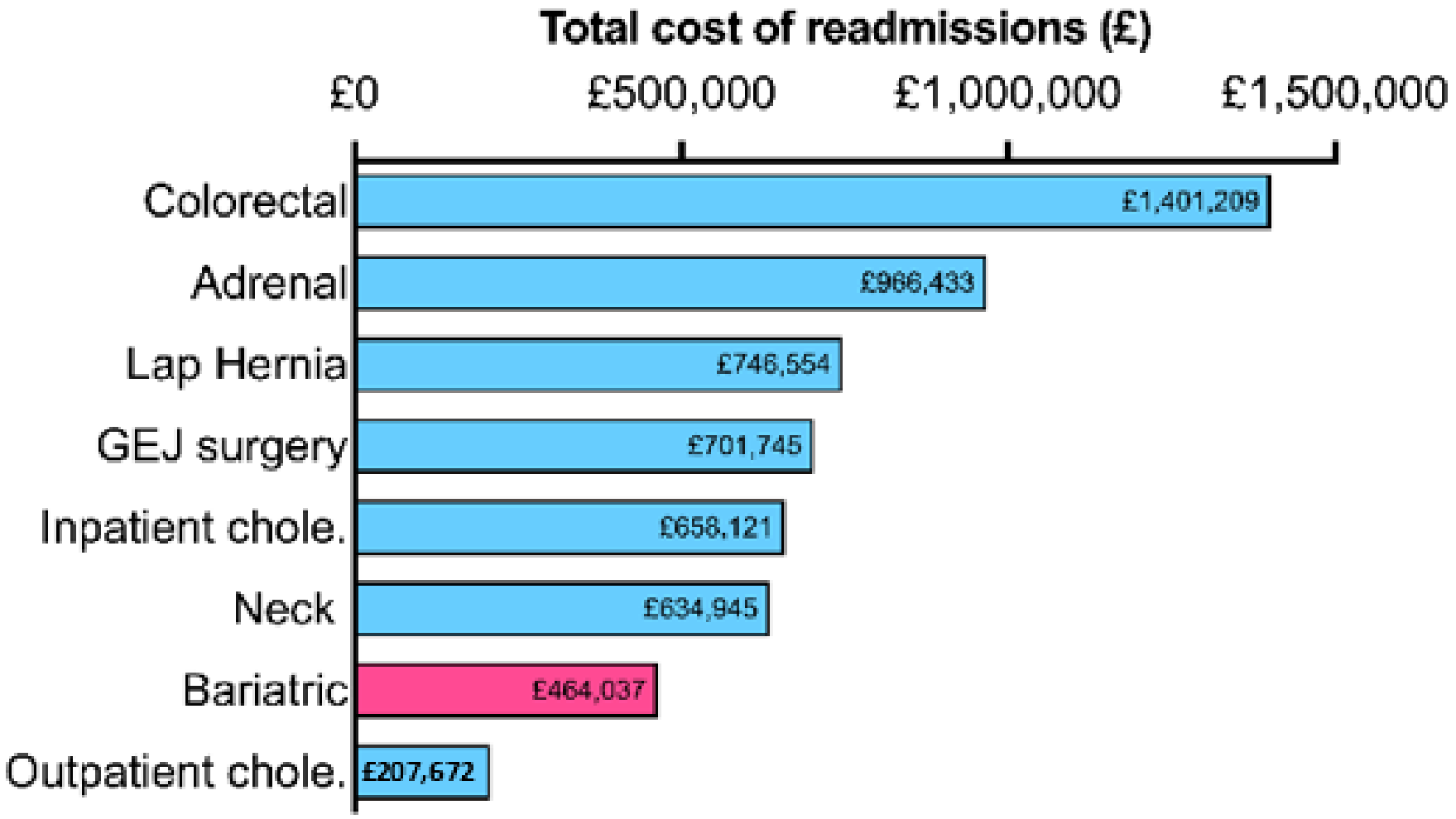
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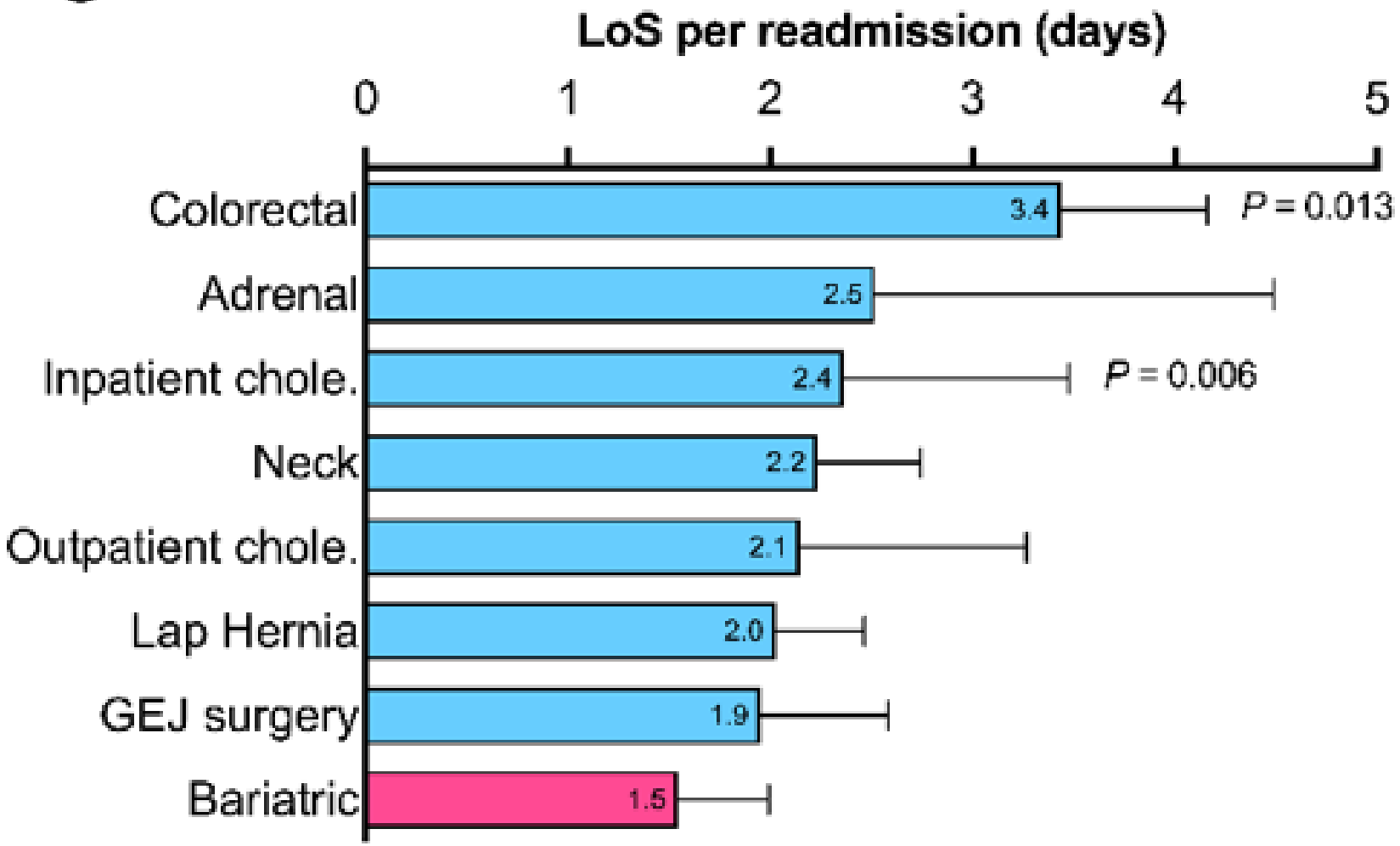
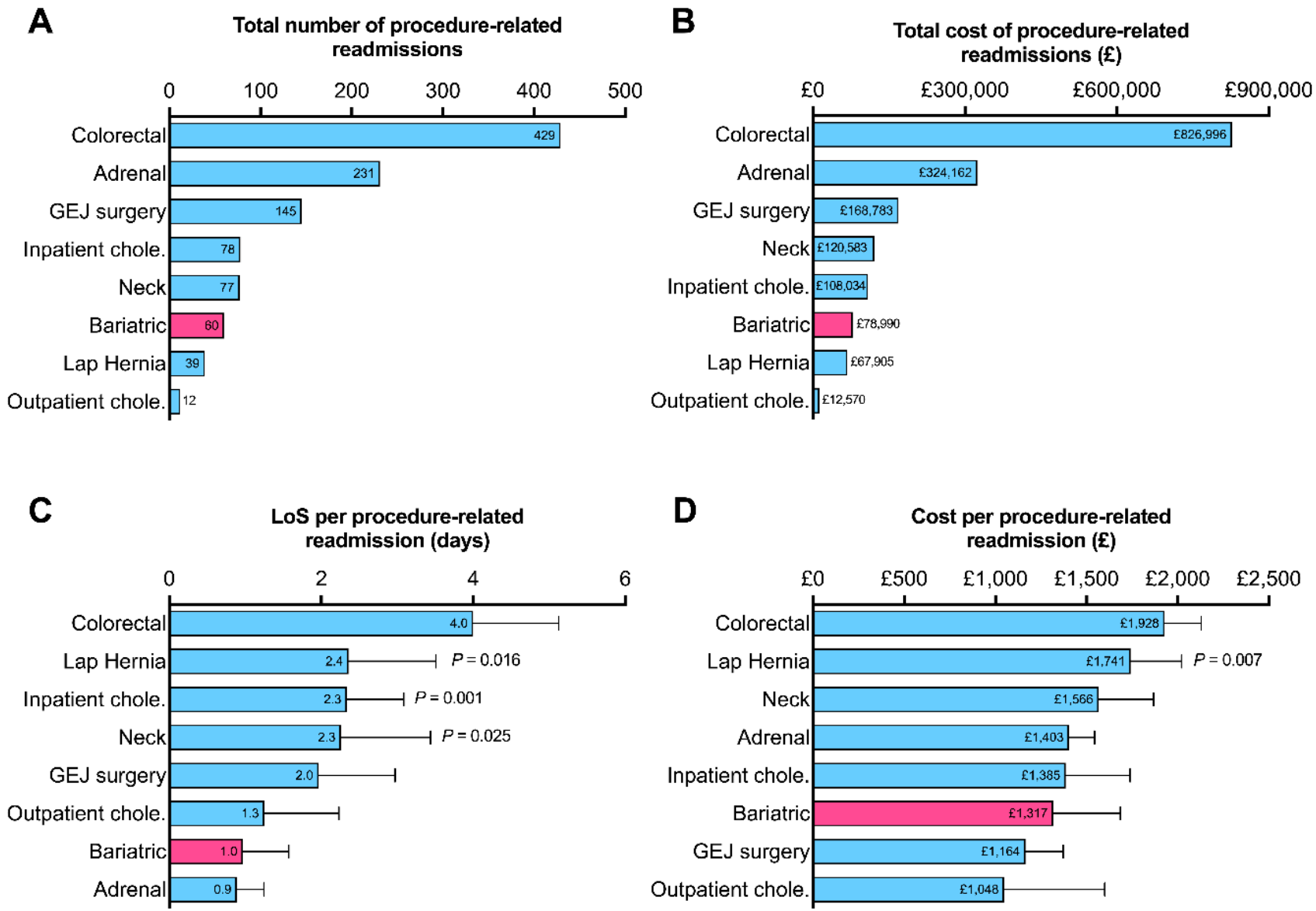
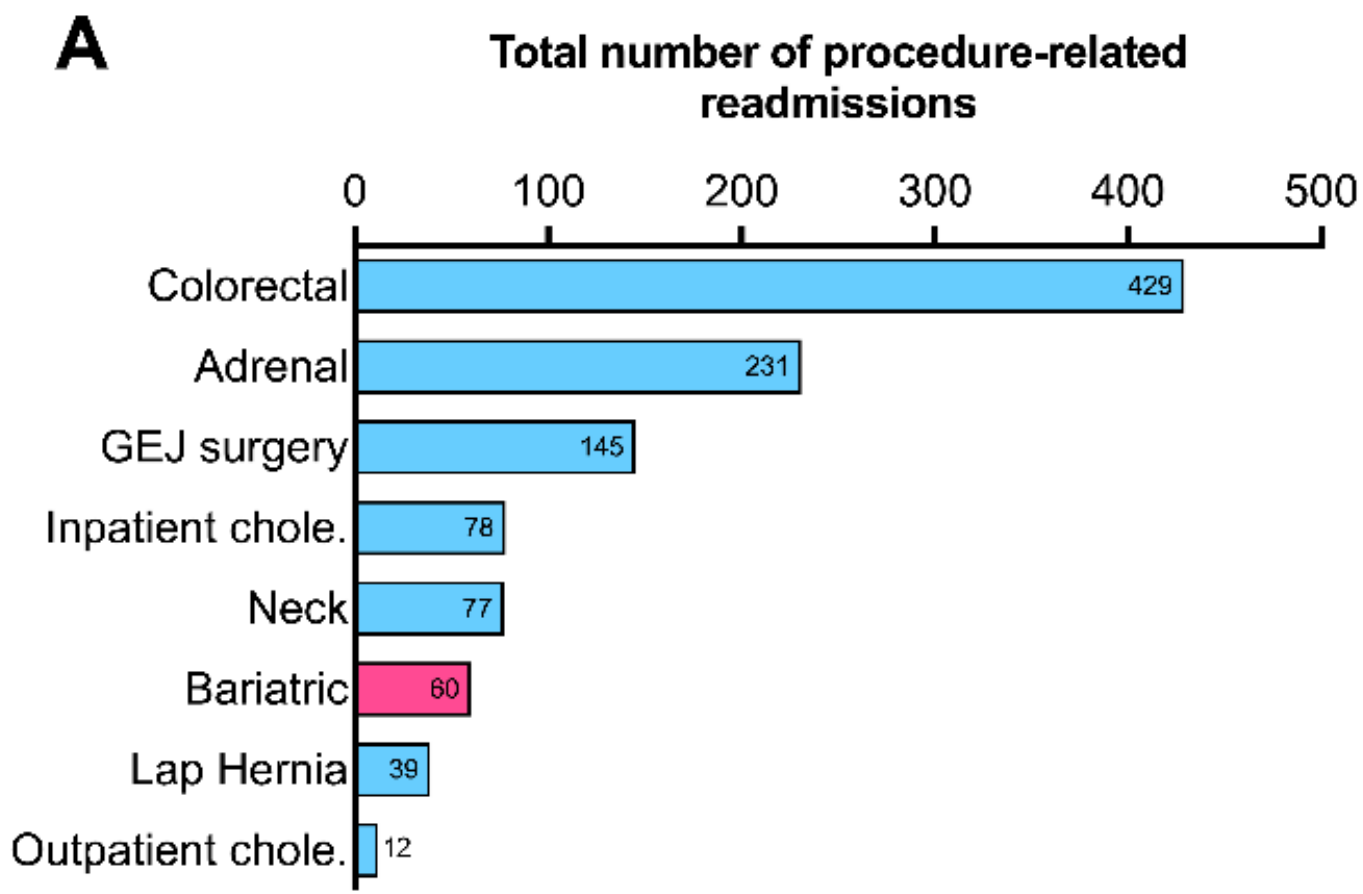
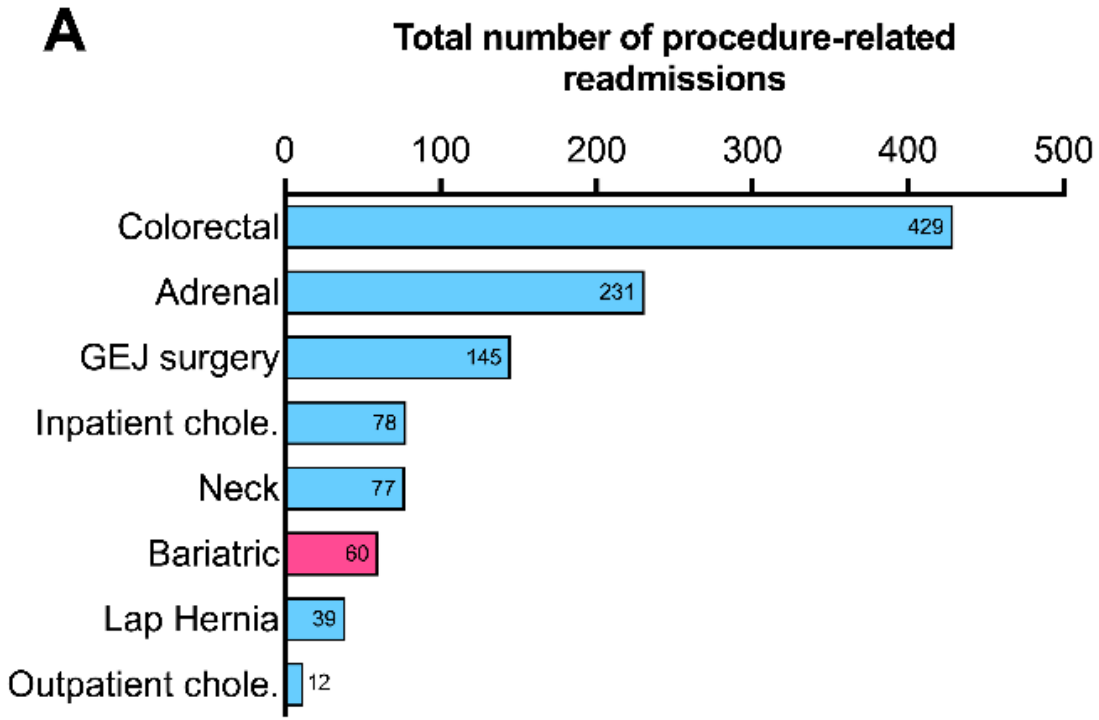

LoS per readmission (days)
0
1
2
3
4
5
Colorectal
3.4
P = 0.013
Adrenal
2.5
Inpatient chole.
2.4
P = 0.006
Neck
2.2
Outpatient chole.
2.1
Lap Hernia
2.0
GEJ surgery
1.9
Bariatric
1.5

Total Procedure Related Admissions and Cost


A
Total number of procedure-related readmissions
0
100
200
300
400
500
Colorectal
429
Adrenal
231
GEJ surgery
145
Inpatient chole.
78
Neck
77
Bariatric
60
Lap Hernia
39
Outpatient chole.
12
B
Total cost of procedure-related readmissions (£)
£0
£300,000
£600,000
£900,000
Colorectal
£826,996
Adrenal
£324,162
GEJ surgery
£168,783
Neck
£120,583
Inpatient chole.
£108,034
Bariatric
£78,990
Lap Hernia
£67,905
Outpatient chole.
£12,570
C
LoS per procedure-related readmission (days)
0
2
4
6
Colorectal
4.0
Lap Hernia
2.4
P = 0.016
Inpatient chole.
2.3
P = 0.001
Neck
2.3
P = 0.025
GEJ surgery
2.0
Outpatient chole.
1.3
Bariatric
1.0
Adrenal
0.9
D
Cost per procedure-related readmission (£)
£0
£500
£1,000
£1,500
£2,000
£2,500
Colorectal
£1,928
Lap Hernia
£1,741
P = 0.007
Neck
£1,566
Adrenal
£1,403
Inpatient chole.
£1,385
Bariatric
£1,317
GEJ surgery
£1,164
Outpatient chole.
£1,048


A
Total number of procedure-related readmissions
0
100
200
300
400
500
Colorectal
429
Adrenal
231
GEJ surgery
145
Inpatient chole.
78
Neck
77
Bariatric
60
Lap Hernia
39
Outpatient chole.
12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Total number of procedure-related readmissions
0
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300
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Colorectal
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Inpatient chole.
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Neck
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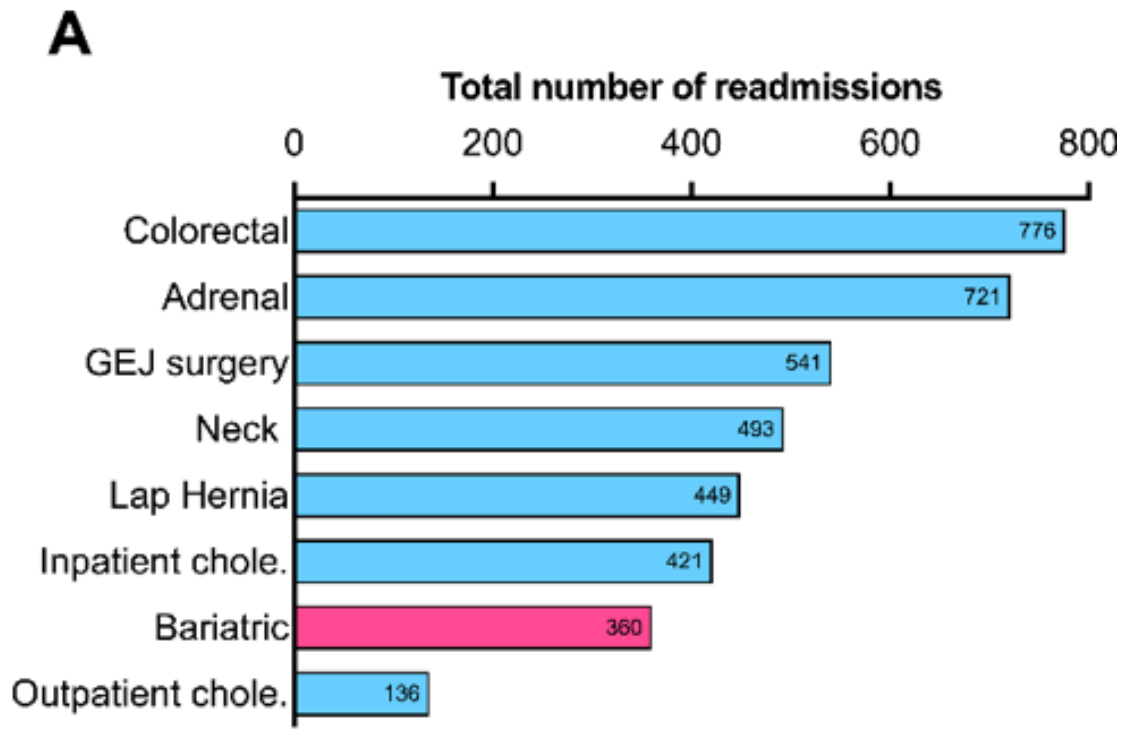
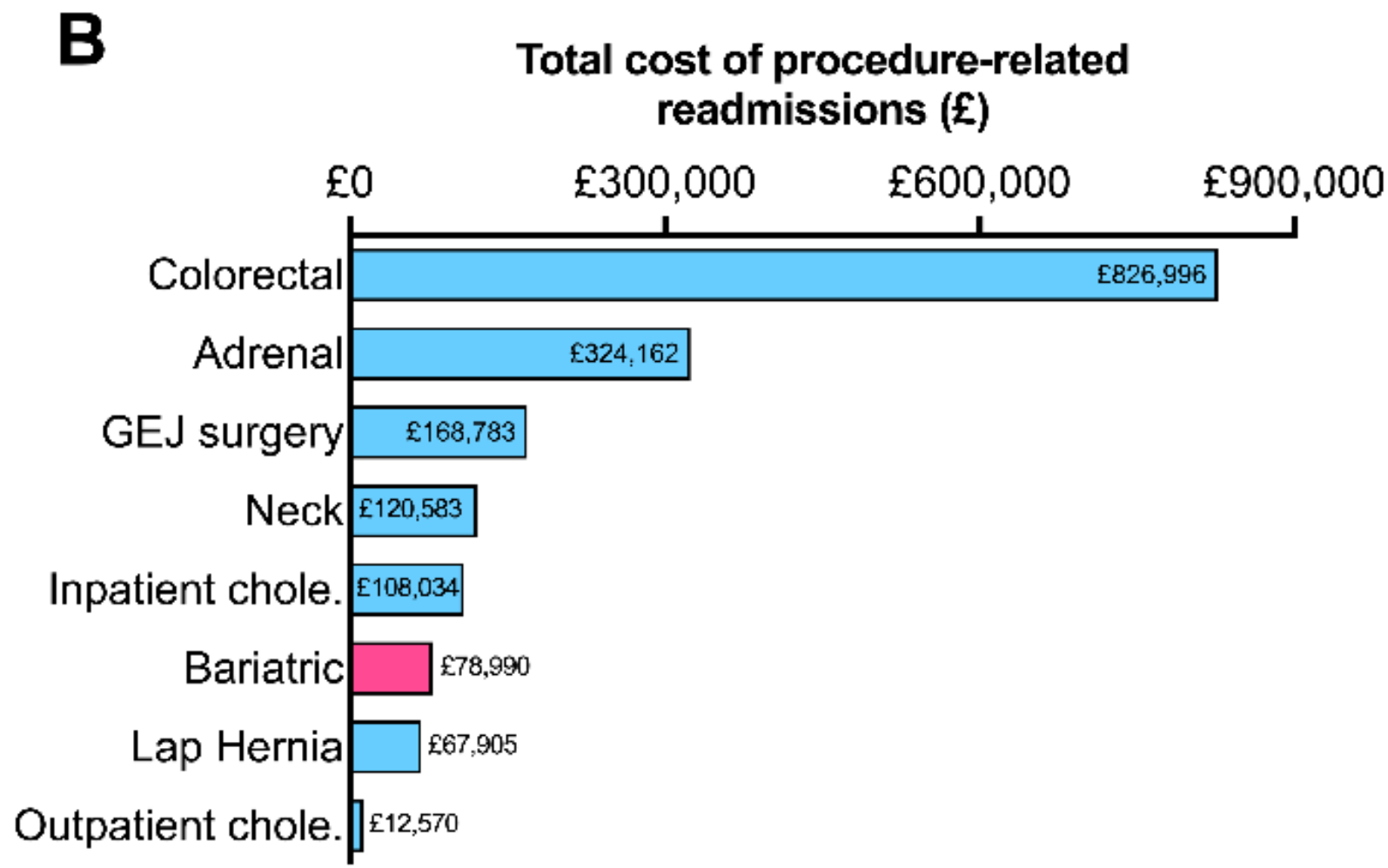
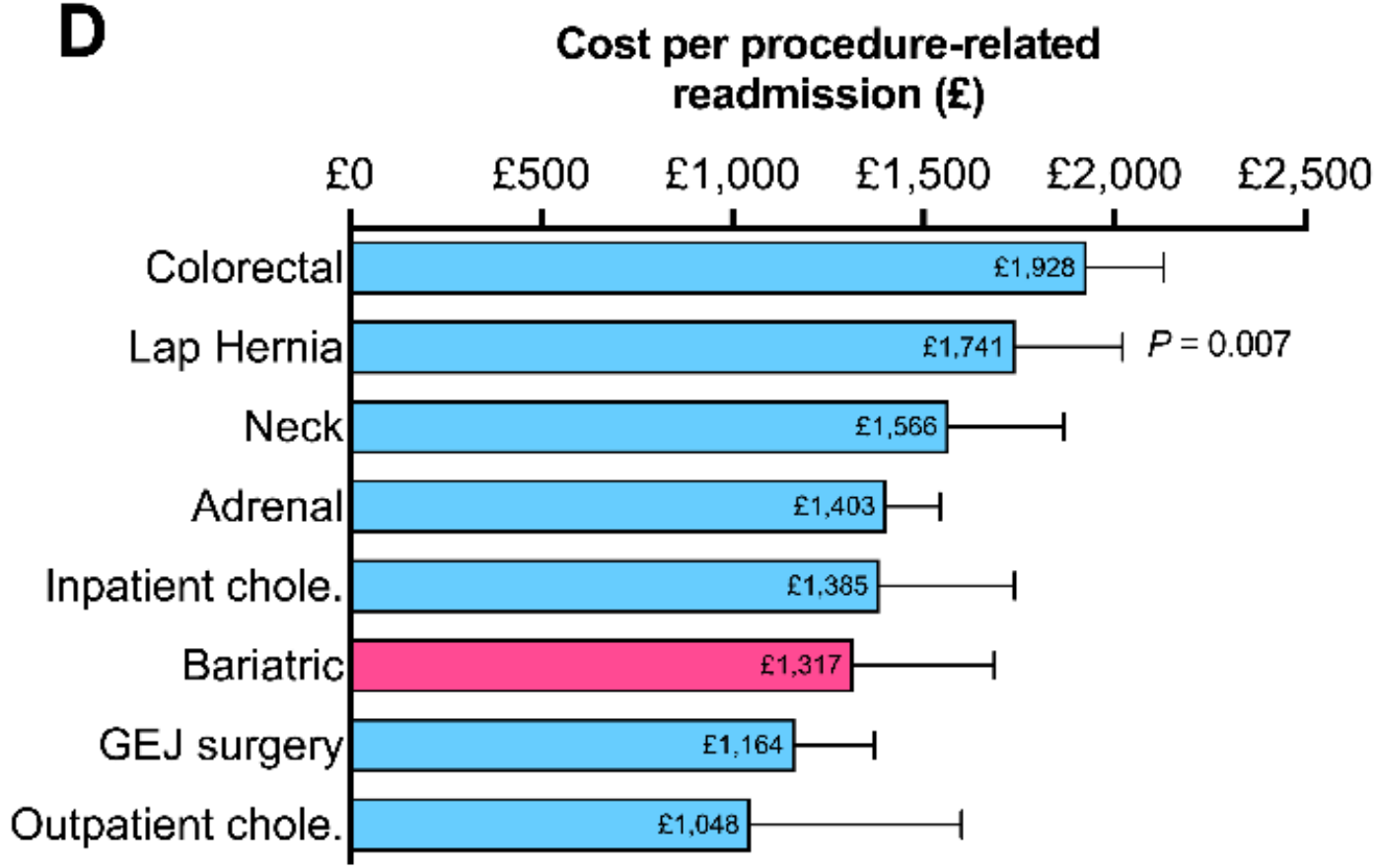
12


A
Total number of readmissions
0
200
400
600
800
Colorectal
776
Adrenal
721
GEJ surgery
541
Neck
493
Lap Hernia
449
Inpatient chole.
421
Bariatric
360
Outpatient chole.
136


B
Total cost of procedure-related readmissions (£)
£0
£300,000
£600,000
£900,000
Colorectal
£826,996
Adrenal
£324,162
GEJ surgery
£168,783
Neck
£120,583
Inpatient chole.
£108,034
Bariatric
£78,990
Lap Hernia
£67,905
Outpatient chole.
£12,570

D


Cost per procedure-related readmission (£)
£0
£500
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£2,000
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Colorectal
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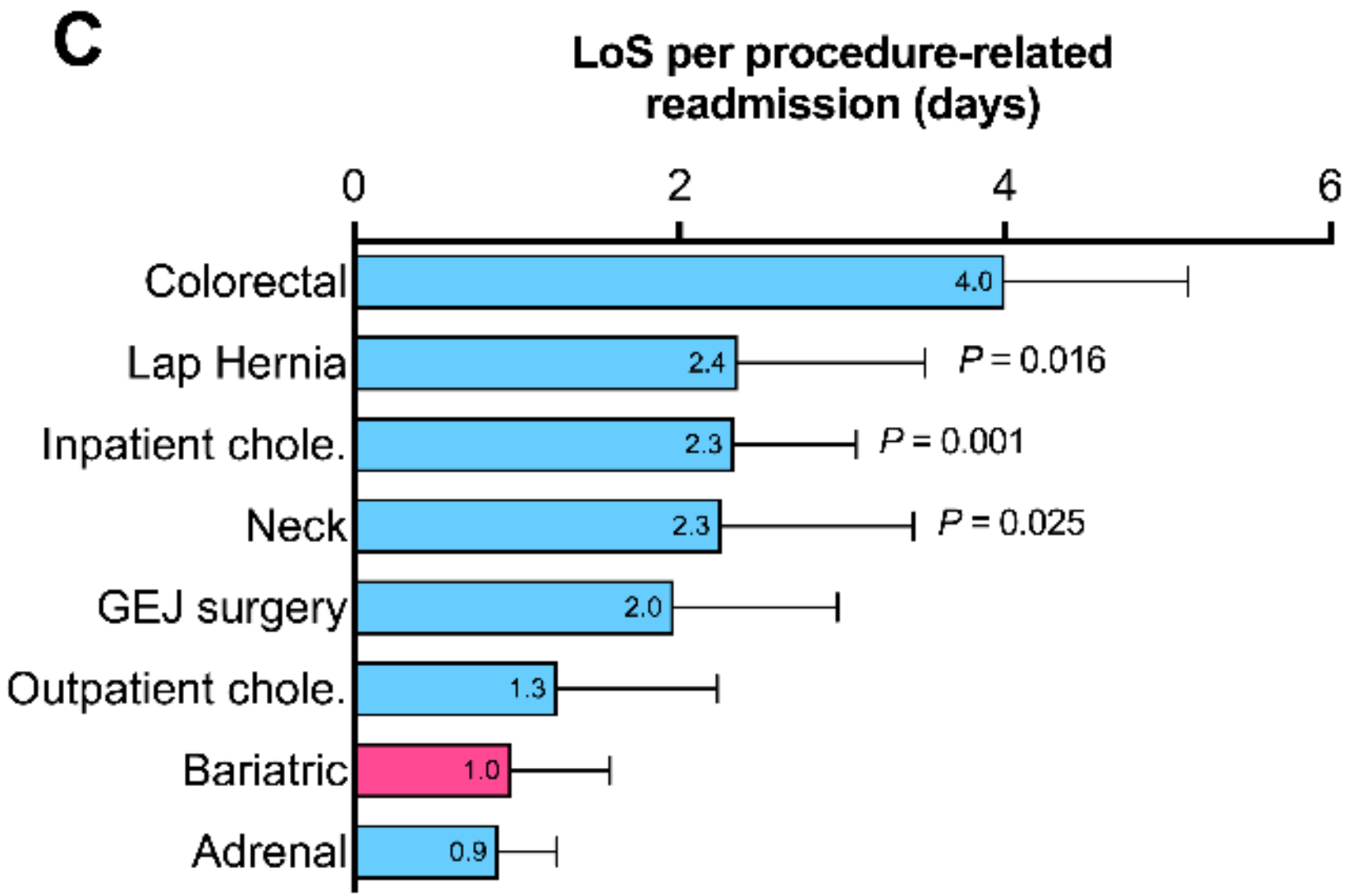
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Lap Hernia
2.4
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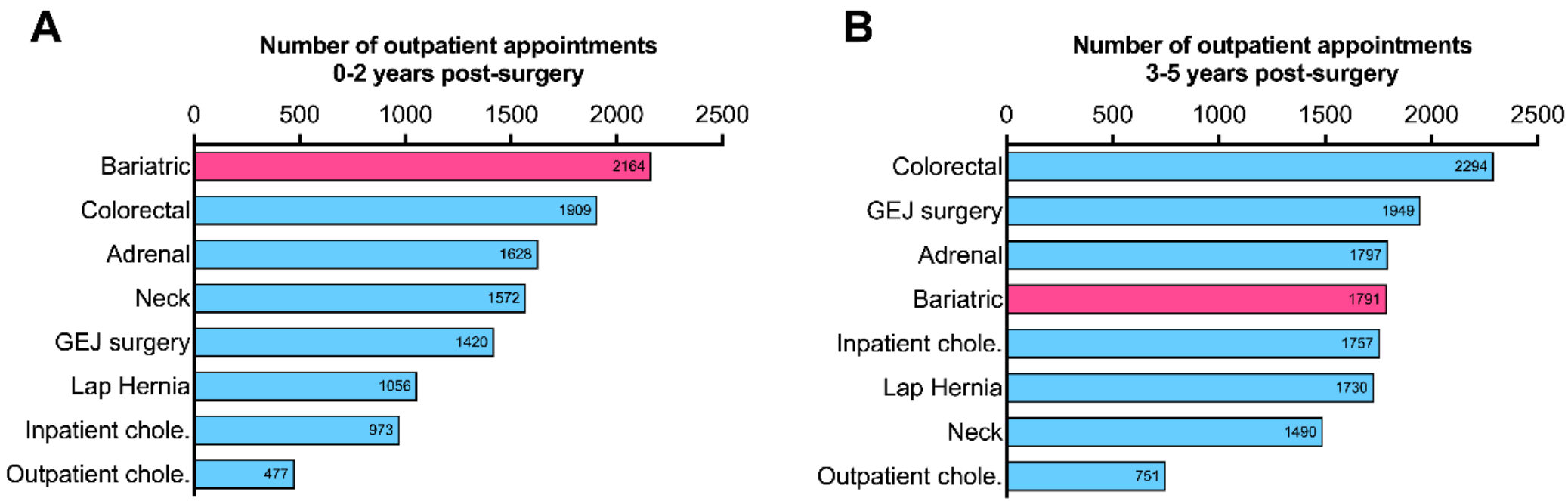
2.3
P = 0.001
Neck
2.3
P = 0.025
GEJ surgery
2.0
Outpatient chole.
1.3
Bariatric
1.0
Adrenal
0.9

Outpatient Appointments over 5 years

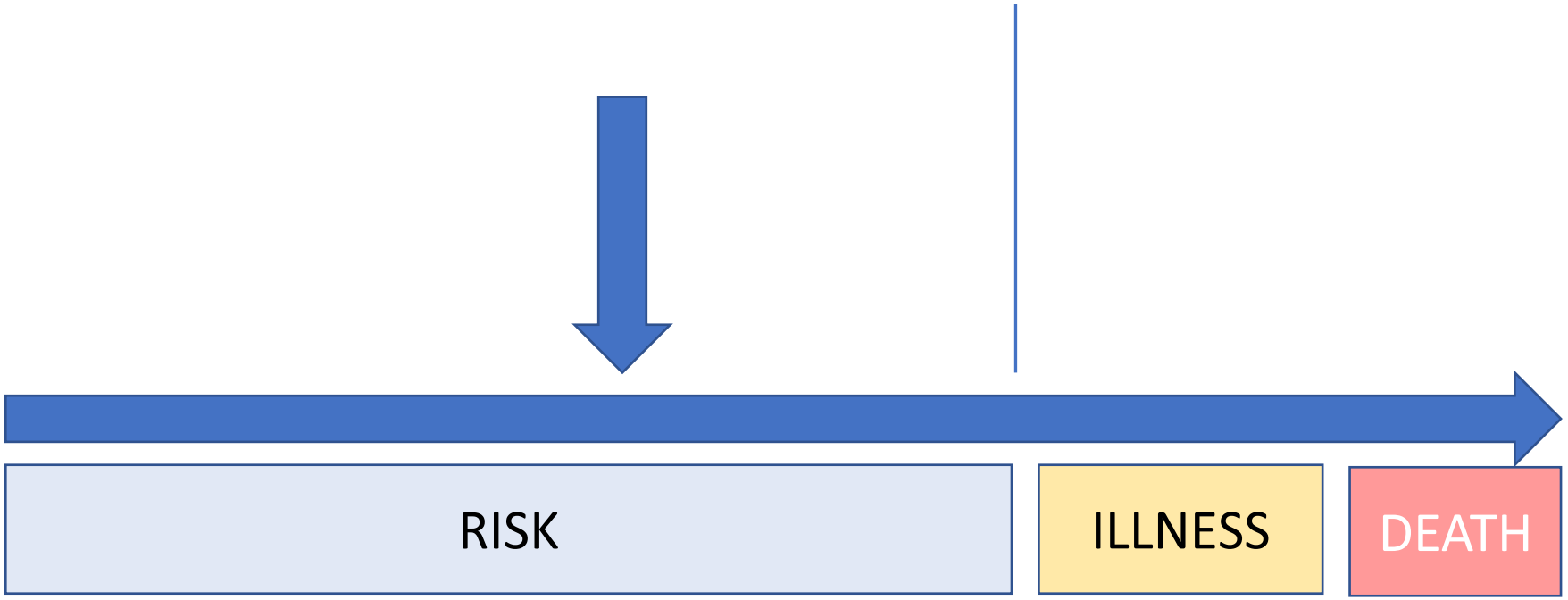

A
Number of outpatient appointments
0-2 years post-surgery
0
500
1000
1500
2000
2500
Bariatric
2164
Colorectal
1909
Adrenal
1628
Neck
1572
GEJ surgery
1420
Lap Hernia
1056
Inpatient chole.
973
Outpatient chole.
477
B
Number of outpatient appointments
3-5 years post-surgery
0
500
1000
1500
2000
2500
Colorectal
2294
GEJ surgery
1949
Adrenal
1797
Bariatric
1791
Inpatient chole.
1757
Lap Hernia
1730
Neck
1490
Outpatient chole.
751

Conclusion

- BMS is as safe as commonly performed general surgery operations

- 5-year healthcare utilization and cost is comparable or better than other elective general surgery procedures

“BARIATRIC” (WEIGHT-LOSS) SURGERY: REASONS FOR MISPERCEPTIONS OF SAFETY



BARIATRIC SURGERY COCEPTUALIZED AS “PROPHYLACTIC” SURGERY

THE LANCET
Diabetes & Endocrinology

KING'S HEALTH PARTNERS
An Academic Health Sciences Centre for London
Pioneering better health for all

Lancet Commission on Clinical Obesity

"Commissioners Group": Globally representative, multidisciplinary group of 58 world-leading experts, including:

- Academic clinicians specialised in obesity care
- Scientists (mechanisms underlying clinical manifestations of obesity)
- Public Health Specialists
- Patients Representatives
- WHO officers

Clinical Diagnosis, Biological Diagnosis and Physical Phenotype

Obesity (Excess Adiposity)

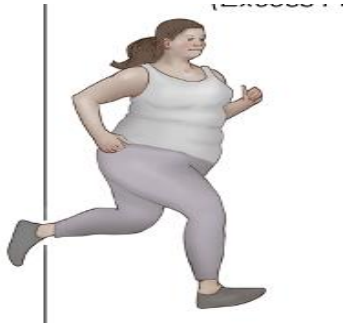
Preserved Health

Illness (Clinical Obesity)

PHYSICAL PHENOTYPE
adiposity-related risk exists as a continuum

CLINICAL DIAGNOSIS
Health & Illness are objective, binary conditions

Scope of Care in Obesity: Primary Prevention, Risk Reduction and Disease Treatment



Causes of Adipose Tissue Expansion

- Genetic
- Environmental
- Psychological
- Other (Unknown)

Obesity

Preserved Health

Illness (Clinical Obesity)

Primary Prevention

Monitoring ± Prophylactic Intervention (Risk Reduction)

Therapeutic Intervention (Disease Treatment)