

Supplementary materials

Table S1 Baseline characteristics of patients who underwent Roux-en-Y gastric bypass or sleeve gastrectomy procedure from 17 health systems participating in the PCORnet Bariatric Study

Variable ^a	Roux-en-Y gastric bypass		Sleeve gastrectomy	
	Number	Proportion	Number	Proportion
Total	20,260	100.0	16,216	100.0
Age				
20-44	9,282	45.8	8,101	50.0
45-64	9,987	49.3	7,346	45.3
65-80	991	4.9	769	4.7
Male sex	4,043	20.0	3,210	19.8
Race				
White	14,711	72.6	9,512	58.7
Black	2,564	12.7	3,498	21.6
Other	2,985	14.7	3,206	19.8
Hispanic ethnicity	3,626	17.9	4,408	27.2
Year of procedure				
2005-2009	1,684	8.3	423	2.6
2010	3,067	15.1	1,134	7.0
2011	4,277	21.1	2,916	18.0
2012	5,219	25.8	3,583	22.1
2013	3,139	15.5	3,829	23.6

2014	2,497	12.3	3,821	23.6
2015	377	1.9	510	3.2
Comorbidity score (SD)	-0.00	0.9	-0.05	0.9
Baseline weight (SD)	280.37	55.9	273	55.9
Baseline weight proximity ^b (SD)	-22.83	32.5	-15.31	32.5
Smoking	2025	10.0	1,402	8.7
Days of hospitalization (SD)	0.40	4.4	0.46	6.0
Diagnosis of				
Anxiety	4,629	22.9	3,510	21.7
Deep vein thrombosis	144	0.7	98	0.6
Depression	6,818	33.7	4,647	28.7
Diabetes	9,019	44.5	4,633	28.6
Dyslipidemia	10,956	54.1	7,517	46.4
Eating disorder	3,634	17.9	1,003	6.2
GERD	9,585	47.3	5,602	34.6
Hypertension	13,018	64.3	8,907	54.9
Infertility	141	0.7	146	0.9
Kidney disease	1,888	9.3	1,247	7.7
NAFLD	6,032	29.8	2,641	16.3
Osteoarthritis	385	1.9	282	1.7
PCOS	1,099	5.4	772	4.8
Psychosis	1,080	5.3	591	3.6

Pulmonary embolism	284	1.4	179	1.1
Sleep apnea	11,011	54.4	6,677	41.2
Substance use disorder	418	2.1	398	2.5

Abbreviations: BMI, body mass index; GERD, gastroesophageal reflux disease; NAFLD, non-alcoholic fatty liver disease; PCOS, polycystic ovarian syndrome; SD, standard deviation

^a measured in the year prior to the surgery unless otherwise specified

^b Number of days between baseline weight measurement and index procedure

Table S2 Results from a linear regression model that adjusted for sites and confounders as individual covariates (Model 1) from 17 health systems participating in the PCORnet Bariatric Study that did not have any warnings or errors when fitting site-specific propensity score models

Variable ^a	Parameter estimate		Standard error	
	Pooled individual- level data analysis	Distributed regression	Pooled individual- level data analysis	Distributed regression
Exposure ^b	-0.05417	-0.05417	0.00104	0.00104
Age				
20-44	-0.01836	-0.01836	0.00106	0.00106
45-64	Reference	Reference	Reference	Reference
65-80	0.01603	0.01603	0.00221	0.00221
Male sex	0.01987	0.01987	0.00134	0.00134
Race				
White	Reference	Reference	Reference	Reference
Black	0.02847	0.02847	0.00136	0.00136
Other	0.00775	0.00775	0.00153	0.00153
Hispanic ethnicity	0.00379	0.00379	0.00143	0.00143
Year of procedure				
2005-2009	-0.00602	-0.00602	0.00215	0.00215
2010	-0.00295	-0.00295	0.00167	0.00167

2011	-0.00297	-0.00297	0.00142	0.00142
2012	Reference	Reference	Reference	Reference
2013	0.00395	0.00395	0.00143	0.00143
2014	0.00659	0.00659	0.00149	0.00149
2015	0.03071	0.03071	0.00308	0.00308
Comorbidity score ^{c,d}	0.00501	0.00501	0.00071879	0.00071879
Baseline weight ^{c,d}	-0.00022947	-0.00022947	0.00000939	0.00000939
Baseline weight proximity ^{d,e}	0.00011663	0.00011663	0.00001382	0.00001382
Smoking ^c	-0.00823	-0.00823	0.00161	0.00161
Days of hospitalization ^{c,d}	0.00052312	0.00052312	0.00008975	0.00008975
Diagnosis of ^c				
Anxiety	-0.00012113	-0.00012113	0.00119	0.00119
Deep vein thrombosis	0.00434	0.00434	0.00574	0.00574
Depression	0.00452	0.00452	0.00108	0.00108
Diabetes	0.01901	0.01901	0.00108	0.00108
Dyslipidemia	0.00194	0.00194	0.00104	0.00104
Eating disorder	-0.00457	-0.00457	0.00244	0.00244
GERD	-0.00158	-0.00158	0.00096297	0.00096297
Hypertension	0.01309	0.01309	0.00126	0.00126
Infertility	0.00942	0.00942	0.00517	0.00517
Kidney disease	0.00097512	0.00097512	0.00176	0.00176
NAFLD	-0.00714	-0.00714	0.00153	0.00153

Osteoarthritis	-0.00243	-0.00243	0.00342	0.00342
PCOS	0.00229	0.00229	0.00213	0.00213
Psychosis	0.00022292	0.00022292	0.00227	0.00227
Pulmonary embolism	0.00202	0.00202	0.00417	0.00417
Sleep apnea	-0.00057665	-0.00057665	0.00098979	0.00098979
Substance use disorder	-0.00201	-0.00201	0.00316	0.00316

Abbreviations: BMI, body mass index; GERD, gastroesophageal reflux disease; NAFLD, non-alcoholic fatty liver disease; PCOS, polycystic ovarian syndrome

^a Also adjusted for sites (16 indicator variables; results not shown for brevity)

^b Roux-en-Y gastric bypass vs. sleeve gastrectomy

^c measured in the year prior to the surgery

^d modeled as a continuous variable

^e Number of days between baseline weight measurement and index procedure

Table S3 Results from a linear regression model that adjusted for sites and confounders as propensity score deciles (Model 2) from 17 health systems participating in the PCORnet Bariatric Study that did not have any warnings or errors when fitting site-specific propensity score models

Variable ^a	Parameter estimate		Standard error	
	Pooled individual-level data analysis	Distributed regression	Pooled individual-level data analysis	Distributed regression
Exposure ^b	-0.05510	-0.05510	0.00112	0.00112
PS stratum 1	Reference	Reference	Reference	Reference
PS stratum 2	-0.00689	-0.00689	0.00212	0.00212
PS stratum 3	-0.00934	-0.00934	0.00213	0.00213
PS stratum 4	-0.00721	-0.00721	0.00213	0.00213
PS stratum 5	-0.00106	-0.00106	0.00214	0.00214
PS stratum 6	-0.00556	-0.00556	0.00215	0.00215
PS stratum 7	-0.00157	-0.00157	0.00217	0.00217
PS stratum 8	-0.00565	-0.00565	0.00219	0.00219
PS stratum 9	-0.00748	-0.00748	0.00221	0.00221
PS stratum 10	-0.01035	-0.01035	0.00224	0.00224

Abbreviation: PS, propensity score

^a Also adjusted for sites (16 indicator variables; results not shown for brevity)

^b Roux-en-Y gastric bypass vs. sleeve gastrectomy

Table S4 Results from a linear regression model that adjusted for sites and confounders as both individual covariates and propensity score deciles (Model 3) from 17 health systems participating in the PCORnet Bariatric Study that did not have any warnings or errors when fitting site-specific propensity score models

Variable ^a	Parameter estimate		Standard error	
	Pooled	Distributed	Pooled	Distributed
	individual-level	regression	individual-level	regression
	data analysis		data analysis	
Exposure ^b	-0.05402	-0.05402	0.00107	0.00107
Age				
20-44	-0.01832	-0.01832	0.00107	0.00107
45-64	Reference	Reference	Reference	Reference
65-80	0.01602	0.01602	0.00222	0.00222
Male sex	0.01977	0.01977	0.00135	0.00135
Race				
White	Reference	Reference	Reference	Reference
Black	0.02844	0.02844	0.00138	0.00138
Other	0.00781	0.00781	0.00154	0.00154
Hispanic ethnicity	0.00378	0.00378	0.00144	0.00144
Year of procedure				
2005-2009	-0.00460	-0.00460	0.00241	0.00241
2010	-0.00195	-0.00195	0.00187	0.00187

2011	-0.00264	-0.00264	0.00144	0.00144
2012	Reference	Reference	Reference	Reference
2013	0.00390	0.00390	0.00149	0.00149
2014	0.00658	0.00658	0.00161	0.00161
2015	0.03077	0.03077	0.00313	0.00313
Comorbidity score ^{c,d}	0.00500	0.00500	0.00072048	0.00072048
Baseline weight ^{c,d}	-0.00022894	-0.00022894	0.00000943	0.00000943
Baseline weight proximity ^{d,e}	0.00010994	0.00010994	0.00001484	0.00001484
Smoking ^c	-0.00831	-0.00831	0.00162	0.00162
Days of hospitalization ^{c,d}	0.00052471	0.00052471	0.00008977	0.00008977
Diagnosis of ^c				
Anxiety	-0.00014698	-0.00014698	0.00119	0.00119
Deep vein thrombosis	0.00464	0.00464	0.00574	0.00574
Depression	0.00460	0.00460	0.00108	0.00108
Diabetes	0.01937	0.01937	0.00120	0.00120
Dyslipidemia	0.00192	0.00192	0.00104	0.00104
Eating disorder	-0.00450	-0.00450	0.00244	0.00244
GERD	-0.00150	-0.00150	0.00098574	0.00098574
Hypertension	0.01311	0.01311	0.00126	0.00126
Infertility	0.00947	0.00947	0.00517	0.00517
Kidney disease	0.00108	0.00108	0.00176	0.00176
NAFLD	-0.00713	-0.00713	0.00154	0.00154
Osteoarthritis	-0.00227	-0.00227	0.00342	0.00342

PCOS	0.00239	0.00239	0.00213	0.00213
Psychosis	0.00032954	0.00032954	0.00227	0.00227
Pulmonary embolism	0.00197	0.00197	0.00417	0.00417
Sleep apnea	-0.00050194	-0.00050194	0.00100	0.00100
Substance use disorder	-0.00208	-0.00208	0.00316	0.00316
PS stratum 1	Reference	Reference	Reference	Reference
PS stratum 2	0.00172	0.00172	0.00206	0.00206
PS stratum 3	0.00052408	0.00052408	0.00210	0.00210
PS stratum 4	-0.00053874	-0.00053874	0.00214	0.00214
PS stratum 5	0.00422	0.00422	0.00221	0.00221
PS stratum 6	-0.00107	-0.00107	0.00229	0.00229
PS stratum 7	0.00193	0.00193	0.00238	0.00238
PS stratum 8	-0.00009193	-0.00009193	0.00251	0.00251
PS stratum 9	0.00005249	0.00005249	0.00268	0.00268
PS stratum 10	-0.00202	-0.00202	0.00302	0.00302

Abbreviations: BMI, body mass index; GERD, gastroesophageal reflux disease; NAFLD, non-alcoholic fatty liver disease; PCOS, polycystic ovarian syndrome; PS, propensity score

^a Also adjusted for sites (16 indicator variables; results not shown for brevity)

^b Roux-en-Y gastric bypass vs. sleeve gastrectomy

^c measured in the year prior to the surgery

^d modeled as a continuous variable

^e Number of days between baseline weight measurement and index procedure