Supplementary material

Supplementary Table 1 ICD-10 codes used in the study

ICD-10 codes	Interpretation
K51*	Ulcerative colitis
Z681	BMI of 19.9 or less
R636	Diagnosis of underweight
Z68230, Z6831, Z6832, Z6833, Z6834, Z6835, Z6836, Z6837, Z6838, Z6839, Z6840, Z6841, Z6842, Z6843, Z6844, Z6845	BMI 30 to 70 or greater
E660, E661, E662, E668, E669	Diagnosis of obesity

*All codes that started with K51

BMI, body mass index; ICD, International Statistical Classification of Diseases and Related Health Problems

Supplementary Table 2 Comorbidities compared between the 2 groups

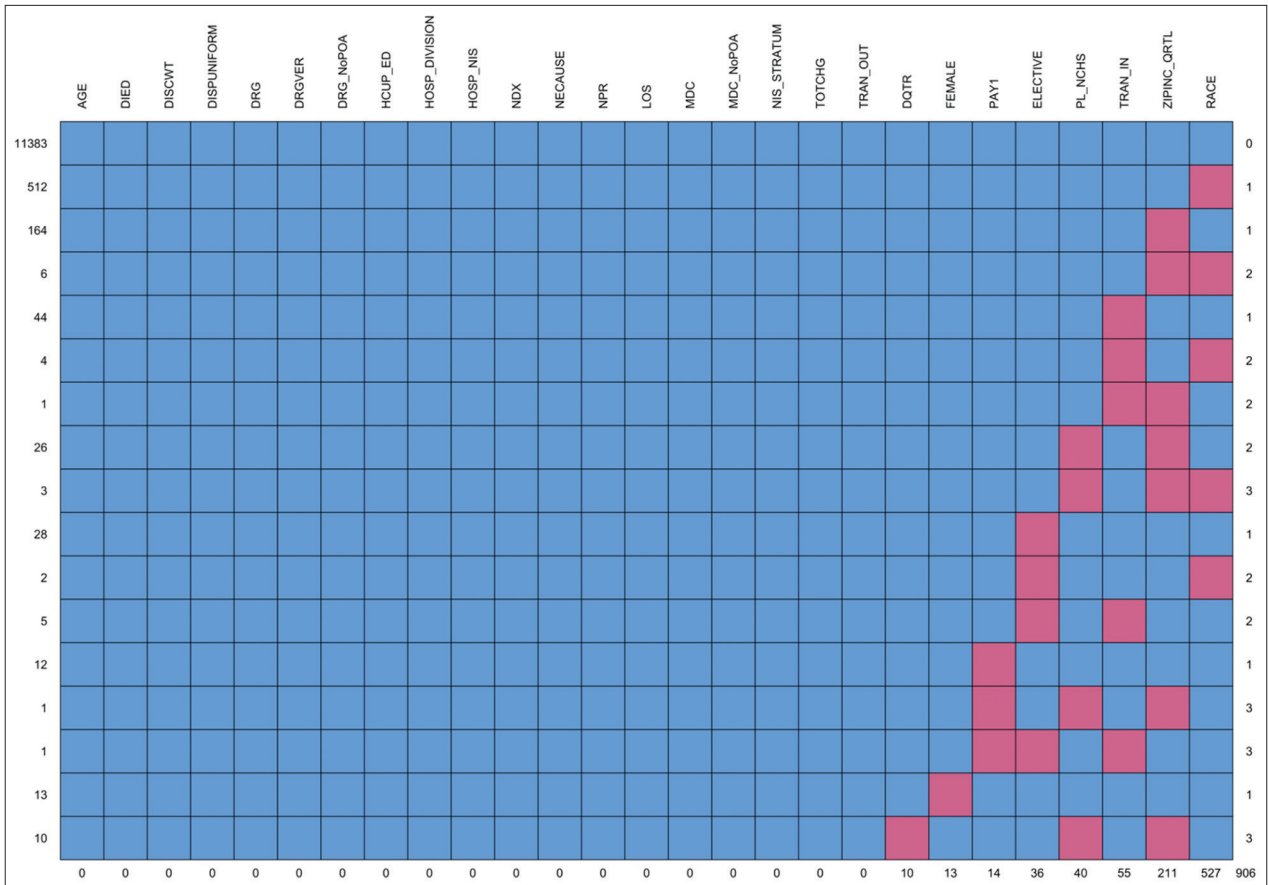| Comorbidities	Non-obese	Obese	P-value
Acute myocardial infarction (%)	1730 (3.1)	265 (4.4)	0.021
Congestive heart failure (%)	2115 (3.8)	435 (7.2)	<0.001
Peripheral vascular disease (%)	2235 (4.1)	290 (4.8)	0.220
Cerebrovascular disease (%)	1105 (2.0)	135 (2.2)	0.583
Dementia (%)	1300 (2.4)	50 (0.8)	0.001
Chronic obstructive pulmonary disease (%)	7340 (13.3)	1290 (21.4)	<0.001
Rheumatoid disease (%)	1735 (3.2)	220 (3.7)	0.345
Peptic ulcer disease (%)	710 (1.3)	80 (1.3)	0.908
Mild liver disease (%)	2260 (4.1)	365 (6.1)	0.002
Diabetes without complications (%)	6255 (11.4)	1420 (23.6)	<0.001
Diabetes with complications (%)	1090 (2.0)	320 (5.3)	<0.001
Hemiplegia or paraplegia (%)	220 (0.4)	30 (0.5)	0.612
Renal disease (%)	2790 (5.1)	485 (8.1)	<0.001
Cancer (any malignancy) (%)	1845 (3.4)	200 (3.3)	0.956
Moderate or severe liver disease (%)	405 (0.7)	40 (0.7)	0.781
Metastatic solid tumor (%)	365 (0.7)	50 (0.8)	0.506
AIDS/HIV (%)	95 (0.2)	0.0 (0.0)	0.149
Weighted Charlson score (mean (SD))	0.77 (1.37)	1.17 (1.59)	<0.001
Pregnant (%)	1330.0 (2.4)	110 (1.8)	0.176

Supplementary Table 3 Balance summary of propensity scores estimated by regression model across all imputations

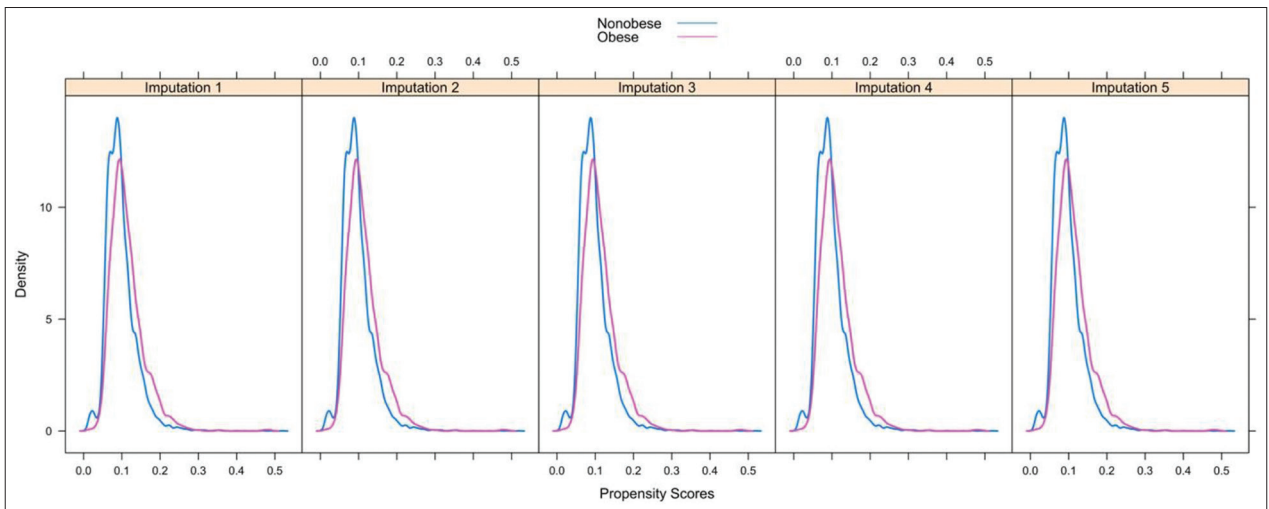| Variable	Type	Min.Diff.Un	Mean.Diff.Un	Max.Diff.Un
prop.score	Distance	-0.399	-0.397	-0.396
AGE	Contin.	-0.164	-0.164	-0.164
ELECTIVE	Binary	-0.083	-0.082	-0.082
FEMALE	Binary	-0.079	-0.079	-0.078
Expected primary payer				
Medicare	Binary	-0.042	-0.041	-0.041
Medicaid	Binary	0.008	0.008	0.008
Private insurance	Binary	0.021	0.021	0.021
Self-pay	Binary	0.005	0.005	0.006
No charge	Binary	0.004	0.004	0.004
Others	Binary	0.002	0.002	0.003
Patient location: NCHS Urban-Rural Code				
"Central" counties of metro areas of ≥1 million population	Binary	0.015	0.015	0.016
"Fringe" counties of metro areas of ≥1 million population	Binary	0.008	0.008	0.008
Counties in metro areas of 250,000-999,999 population	Binary	-0.006	-0.006	-0.005
Counties in metro areas of 50,000-249,999 population	Binary	-0.004	-0.004	-0.004
Micropolitan counties	Binary	-0.011	-0.01	-0.01
Not metropolitan or micropolitan counties	Binary	-0.003	-0.003	-0.002
RACE				
White	Binary	-0.011	-0.011	-0.009
Black	Binary	-0.015	-0.013	-0.011
Hispanic	Binary	0.002	0.003	0.004
Asian or Pacific Islander	Binary	0.012	0.013	0.013
Native American	Binary	-0.002	-0.001	0
Other	Binary	0.008	0.009	0.01
Indicator of a transfer into the hospital				
Not transferred in	Binary	-0.006	-0.005	-0.005
Transferred in from a different acute care hospital	Binary	0.001	0.001	0.002
Transferred in from another type of health facility	Binary	0.004	0.004	0.004
Median household income for patient's ZIP Code				
0-25th percentile	Binary	-0.016	-0.015	-0.014
26th to 50th percentile	Binary	-0.021	-0.02	-0.02
51st to 75th percentile	Binary	-0.007	-0.005	-0.003
76th to 100th percentile	Binary	0.038	0.041	0.042
Weighted Charlson score	Contin.	-0.266	-0.266	-0.266

Supplementary Table 4 Balance summary of propensity scores estimated by generalized boosting modeling

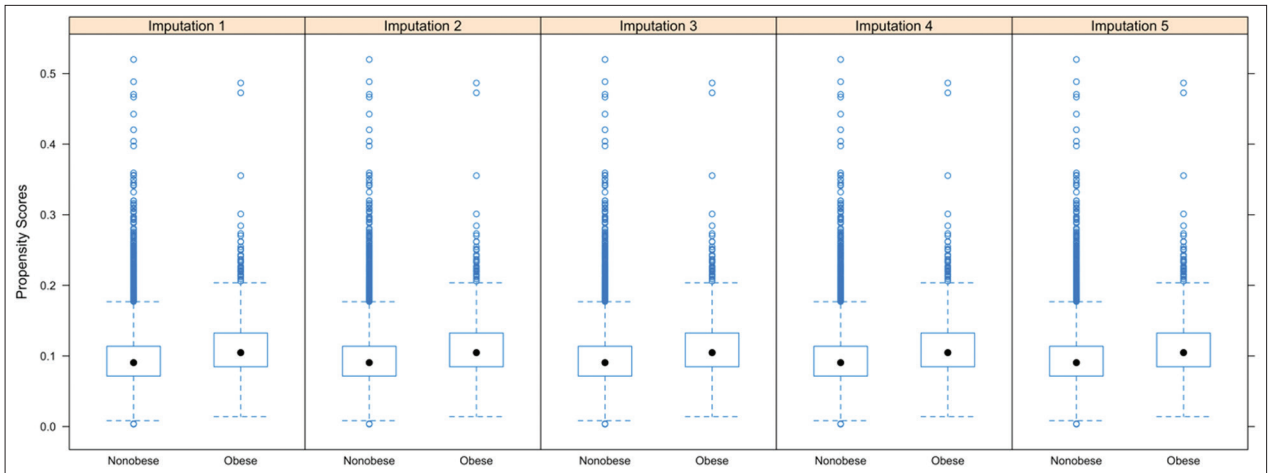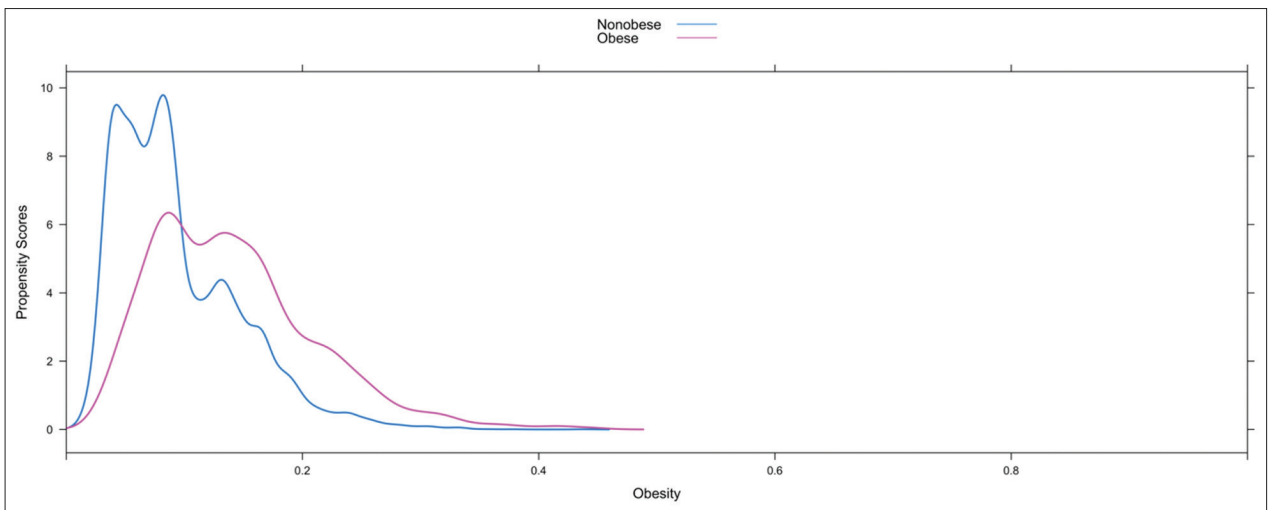| Variable	tx.mn	tx.sd	ct.mn	ct.sd	std.eff. sz	stat	P-value
AGE	51.451	18.544	51.276	19.535	0.009	0.236	0.814
ELECTIVE:0	0.785	0.411	0.796	0.403	-0.026	1.056	0.347
ELECTIVE:1	0.213	0.41	0.201	0.401	0.029	NA	NA
ELECTIVE:<NA>	0.001	0.038	0.003	0.054	-0.039	NA	NA
FEMALE:0	0.431	0.495	0.453	0.498	-0.044	0.966	0.379
FEMALE:1	0.568	0.495	0.546	0.498	0.043	NA	NA
FEMALE:<NA>	0.002	0.039	0.001	0.033	0.011	NA	NA
Expected primary payer (%)							
Medicare	0.329	0.47	0.327	0.469	0.006	0.775	0.55
Medicaid	0.143	0.35	0.142	0.349	0.003	NA	NA
Private insurance	0.465	0.499	0.455	0.498	0.021	NA	NA
Self-pay	0.035	0.185	0.041	0.199	-0.032	NA	NA
No charge	0.002	0.047	0.005	0.07	-0.058	NA	NA
Others	0.025	0.157	0.03	0.17	-0.029	NA	NA
PAY1:<NA>	0	0	0.001	0.034	NA	NA	NA
Patient location: NCHS Urban–Rural Code (%)							
"Central" counties of metro areas of ≥1 million population	0.292	0.455	0.295	0.456	-0.007	1.167	0.322
"Fringe" counties of metro areas of ≥1 million population	0.277	0.448	0.281	0.449	-0.007	NA	NA
Counties in metro areas of 250,000-999,999 population	0.203	0.402	0.199	0.399	0.011	NA	NA
Counties in metro areas of 50,000-249,999 population	0.094	0.292	0.09	0.286	0.014	NA	NA
Micropolitan counties	0.082	0.274	0.077	0.267	0.018	NA	NA
Not metropolitan or micropolitan counties	0.052	0.222	0.055	0.228	-0.015	NA	NA
PL_NCHS:<NA>	0	0	0.003	0.058	NA	NA	NA
RACE (%)							
White	0.744	0.437	0.728	0.445	0.036	1.423	0.205
Black	0.096	0.295	0.094	0.292	0.009	NA	NA
Hispanic	0.089	0.285	0.085	0.279	0.014	NA	NA
Asian or Pacific Islander	0.006	0.077	0.016	0.124	-0.126	NA	NA
Native American	0.004	0.067	0.005	0.068	-0.003	NA	NA
Other	0.024	0.152	0.03	0.17	-0.042	NA	NA
RACE:<NA>	0.037	0.188	0.043	0.203	-0.032	NA	NA
Indicator of a transfer into the hospital (%)							
Not transferred in	0.951	0.215	0.944	0.23	0.034	0.354	0.781
Transferred in from a different acute care hospital	0.033	0.18	0.039	0.193	-0.031	NA	NA
Transferred in from another type of health facility	0.012	0.109	0.013	0.112	-0.007	NA	NA
Median household income for patient's ZIP Code							
0-25th percentile	0.003	0.058	0.004	0.066	-0.017	NA	NA
26th to 50th percentile (median)	0.227	0.419	0.223	0.416	0.011	1.59	0.174
51st to 75th percentile	0.257	0.437	0.241	0.428	0.036	NA	NA
76th to 100th percentile	0.258	0.438	0.258	0.438	0	NA	NA
Median household income for patient's ZIP Code	0.25	0.433	0.26	0.439	-0.025	NA	NA
ZIPINC_QRTL:<NA>	0.008	0.091	0.017	0.131	-0.101	NA	NA
Weighted Charlson score	0.825	1.399	0.808	1.395	0.012	0.385	0.701

NA, not available

Supplementary Figure 1 Missing data pattern, blue represents no missing data and pink represents missing data
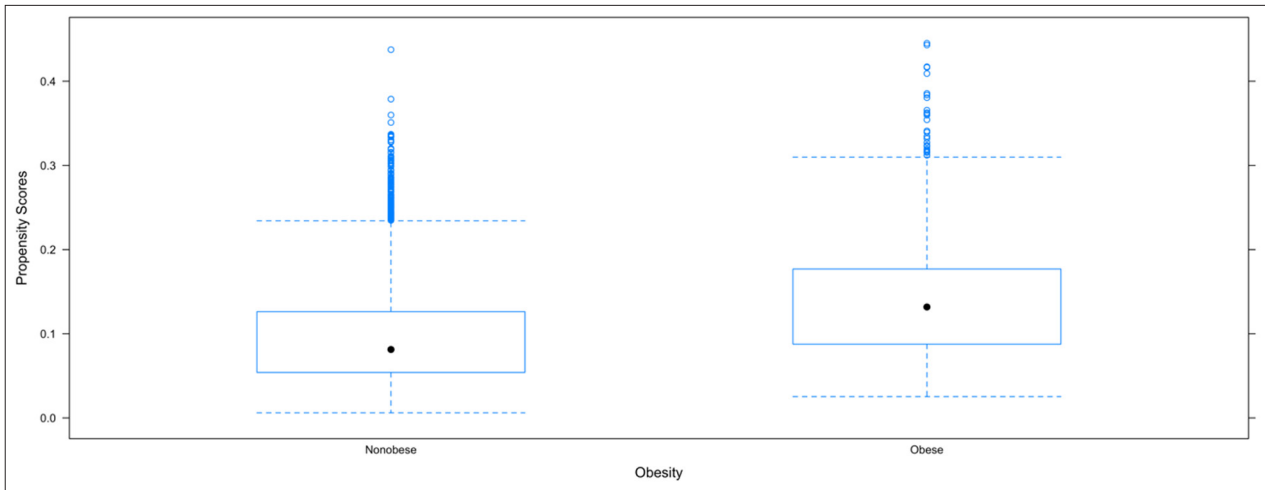

Supplementary Figure 2 Kernel density plots to evaluate common support in the propensity scores estimated by regression model in all imputed datasets. Imputation 1 to Imputation 5 represent all imputed datasets estimated by multiple imputations. The blue curves represent nonobese subjects and pink curves represent obese subjects in the dataset
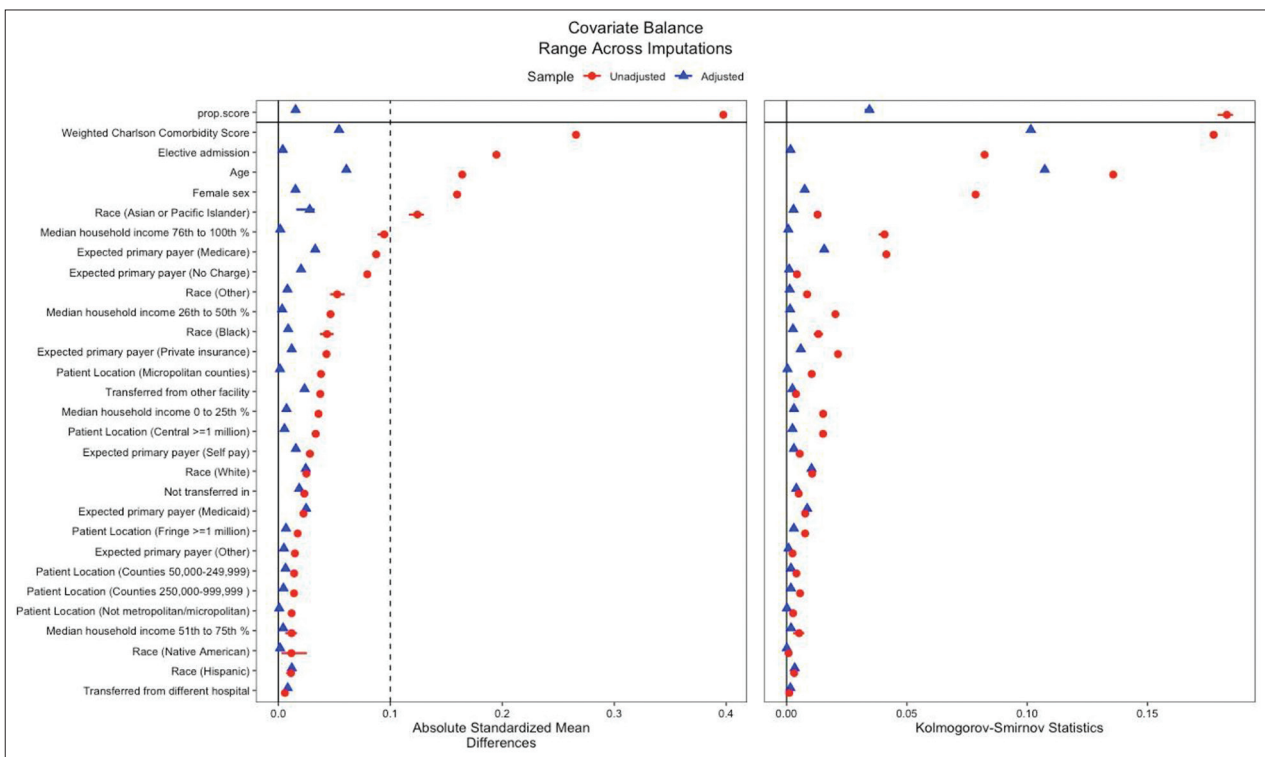
Supplementary Figure 3 Box-and-whiskers plots to evaluate common support in the propensity scores estimated by regression model in all imputed datasets. Imputation 1 to Imputation 5 represent all imputed datasets estimated by multiple imputations
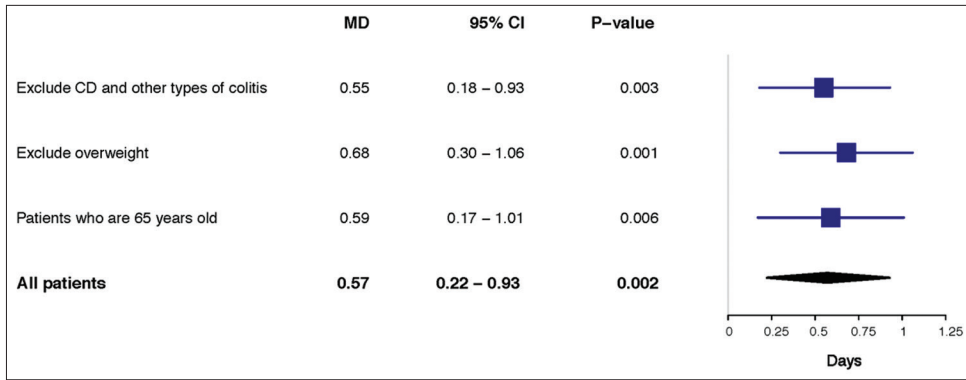

Supplementary Figure 4 Kernel density plot to evaluate common support in the propensity scores estimated by generalized boosting modeling
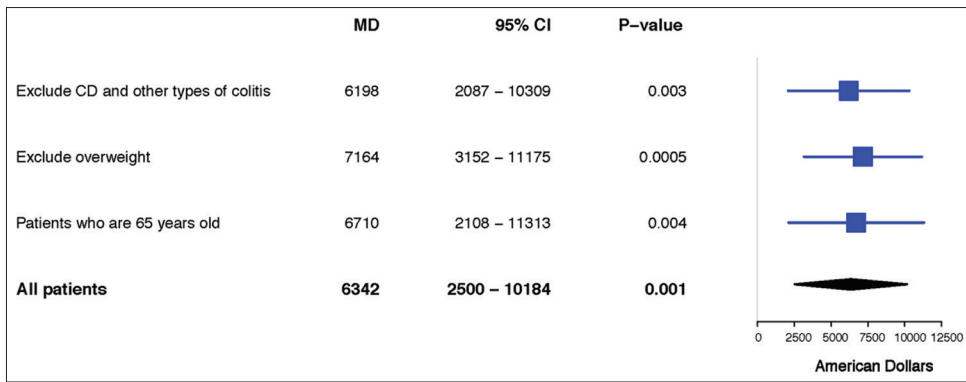
Supplementary Figure 5 Box-and-whiskers plots to evaluate common support in the propensity scores estimated by generalized boosting modeling

Supplementary Figure 6 Love plot summarizing covariate balance before and after applying inverse probability of treatment weighting (IPTW). ● Represent covariates before applying IPTW and ▲ represent covariates after applying IPTW

	MD	95% CI	P-value
Exclude CD and other types of colitis	0.55	0.18 – 0.93	0.003
Exclude overweight	0.68	0.30 – 1.06	0.001
Patients who are 65 years old	0.59	0.17 – 1.01	0.006
All patients	**0.57**	**0.22 – 0.93**	**0.002**

Supplementary Figure 7 Subgroup analyses of length of hospital stay
CI, confidence interval; MD, mean difference; CD, Crohn's disease

	MD	95% CI	P-value
Exclude CD and other types of colitis	6198	2087 – 10309	0.003
Exclude overweight	7164	3152 – 11175	0.0005
Patients who are 65 years old	6710	2108 – 11313	0.004
All patients	**6342**	**2500 – 10184**	**0.001**

Supplementary Figure 8 Subgroup analyses of total charges
CI, confidence interval; MD, mean difference; CD, Crohn's disease