

Table S1: CPT and ICD-9 codes used to define surgical procedures in cohort

Colectomy	
Inclusion	44140, 44141, 44143, 44144, 44145, 44146, 44147, 44150, 44151, 44155, 44156, 44157, 44158, 44160
Exclusion	44204, 44205, 44206, 44207, 44208, 44210, 44211, 44212
Other Exclusion Criteria	- ICD-9 admitting diagnosis of obstruction (560.89, 560.9), perforation (569.83), peritonitis (567.0, 567.2x, 567.8x, 567.9) - ICD-9 code 45.81 or 17.3x for laparoscopic colectomy
Nephrectomy	
Inclusion	50220, 50225, 50230, 50234, 50236, 50240
Exclusion	50543, 50545, 50546, 50548
Splenectomy	
Inclusion	38100, 38101
Exclusion	38120
Adrenalectomy	
Inclusion	60540, 60545
Exclusion	60650
Complete Cystectomy	
Inclusion	51570, 51575, 51580, 51585, 51590, 51595, 51596
Exclusion	51999
Pancreatectomy	
Inclusion	48150, 48152, 48153, 48154

Abbreviations:

CPT – current procedure terminology

ICD-9 - International Classification of Disease 9th Edition

Table S2: Co-morbidity and medication definitions

Co-morbidity	Definition
Smoking	V15.82, 305.1x, prescription of varenicline tartrate or nicotine replacement therapy (nicotine patch or gum) anytime during baseline
Heart failure	428.xx, 398.91, 402.01, 402.11, 402.91, 404.01, 404.11, 404.91, 404.03, 404.13, 404.93
Ischemic Heart Disease	410.xx, 411.xx, 412.xx, 413.xx, 414.xx, V45.82 V45.81 ICD-9 Procedure Codes 00.66, 36.01, 36.02, 36.03, 36.05, 36.09, 36.06, 36.07, 36.1x, 36.2x CPT Codes: 92973, 92982, 92984, 92995, 92996, 92980, 92981, 33510 – 33536, 33545, 33572
Cardiac dysrhythmia or conduction disorders	427.xx (excluding 427.5), 426.xx
Cerebrovascular Disease	433.x1, 434.x1, 436.xx, 437.1x, 437.9x, 438.xx, 435.xx, V12.54, 430.xx, 431.xx, 432.xx
Diabetes	250.xx
Obesity and overweight	278.0x
COPD	491.xx, 492.xx, or 496.xx
Asthma	493.xx
Oxygen	V46.2x
Osteoarthritis	715.xx
Rheumatoid arthritis	714.xx
Acute or Chronic Renal Dysfunction	580.0, 580.4, 580.8x, 580.9, 581.0, 581.1, 581.2, 581.2, 581.3, 581.8, 581.9, 584.6, 584.7, 584.8, 584.9, 582.x, 583.x, 585.x, 586.x, 587.x, 250.4, 250.40, 250.41, 250.42, 250.43, 403.xx, 404.xx, 274.10, 440.1, 442.1, 453.3, 581.xx, 593.xx, 753.0, 753.3, 866.00 866.01, 866.1 ICD-9 procedure Codes: 39.95, 54.98, V56.0, V56.8 CPT Codes: 90935 – 90993, 99512, 99559
Liver Disease	571.xx, 070.xx, 570.xx, 572.xx, 573.xx, 456.0x – 456.2x, 155.0x, 155.1x, 155.2x, 576.8x, 277.3x, 751.60, 751.69, 782.4x, 789.5x ICD-9 procedure codes: 39.1x, 42.91
GI chronic inflammatory diseases	555.xx, 556.xx
Haemostatic disorders	269.0x, 286.7x, 286.0x-2x, 286.3x, 286.4x, 286.5x, 286.6x, 286.9x, 287.1x, 287.3x, 287.4x, 287.5x, 289.81, 289.82, 289.84, 208.xx,
Dementia	290.xx, 294.xx, 330.xx, 331.xx
Alcohol or drug abuse or dependence	291.xx, 303.xx, 305.0x, 292.xx, 304.xx, 305.2x-305.9x
Cancer	140.x-195.x, 196.x-198.x, 199.x, 200.x-208.x, 230.x-234.x, 235.x-238.x, 239.x, excluding (173.xx), v10.xx
Delirium	290.11, 290.3x, 290.41, 291.0x, 292.81, 293.xx, 348.3x, 349.82
Mood disorder	293.83, 296.2x, 296.3x, 298.0x, 300.4x, 309.0x, 309.1x, 309.28, 311.xx 296.0x, 296.1x, 296.4x, 296.5x, 296.6x, 296.7x, 296.8x, 296.99
Psychosis	290.8x, 290.9x, 295.xx, 297.xx, 298.xx, 299.xx, 780.1x
Back Pain	720.xx - 724.xx, 738.4x, 739.3x, 739.4x, 756.11, 756.12, 805.xx, 846.xx, 847.xx, 648.7x
Fibromyalgia	729.1
Migraine or other headache syndrome	346.xx, 339.0x-339.8x; 784.0x
Chronic Pain	338.0x (338.1x excluded), 338.2x, 338.4x
Seizure Disorder	345.x
MEDICATIONS	Definition
ACE-Inhibitors	Benazepril, Captopril, Enalapril, Fosinopril, Lisinopril, Moexipril, Perindopril, Quinapril, Ramipril, Trandolapril

ARBs	Candesartan, Eprostatan, Irbesartan, Losartan, Olmesartan, Telmisartan, Valsartan
Beta-blockers	Acebutolol, atenolol, betaxolol, bisoprolol, carteolol, carvedilol, esmolol, labetalol, metoprolol tartrate, metoprolol succinate, propranolol, penbutolol, pindolol, nadolol, sotalol, timolol
Calcium channel blockers	Diltiazem, Mibefradil, Verapamil, Amlodipine, Bepridil, Felodipine, Isradipine, Nicardipine, Nifedipine, Nimodipine, Nisoldipine, Amlodipine-atorvastatin
Diuretics	Bendroflumethiazide, Benzthiazide, Chlorothiazide, Chlorthalidone, Cyclothiazide, Hydrochlorothiazide, Hydroflumethiazide, Indapamide, Methyclothiazide, Metolazone, Polythiazide, Quinethazone, Trichlormethiazide, Furosemide, Bumetanide, Torsemide, Ethacrynic Acid
Antiarrhythmics	Amiodarone, Dronedarone, Flecainide, Ibutilide, Procainamide, Propafenone, Quinidine Disopyramide, Dofetilide, Mexiletine, Moricizine, Tocainide
Oral anticoagulants	Warfarin, Dabigatran, Rivaroxaban
Heparin, LMWH, or fondaparinux	Heparin, Dalteparin, Enoxaparin, Tinzaparin, Fondaparinux
Antiplatelets	Aspirin, Clopidogrel, Prasugrel, Dipyridamole, Aspirin-Dipyridamole
Insulin	Insulin
Non-insulin hypoglycemics	Acarbose, Acetahexamide, Chlorpropamide, Exenatide, Liraglutide, Glimepiride, Glipizide, Glyburide, Linagliptin, Metformin, Miglitol, Nateglinide, Pioglitazone, Pramlintide, Repaglinide, Rosiglitazone, Saxagliptin, Sitagliptin, Tolazamide, Tolbutamide, Troglitazone,
Digoxin	Digoxin
Statins	Atorvastatin, Fluvastatin, Lovastatin, Pravastatin, Simvastatin, Rosuvastatin, Lovastatin-Niacin, Ezetimibe-Simvastatin, Pravastatin-Aspirin
Chronic respiratory therapy	Beclomethasone, Budesonide, Ciclesonide, Flunisolide, Fluticasone, Mometasone, Triamcinolone, Albuterol, Levalbuterol, Metaproterenol, Pirbuterol, terbutaline, Aformoterol, Formoterol, Salmeterol, Fluticasone-salmeterol, Budesonide-formoterol, Mometasone-formoterol, Ipratropium, Tiotropium, Montelukast, Zefirlukast, Zileuton, Teophylline,
Corticosteroids	Cortisone, Hydrocortisone, Prednisone, Prednisolone, Methylprednisolone, Triamcinolone, Dexamethasone,, Bethamethasone
Nonselective nonsteroidal anti-inflammatory drugs	Diclofenac, Etodolac, Flurbiprofen, Ketorolac, Ibuprofen, Indomethacin, Meloxicam, Naproxen, Piroxicam, Sulindac,
Selective COX-2 inhibitors	Celecoxib, Rofecoxib, Valdecoxib
Antidepressants	Paroxetine, Citalopram, Fluoxetine, Fluvoxamine, Sertraline, Venlafaxine, Duloxetine, Amitriptyline, Amoxapine, Clomipramine, Desipramine, Doxepin, Imipramine, Maprotiline, Nortriptyline, Protriptyline, Trimipramine, Mirtazapine, Nefazodone, Trazodone, Phenelzine , Tranylcypromine,
Antipsychotics	Clozapine, Risperidone, Olanzapine, Quetiapine, Aripiprazole, Ziprasidone, Acetophenazine, Chlorpromazine, Fluphenazine, Mesoridazine, Perphenazine, Promazine, Thioridazine, Trifluoperazine, Triflupromazine, Chlorprothixene, Haloperidol, Loxapine, Molindone, Pimozide, Thiothixene
Anti-convulsants	carbamazepine, clonazepam, divalproex, ethosuximide, felbamate, lamotrigine, levetiracetam, mephenytoin, methsuximide, oxcarbazepine, phensuximide, phenytoin, primidone, tiagabine, topiramate, trimethadione, valproic acid, zonisamide, gabapentin, pregabalin
Anxiolytics	alprazolam, chlordiazepoxide, clorazepate, diazepam, estazola, flurazepam, halazepam, hydroxyzine, lorazepam, meprobamate, oxazepam, quazepam, prazepam, temazepam, triazolam
Muscle Relaxants	tizanidine, orphenadrine, methocarbamol, metaxalone, dantrolene, cyclobenzaprine, chlorzoxazone, chlorphenesin, chlormezanone, carisoprodol, baclofen

Abbreviations:

COPD- chronic obstructive pulmonary disease

GI - gastrointestinal

ACE-inhibitors – angiotensin converting enzyme inhibitors

ARB – angiotensin II receptor blocker

LMWH – low molecular weight heparin

COX-2 – cyclooxygenase 2

Table S3: Additional baseline patient characteristics of cohort, stratified by whether the patient received an epidural

	Total	Epidural Placed	No Epidural Placed
Total, n	11537	2220	9317
Year			
2004	890(7.7)	163(7.3)	727(7.8)
2005	1783(15.5)	355(16.0)	1428(15.3)
2006	1426(12.4)	282(12.7)	1144(12.3)
2007	1420(12.3)	281(12.7)	1139(12.2)
2008	1431(12.4)	274(12.3)	1157(12.4)
2009	1184(10.3)	215(9.7)	969(10.4)
2010	1064(9.2)	217(9.8)	847(9.1)
2011	907(7.9)	164(7.4)	743(8.0)
2012	762(6.6)	148(6.7)	614(6.6)
2013	670(5.8)	121(5.5)	549(5.9)
Resource Utilization			
Number of office visits during baseline period, mean (std. dev)	5.68(4.1)	6.11(3.8)	5.58(4.2)
Number of distinct medications filled during baseline period, mean (std. dev)	5.27(4.2)	5.40(4.1)	5.23(4.3)
Number of Hospitalizations during baseline period	0.19(0.5)	0.18(0.5)	0.19(0.5)
Number of days spent in the hospital during the baseline period	1.02(3.5)	0.94(2.9)	1.04(3.6)
Comorbidities			
Diabetes	1883(16.3)	340(15.3)	1543(16.6)
Cerebrovascular Disease	253(2.2)	38(1.7)	215(2.3)
Migraine Headaches	476(4.1)	98(4.4)	378(4.1)
Mood Disorder	650(5.6)	123(5.5)	527(5.7)
Obesity	610(5.3)	123(5.5)	487(5.2)
Osteoarthritis	722(6.3)	160(7.2)	562(6.0)
Oxygen Dependent	7(0.1)	2(0.1)	5(0.1)
Psychosis	45(0.4)	10(0.5)	35(0.4)
Rheumatoid Arthritis	117(1.0)	20(0.9)	97(1.0)
Congestive Heart Failure	307(2.7)	43(1.9)	264(2.8)
Delirium	41(0.4)	7(0.3)	34(0.4)
Dementia	72(0.6)	14(0.6)	58(0.6)
Inflammatory Bowel Disease	604(5.2)	135(6.1)	469(5.0)
Seizure	47(0.4)	12(0.5)	35(0.4)
Cardiac Dysrhythmia	1142(9.9)	227(10.2)	915(9.8)
Ischemic Heart Disease	1320(11.4)	240(10.8)	1080(11.6)
History of Smoking	1736(15.1)	336(15.1)	1400(15.0)

Medications			
ACE-Inhibitor	2040(17.7)	402(18.1)	1638(17.6)
ARBs	1174(10.2)	226(10.2)	948(10.2)
Anti-Psychotics	103(0.9)	22(1.0)	81(0.9)
Anxiolytics	1227(10.6)	252(11.4)	975(10.5)
Corticosteroids	1688(14.6)	342(15.4)	1346(14.5)
Digoxin	122(1.1)	14(0.6)	108(1.2)
Diuretics	2281(19.8)	430(19.4)	1851(19.9)
Hypoglycemics	1159(10.1)	203(9.1)	956(10.3)
Insulin	317(2.8)	62(2.8)	255(2.7)
Statin	2725(23.6)	570(25.7)	2155(23.1)
Calcium Channel Blocker	1444(12.5)	272(12.3)	1172(12.6)
Chronic Respiratory Therapy	1604(13.9)	331(14.9)	1273(13.7)
Anti-Arrhythmics	78(0.7)	11(0.5)	67(0.7)
Anti-Convulsants	539(4.7)	106(4.8)	433(4.7)
Anti-Depressants	1459(12.7)	309(13.9)	1150(12.3)
Anti-Platelets	376(3.3)	51(2.3)	325(3.5)

Values are displayed as N (%), unless otherwise stated

Abbreviations

std dev – standard deviation

ACE-inhibitors – angiotensin converting enzyme inhibitors

ARB – angiotensin II receptor blocker

Table S4: Additional baseline patient characteristics of cohort, stratified by whether the patient received an epidural, after propensity score matching

	Epidural Placed	No Epidural Placed	Standardized Difference (%)
Total, n	2144	4288	
Year			
2004	157(7.3)	307(7.2)	0.6
2005	343(16.0)	695(16.2)	-0.6
2006	274(12.8)	576(13.4)	-1.9
2007	271(12.6)	527(12.3)	1.1
2008	262(12.2)	545(12.7)	-1.5
2009	212(9.9)	403(9.4)	1.7
2010	206(9.6)	405(9.4)	0.6
2011	161(7.5)	322(7.5)	0.0
2012	143(6.7)	279(6.5)	0.6
2013	115(5.4)	229(5.3)	0.1
Resource Utilization			
Number of office visits during baseline period, mean (std. dev)	6.04(3.8)	6.02(4.1)	0.0
Number of distinct medications filled during baseline period, mean (std. dev)	5.35(4.0)	5.38(4.2)	0.0
Number of Hospitalizations during baseline period	0.18(0.5)	0.17(0.5)	0.0
Number of days spent in the hospital during the baseline period	0.92(2.9)	0.89(2.9)	0.0
Comorbidities			
Diabetes	329(15.4)	664(15.5)	-0.4
Cerebrovascular Disease	38(1.8)	69(1.6)	1.2
Migraine Headaches	92(4.3)	186(4.3)	-0.2
Mood Disorder	116(5.4)	238(5.6)	-0.6
Obesity	117(5.5)	232(5.4)	0.2
Osteoarthritis	147(6.9)	303(7.1)	-0.8
Oxygen Dependent	1(0.1)	4(0.1)	-1.5
Psychosis	8(0.4)	17(0.4)	-0.5
Rheumatoid Arthritis	18(0.8)	35(0.8)	0.2
Congestive Heart Failure	43(2.0)	87(2.0)	-0.1
Delirium	6(0.3)	12(0.3)	0.0
Dementia	14(0.7)	24(0.6)	1.2
Inflammatory Bowel Disease	135(6.3)	275(6.4)	-0.5
Seizure	8(0.4)	18(0.4)	-0.8
Ischemic Heart Disease	233(10.9)	473(11.0)	-0.5
History of Smoking	321(15.0)	644(15.0)	-0.1
Cardiac Dysrhythmia	215(10.0)	434(10.1)	-0.3
Medications			
ACE-Inhibitor	388(18.1)	778(18.1)	-0.1
ARBs	219(10.2)	432(10.1)	0.5

Anti-Psychotics	20(0.9)	37(0.9)	0.7
Anxiolytics	237(11.1)	443(10.3)	2.3
Corticosteroids	325(15.2)	646(15.1)	0.3
Digoxin	14(0.7)	30(0.7)	-0.6
Diuretics	415(19.4)	843(19.7)	-0.8
Hypoglycemics	196(9.1)	399(9.3)	-0.6
Insulin	59(2.8)	121(2.8)	-0.4
Statin	539(25.1)	1084(25.3)	-0.3
Calcium Channel Blocker	267(12.5)	532(12.4)	0.1
Chronic Respiratory Therapy	318(14.8)	633(14.8)	0.2
Anti-Arrhythmics	10(0.5)	22(0.5)	-0.6
Anti-Convulsants	96(4.5)	187(4.4)	0.6
Anti-Depressants	288(13.4)	571(13.3)	0.3
Anti-Platelets	51(2.4)	106(2.5)	-0.6

Values are displayed as N (%), unless otherwise stated

Abbreviations

std dev – standard deviation

ACE-inhibitors – angiotensin converting enzyme inhibitors

ARB – angiotensin II receptor blocker