

Appendix A

Principal diagnosis codes for patients undergoing each of the procedures included in our analysis.

51.23	Laparoscopic cholecystectomy	201,351
57400	Calculus of gallbladder acute cholecystitis, no obstruction	69,856
57410	Calculus of gallbladder other cholecystitis, no obstruction	34,668
5770	Acute pancreatitis	19,463
5750	Acute cholecystitis	17,566
57420	Calculus of gallbladder no cholecystitis, no obstruction	9,381
57511	Chronic cholecystitis	6,066
57460	Calculus of gallbladder and bile duct acute cholecystitis, no obstruction	5,719
57470	Calculus of gallbladder and bile duct other cholecystitis, no obstruction	5,240
57512	Acute and chronic cholecystitis	4,715
57401	Calculus of gallbladder acute cholecystitis, obstruction	4,335
57480	Calculus of gallbladder and bile duct acute and chronic cholecystitis, no obstr	3,566
57430	Calculus of bile duct acute cholecystitis, no obstruction	3,208
57461	Calculus of gallbladder and bile duct acute cholecystitis, obstruction	3,104
57471	Calculus of gallbladder and bile duct other cholecystitis, obstruction	2,332
57481	Calculus of gallbladder and bile duct acute and chronic cholecystitis, obstr	2,085
57510	Cholecystitis, unspecified	1,815
57490	Calculus of gallbladder and bile duct without cholecystitis, no obstruction	1,735
57440	Calculus of bile duct other cholecystitis, no obstruction	1,442
57431	Calculus of bile duct acute cholecystitis, obstruction	1,436
57411	Calculus of gallbladder other cholecystitis, obstruction	984
57450	Calculus of bile duct no cholecystitis, no obstruction	787
57491	Calculus of gallbladder and bile duct without cholecystitis, obstruction	689
57441	Calculus of bile duct other cholecystitis, obstruction	584
57451	Calculus of bile duct no cholecystitis, obstruction	297
57421	Calculus of gallbladder no cholecystitis, obstruction	203
5753	Hydrops of gallbladder	75
60.5	Radical prostatectomy	78,763
185	Malignant neoplasm of prostate	78,763

60.29	Transurethral prostatectomy (TURP)	73,752
60001	Hypertrophy (benign) of prostate, urinary obstruction and LUTS	60,704
60000	Hypertrophy (benign) of prostate without urinary obstruction and LUTS	6,333
60091	Hyperplasia of prostate, unspecified, urinary obstruction and LUTS	3,843
60021	Benign localized hyperplasia of prostate, urinary obstruction and LUTS	1,507
60011	Nodular prostate urinary obstruction	675
60090	Hyperplasia of prostate, unspecified, without urinary obstruction and LUTS	439
60020	Benign localized hyperplasia of prostate without urinary obstruction and LUTS	167
60010	Nodular prostate without urinary obstruction	84
81.02	Cervical fusion of the anterior column, anterior technique	52,972
7210	Cervical spondylosis without myelopathy	16,718
7220	Displacement of cervical intervertebral disc without myelopathy	15,954
7230	Spinal stenosis in cervical region	10,493
7224	Degeneration of cervical intervertebral disc	9,072
7234	Brachial neuritis or radiculitis NOS	735
81.07	Lumbar and lumbosacral fusion of posterior column, posterior technique	106,689
72402	Spinal stenosis, lumbar region, without neurogenic claudication	28,774
7384	Acquired spondylolisthesis	18,507
72252	Degeneration of lumbar or lumbosacral intervertebral disc	16,463
7213	Lumbosacral spondylosis without myelopathy	12,787
72210	Displacement of lumbar intervertebral disc without myelopathy	10,534
72403	Spinal stenosis, lumbar region, neurogenic claudication	10,214
75612	Spondylolisthesis	6,118
73730	Scoliosis [and kyphoscoliosis], idiopathic	2,027
72283	Postlaminectomy syndrome, lumbar region	1,265
81.08	Lumbar and lumbosacral fusion of anterior column, posterior technique	102,716
72402	Spinal stenosis, lumbar region, without neurogenic claudication	29,078
7384	Acquired spondylolisthesis	21,751
72252	Degeneration of lumbar or lumbosacral intervertebral disc	19,723
7213	Lumbosacral spondylosis without myelopathy	13,471
72210	Displacement of lumbar intervertebral disc without myelopathy	11,554
75612	Spondylolisthesis	7,139

81.51	Total hip replacement	494,576
71535	Osteoarthritis, localized, unspecified whether primary or secondary, pelvic region and thigh	353,686
71595	Osteoarthritis, unspecified whether generalized or localized, pelvic region and thigh	86,914
71515	Osteoarthritis, localized, primary, pelvic region and thigh	53,976
	*Cases with DRG of 466,467 or 468 were removed to exclude revision surgeries.	
	*Cases with a second procedure code of 81.51 are removed to exclude bilateral procedures.	

81.54	Total knee replacement	1,190,631
71536	Osteoarthritis, localized, not specified whether primary or secondary, lower leg	845,106
71596	Osteoarthritis, unspecified whether generalized or localized, lower leg	210,514
71516	Osteoarthritis, localized, primary, lower leg	120,353
71696	Arthropathy, unspecified, lower leg	6,393
7140	Rheumatoid arthritis	3,792
71589	Osteoarthritis involving more than one site, not generalized	2,557
71526	Osteoarthritis, localized, secondary, lower leg	1,916
	*Cases with DRG of 466,467 or 468 were removed to exclude revision procedures.	
	*Cases with a second procedure code of 81.54 are removed to exclude bilateral procedures.	

Appendix B

Readmissions due to surgical complication for each of the procedures included in our analysis, broken down by principal diagnosis on readmission. Counts smaller than 11 have been redacted to protect patient privacy.

51.23	Laparoscopic cholecystectomy	7,882
99859	Other postoperative infection	1,115
5770	Acute pancreatitis	858
0389	Unspecified septicemia	844
9974	Surgical complications, digestive system	547
99749	Other digestive system complications	507
00845	Intestinal infection due to <i>Clostridium difficile</i>	418
41519	Other pulmonary embolism and infarction	294
99812	Hematoma complicating a procedure	200
78900	Abdominal pain, unspecified site	152
99811	Hemorrhage complicating a procedure	150
99741	Retained cholelithiasis following cholecystectomy	138
5609	Unspecified intestinal obstruction	132
78901	Abdominal pain, right upper quadrant	119
56722	Peritoneal abscess	112
33818	Other acute postoperative pain	108
5762	Obstruction of bile duct	97
45341	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	93
5768	Other specified disorders of biliary tract	92
03842	Septicemia due to <i>E. coli</i>	92
56400	Constipation, unspecified	88
99739	Other respiratory complications	83
5761	Cholangitis	80
78909	Abdominal pain, other specified site	79
78906	Abdominal pain, epigastric	77
56081	Intestinal or peritoneal adhesions with obstruction (postoperative) (postinfection)	75
41511	Iatrogenic pulmonary embolism and infarction	73
55221	Incisional ventral hernia with obstruction	62
03849	Other septicemia due to gram-negative organisms	50
45342	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	47
2851	Acute posthemorrhagic anemia	47
5720	Abscess of liver	41
0380	Streptococcal septicemia	40
45340	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	39
0088	Intestinal infection due to other organism, not elsewhere classified	38
78062	Postprocedural fever	36
99889	Other specified complications of procedures not elsewhere classified	33
99813	Seroma complicating a procedure	31
9975	Urinary complications, not elsewhere classified	31
99851	Infected postoperative seroma	30

9982	Accidental puncture or laceration during a procedure, not elsewhere classified	28
03812	Methicillin resistant Staphylococcus aureus septicemia	27
56032	Fecal impaction	25
45829	Other iatrogenic hypotension	24
56409	Other constipation	23
7907	Bacteremia	22
9971	Cardiac complications, not elsewhere classified	22
78959	Other ascites	21
5643	Vomiting following gastrointestinal surgery	20
99931	Other and unspecified infection due to central venous catheter	20
44422	Arterial embolism and thrombosis of lower extremity	20
56089	Other specified intestinal obstruction	20
99669	Infection and inflammatory react due to other internal prosth device, implant, graft	19
78907	Abdominal pain, generalized	18
03843	Septicemia due to pseudomonas	18
99662	Infection and inflammatory reaction due to other vascular device, implant, and graft	18
99679	Other complications due to other internal prosthetic device, implant, and graft	17
48242	Methicillin resistant pneumonia due to Staphylococcus aureus	16
0388	Other specified septicemias	15
0383	Septicemia due to anaerobes	15
56039	Other impaction of intestine	14
0090	Infectious colitis, enteritis, and gastroenteritis	14
56889	Other specified disorders of peritoneum	14
78903	Abdominal pain, right lower quadrant	14
9986	Persistent postoperative fistula	14
56881	Hemoperitoneum (nontraumatic)	13
7824	Jaundice, unspecified, not of newborn	13
72992	Nontraumatic hematoma of soft tissue	12
56781	Choleperitonitis	11
56983	Perforation of intestine	11
4829	Bacterial pneumonia, unspecified	11
03811	Methicillin susceptible Staphylococcus aureus septicemia	*
99831	Disruption of internal operation (surgical) wound	*
78904	Abdominal pain, left lower quadrant	*
78652	Painful respiration	*
99939	Infection following other infusion, injection, transfusion, or vaccination	*
57420	Calculus of gallbladder without cholecystitis, without obstruction	*
7873	Flatulence, eructation, and gas pain	*
99932	Bloodstream infection due to central venous catheter	*
56723	Spontaneous bacterial peritonitis	*
03840	Septicemia due to gram-negative organism, unspecified	*
5644	Other postoperative functional disorders	*
78902	Abdominal pain, left upper quadrant	*
45382	Acute venous embolism and thrombosis of deep veins of upper extremity	*
57490	Calculus of gallbladder and bile duct without cholecystitis, without obstruction	*
99832	Disruption of external operation (surgical) wound	*

0382	Pneumococcal septicemia	*
45383	Acute venous embolism and thrombosis of upper extremity, unspecified	*
5758	Other specified disorders of gallbladder	*
57491	Calculus of gallbladder and bile duct without cholecystitis, with obstruction	*
4536	Venous embolism and thrombosis of superficial vessels of lower extremity	*
03810	Staphylococcal septicemia, unspecified	*
5680	Peritoneal adhesions (postoperative) (postinfection)	*
99591	Sepsis	*
5121	Iatrogenic pneumothorax	*
45381	Acute venous embolism and thrombosis of superficial veins of upper extremity	*
57421	Calculus of gallbladder without mention of cholecystitis, with obstruction	*
78905	Abdominal pain, periumbilic	*
45386	Acute venous embolism and thrombosis of internal jugular veins	*
00842	Intestinal infection due to pseudomonas	*
48241	Methicillin susceptible pneumonia due to Staphylococcus aureus	*
5793	Other and unspecified postsurgical nonabsorption	*
03844	Septicemia due to serratia	*
99883	Non-healing surgical wound	*
86401	Injury to liver without mention of open wound into cavity, hematoma and contusion	*
99702	Iatrogenic cerebrovascular infarction or hemorrhage	*
0091	Colitis, enteritis, and gastroenteritis of presumed infectious origin	*
48289	Pneumonia due to other specified bacteria	*
33828	Other chronic postoperative pain	*
33819	Other acute pain	*
99830	Disruption of wound, unspecified	*
72991	Post-traumatic seroma	*
5752	Obstruction of gallbladder	*
00841	Intestinal infection due to staphylococcus	*

60.5	Radical prostatectomy	2,429
9974	Digestive system complications	249
99859	Other postoperative infection	238
99749	Other digestive system complications	186
41519	Other pulmonary embolism and infarction	183
9975	Urinary complications, not elsewhere classified	148
41511	Iatrogenic pulmonary embolism and infarction	104
5990	Urinary tract infection, site not specified	98
0389	Unspecified septicemia	91
99812	Hematoma complicating a procedure	90
99811	Hemorrhage complicating a procedure	83
5601	Paralytic ileus	70
45341	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	66
9972	Peripheral vascular complications, not elsewhere classified	46
45342	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	42
99831	Disruption of internal operation (surgical) wound	39

99664	Infection and inflammatory reaction due to indwelling urinary catheter	36
56081	Intestinal or peritoneal adhesions with obstruction (postoperative) (postinfection)	36
9986	Persistent postoperative fistula	35
78062	Postprocedural fever	35
5609	Unspecified intestinal obstruction	34
00845	Intestinal infection due to <i>Clostridium difficile</i>	30
55221	Incisional ventral hernia with obstruction	29
59971	Gross hematuria	27
45340	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	24
03842	Septicemia due to <i>E. coli</i>	21
78900	Abdominal pain, unspecified site	18
99889	Other specified complications of procedures not elsewhere classified	18
99851	Infected postoperative seroma	15
99631	Mechanical complication due to urethral (indwelling) catheter	14
99832	Disruption of external operation (surgical) wound	14
33818	Other acute postoperative pain	14
03849	Other septicemia due to gram-negative organisms	14
99676	Other complications due to genitourinary device, implant, and graft	14
56400	Constipation, unspecified	13
2851	Acute posthemorrhagic anemia	13
60490	Orchitis and epididymitis, unspecified	12
99739	Other respiratory complications	12
9982	Accidental puncture or laceration during a procedure, not elsewhere classified	11
4536	Venous embolism and thrombosis of superficial vessels of lower extremity	*
56089	Other specified intestinal obstruction	*
5921	Calculus of ureter	*
99799	Complications affecting other specified body systems, not elsewhere classified	*
60499	Other orchitis, epididymitis, and epididymo-orchitis, without mention of abscess	*
591	Hydronephrosis	*
78820	Retention of urine, unspecified	*
99813	Seroma complicating a procedure	*
55010	Inguinal hernia, obstr, without gangrene, unilateral or unspecified (not recurrent)	*
59970	Hematuria, unspecified	*
5959	Cystitis, unspecified	*
5789	Hemorrhage of gastrointestinal tract, unspecified	*
59080	Pyelonephritis, unspecified	*
0380	Streptococcal septicemia	*
03843	Septicemia due to <i>pseudomonas</i>	*
5934	Other ureteric obstruction	*
5961	Intestinovesical fistula	*
03840	Septicemia due to gram-negative organism, unspecified	*
5967	Hemorrhage into bladder wall	*
8670	Injury to bladder and urethra, without mention of open wound into cavity	*
99830	Disruption of wound, unspecified	*
03812	Methicillin resistant <i>Staphylococcus aureus</i> septicemia	*
78829	Other specified retention of urine	*

99639	Other mechanical complication of genitourinary device, implant, and graft	*
4829	Bacterial pneumonia, unspecified	*
44422	Arterial embolism and thrombosis of lower extremity	*
99665	Infection and inflammatory reaction due to other genitourinary device, implant, graft	*
48283	Pneumonia due to other gram-negative bacteria	*
99659	Mechanical complication due to other implant and internal device	*
0383	Septicemia due to anaerobes	*
45119	Phlebitis and thrombophlebitis of deep veins of lower extremities, other	*
5960	Bladder neck obstruction	*
03844	Septicemia due to serratia	*
0388	Other specified septicemias	*
55090	Inguinal hernia, without obstr or gangrene, unilateral or unspecified (not recurrent)	*
59960	Urinary obstruction, unspecified	*
2875	Thrombocytopenia, unspecified	*
5693	Hemorrhage of rectum and anus	*
44481	Embolism and thrombosis of iliac artery	*
03811	Methicillin susceptible Staphylococcus aureus septicemia	*
4590	Hemorrhage, unspecified	*
0382	Pneumococcal septicemia	*
5121	Iatrogenic pneumothorax	*
99939	Infection following other infusion, injection, transfusion, or vaccination	*
45829	Other iatrogenic hypotension	*
03810	Staphylococcal septicemia, unspecified	*
55092	Inguinal hernia, without obstruction or gangrene, bilateral (not specified as recurrent)	*
03819	Other staphylococcal septicemia	*
48242	Methicillin resistant pneumonia due to Staphylococcus aureus	*
6012	Abscess of prostate	*
60.29 Transurethral prostatectomy (TURP)		3,080
99811	Hemorrhage complicating a procedure	687
5990	Urinary tract infection, site not specified	436
59971	Gross hematuria	304
0389	Unspecified septicemia	209
9975	Urinary complications, not elsewhere classified	175
59970	Hematuria, unspecified	112
5967	Hemorrhage into bladder wall	87
99664	Infection and inflammatory reaction due to indwelling urinary catheter	80
41519	Other pulmonary embolism and infarction	74
60001	Hypertrophy (benign) of prostate with urinary obstruction and other (LUTS)	72
99859	Other postoperative infection	51
00845	Intestinal infection due to Clostridium difficile	48
45341	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	38
2851	Acute posthemorrhagic anemia	37
99676	Other complications due to genitourinary device, implant, and graft	34
78820	Retention of urine, unspecified	31

0380	Streptococcal septicemia	31
03842	Septicemia due to E.coli	31
6021	Congestion or hemorrhage of prostate	28
45342	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	28
60490	Orchitis and epididymitis, unspecified	24
45340	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	24
41511	Iatrogenic pulmonary embolism and infarction	22
03849	Other septicemia due to gram-negative organisms	21
5959	Cystitis, unspecified	21
99631	Mechanical complication due to urethral (indwelling) catheter	20
99812	Hematoma complicating a procedure	19
5609	Unspecified intestinal obstruction	19
8670	Injury to bladder and urethra, without mention of open wound into cavity	17
03812	Methicillin resistant Staphylococcus aureus septicemia	15
5601	Paralytic ileus	14
60499	Other orchitis, epididymitis, and epididymo-orchitis, without mention of abscess	13
5789	Hemorrhage of gastrointestinal tract, unspecified	13
5960	Bladder neck obstruction	12
59080	Pyelonephritis, unspecified	12
59969	Urinary obstruction, not elsewhere classified	*
56400	Constipation, unspecified	*
5921	Calculus of ureter	*
78829	Other specified retention of urine	*
59960	Urinary obstruction, unspecified	*
03843	Septicemia due to pseudomonas	*
0388	Other specified septicemias	*
56081	Intestinal or peritoneal adhesions with obstruction (postoperative) (postinfection)	*
44422	Arterial embolism and thrombosis of lower extremity	*
99665	Infection and inflammatory reaction due to other genitourinary device, implant, graft	*
55010	Inguinal hernia, with obstr, without gangrene, unilateral or unspecified (not recurrent)	*
03819	Other staphylococcal septicemia	*
591	Hydronephrosis	*
5941	Other calculus in bladder	*
03811	Methicillin susceptible Staphylococcus aureus septicemia	*
60091	Hyperplasia of prostate, unspecified, with urinary obstruction and other LUTS	*
33818	Other acute postoperative pain	*
45829	Other iatrogenic hypotension	*
5934	Other ureteric obstruction	*
99639	Other mechanical complication of genitourinary device, implant, and graft	*
6019	Prostatitis, unspecified	*
60021	Benign localized hyperplasia of prostate with urinary obstruction and other LUTS	*
55090	Inguinal hernia, without obstr or gangrene, unilateral or unspecified (not recurrent)	*
78900	Abdominal pain, unspecified site	*
78062	Postprocedural fever	*
6010	Acute prostatitis	*
9974	Therapeutic plateletpheresis	*

03840	Septicemia due to gram-negative organism, unspecified	*
99931	Other and unspecified infection due to central venous catheter	*
99889	Other specified complications of procedures not elsewhere classified	*
48283	Pneumonia due to other gram-negative bacteria	*
03810	Staphylococcal septicemia, unspecified	*
9982	Accidental puncture or laceration during a procedure, not elsewhere classified	*
5693	Hemorrhage of rectum and anus	*
56089	Other specified intestinal obstruction	*
6011	Chronic prostatitis	*
99659	Mechanical complication due to other implant and internal device	*
99799	Complications affecting other specified body systems	*
99739	Other respiratory complications	*
5121	Iatrogenic pneumothorax	*
55221	Incisional ventral hernia with obstruction	*
0383	Septicemia due to anaerobes	*
99749	Other digestive system complications	*
99939	Infection following other infusion, injection, transfusion, or vaccination	*
60020	Benign localized hyperplasia of prostate without urinary obstruction and other LUTS	*
9989	Unspecified complication of procedure, not elsewhere classified	*
55092	Inguinal hernia, without obstruction or gangrene, bilateral (not recurrent)	*
5961	Intestinovesical fistula	*
48242	Methicillin resistant pneumonia due to Staphylococcus aureus	*
44489	Embolism and thrombosis of other specified artery	*
9980	Postoperative shock	*
6028	Other specified disorders of prostate	*
45381	Acute venous embolism and thrombosis of superficial veins of upper extremity	*
44481	Embolism and thrombosis of iliac artery	*
45119	Phlebitis and thrombophlebitis of deep veins of lower extremities, other	*
81.02 Cervical fusion of the anterior column, anterior technique		1,048
99812	Hematoma complicating a procedure	169
5070	Pneumonitis due to inhalation of food or vomitus	93
99859	Other postoperative infection	90
0389	Unspecified septicemia	76
99649	Other mechanical complication of other internal orthopedic device, implant, and graft	67
99889	Other specified complications of procedures not elsewhere classified	58
41519	Other pulmonary embolism and infarction	54
99813	Seroma complicating a procedure	38
33818	Other acute postoperative pain	31
99799	Complications affecting other specified body systems, not elsewhere classified	29
99709	Other nervous system complications	24
72402	Spinal stenosis, lumbar region, without neurogenic claudication	23
41511	Iatrogenic pulmonary embolism and infarction	20
7231	Cervicalgia	15
99678	Other complications due to other internal orthopedic device, implant, and graft	15

45341	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	13
72210	Displacement of lumbar intervertebral disc without myelopathy	13
45342	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	13
7842	Swelling, mass, or lump in head and neck	11
56400	Constipation, unspecified	*
5601	Paralytic ileus	*
47825	Edema of pharynx or nasopharynx	*
7220	Displacement of cervical intervertebral disc without myelopathy	*
9974	Surgical complications, digestive system	*
7384	Acquired spondylolisthesis	*
29281	Drug-induced delirium	*
78062	Postprocedural fever	*
00845	Intestinal infection due to <i>Clostridium difficile</i>	*
56409	Other constipation	*
99851	Infected postoperative seroma	*
7213	Lumbosacral spondylosis without myelopathy	*
45340	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	*
5789	Hemorrhage of gastrointestinal tract, unspecified	*
99667	Infection and inflammatory reaction due to other internal ortho device, implant, graft	*
75612	Spondylolisthesis	*
78722	Dysphagia, oropharyngeal phase	*
45829	Other iatrogenic hypotension	*
9972	Peripheral vascular complications, not elsewhere classified	*
34931	Accidental puncture or laceration of dura during a procedure	*
99640	Unspecified mechanical complication of internal orthopedic device, implant, and graft	*
99779	Vascular complications of other vessels	*
99701	Central nervous system complication	*
47831	Unilateral paralysis of vocal cords or larynx, partial	*
7907	Bacteremia	*
0388	Other specified septicemias	*
9982	Accidental puncture or laceration during a procedure, not elsewhere classified	*
7242	Lumbago	*
99679	Other complications due to other internal prosthetic device, implant, and graft	*
9694	Poisoning by benzodiazepine-based tranquilizers	*
9975	Urinary complications, not elsewhere classified	*
99702	Iatrogenic cerebrovascular infarction or hemorrhage	*
99832	Disruption of external operation (surgical) wound	*
99677	Other complications due to internal joint prosthesis	*
99831	Disruption of internal operation (surgical) wound	*
99643	Broken prosthetic joint implant	*
99641	Mechanical loosening of prosthetic joint	*
99675	Other complications due to nervous system device, implant, and graft	*
99642	Dislocation of prosthetic joint	*
03819	Other staphylococcal septicemia	*
71945	Pain in joint, pelvic region and thigh	*
72991	Post-traumatic seroma	*

73028	Unspecified osteomyelitis, other specified sites	*
48242	Methicillin resistant pneumonia due to Staphylococcus aureus	*
99647	Other mechanical complication of prosthetic joint implant	*
72293	Other and unspecified disc disorder, lumbar region	*
99811	Hemorrhage complicating a procedure	*
99989	Other transfusion reaction	*
7292	Neuralgia, neuritis, and radiculitis, unspecified	*
03810	Staphylococcal septicemia, unspecified	*
9962	Mechanical complication of nervous system device, implant, and graft	*
99669	Infection and inflammatory react due to other internal prosth device, implant, graft	*
3209	Meningitis due to unspecified bacterium	*
99674	Other complications due to other vascular device, implant, and graft	*
99644	Peri-prosthetic fracture around prosthetic joint	*
9986	Persistent postoperative fistula	*
2851	Acute posthemorrhagic anemia	*
81.07	Lumbar and lumbosacral fusion of posterior column, posterior technique	4,675
99859	Other postoperative infection	1,366
0389	Unspecified septicemia	292
99812	Hematoma complicating a procedure	219
41519	Other pulmonary embolism and infarction	216
33818	Other acute postoperative pain	185
99813	Seroma complicating a procedure	180
99649	Other mechanical complication of other internal orthopedic device, implant, and graft	154
99709	Other nervous system complications	131
99832	Disruption of external operation (surgical) wound	128
99667	Infection and inflammatory reaction due to other internal ortho device, implant, graft	116
99851	Infected postoperative seroma	114
7242	Lumbago	106
41511	Iatrogenic pulmonary embolism and infarction	87
00845	Intestinal infection due to Clostridium difficile	81
7244	Thoracic or lumbosacral neuritis or radiculitis, unspecified	70
72402	Spinal stenosis, lumbar region, without neurogenic claudication	70
5601	Paralytic ileus	69
45341	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	63
9972	Peripheral vascular complications, not elsewhere classified	55
7245	Backache, unspecified	49
78062	Postprocedural fever	46
99701	Central nervous system complication	46
45342	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	43
29281	Drug-induced delirium	43
99831	Disruption of internal operation (surgical) wound	43
5070	Pneumonitis due to inhalation of food or vomitus	43
72210	Displacement of lumbar intervertebral disc without myelopathy	42
8054	Closed fracture of lumbar vertebra without mention of spinal cord injury	40

45340	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	39
9974	Surgical complications, digestive system	36
99678	Other complications due to other internal ortho device, implant, and graft	35
56400	Constipation, unspecified	29
34931	Accidental puncture or laceration of dura during a procedure	29
5789	Hemorrhage of gastrointestinal tract, unspecified	29
2851	Acute posthemorrhagic anemia	28
99883	Non-healing surgical wound	24
56409	Other constipation	22
99830	Disruption of wound, unspecified	21
7213	Lumbosacral spondylosis without myelopathy	19
99889	Other specified complications of procedures not elsewhere classified	18
9975	Urinary complications, not elsewhere classified	16
72283	Postlaminectomy syndrome, lumbar region	15
99640	Unspecified mechanical complication of internal orthopedic device, implant, and graft	14
45829	Other iatrogenic hypotension	14
7384	Acquired spondylolisthesis	14
75612	Spondylolisthesis	14
7907	Bacteremia	12
33819	Other acute pain	11
7248	Other symptoms referable to back	*
99811	Hemorrhage complicating a procedure	*
33828	Other chronic postoperative pain	*
0388	Other specified septicemias	*
9694	Poisoning by benzodiazepine-based tranquilizers	*
3241	Intraspinal abscess	*
99675	Other complications due to nervous system device, implant, and graft	*
99939	Infection following other infusion, injection, transfusion, or vaccination	*
9986	Persistent postoperative fistula	*
99663	Infection and inflammatory reaction due to nervous system device, implant, and graft	*
99674	Other complications due to other vascular device, implant, and graft	*
99669	Infection and inflammatory react due to other internal prosth device, implant, graft	*
72992	Nontraumatic hematoma of soft tissue	*
34939	Other dural tear	*
99677	Other complications due to internal joint prosthesis	*
99666	Infection and inflammatory reaction due to internal joint prosthesis	*
99642	Dislocation of prosthetic joint	*
48242	Methicillin resistant pneumonia due to Staphylococcus aureus	*
03819	Other staphylococcal septicemia	*
72142	Spondylosis with myelopathy, lumbar region	*
99647	Other mechanical complication of prosthetic joint implant	*
9654	Poisoning by aromatic analgesics, not elsewhere classified	*
9678	Poisoning by other sedatives and hypnotics	*
71945	Pain in joint, pelvic region and thigh	*
72293	Other and unspecified disc disorder, lumbar region	*
3209	Meningitis due to unspecified bacterium	*

9583	Posttraumatic wound infection not elsewhere classified	*
9659	Poisoning by unspecified analgesic and antipyretic	*
99779	Vascular complications of other vessels	*
99799	Complications affecting other specified body systems, not elsewhere classified	*
7231	Cervicalgia	*
9962	Mechanical complication of nervous system device, implant, and graft	*
7220	Displacement of cervical intervertebral disc without myelopathy	*
73028	Unspecified osteomyelitis, other specified sites	*
99702	Iatrogenic cerebrovascular infarction or hemorrhage	*
72991	Post-traumatic seroma	*
99931	Other and unspecified infection due to central venous catheter	*
7292	Neuralgia, neuritis, and radiculitis, unspecified	*
99644	Peri-prosthetic fracture around prosthetic joint	*
99679	Other complications due to other internal prosthetic device, implant, and graft	*
99659	Mechanical complication due to other implant and internal device, not elsewhere classified	*

81.08	Lumbar and lumbosacral fusion of the anterior column, posterior technique	4,505
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99859	Other postoperative infection	1,248
33818	Other acute postoperative pain	240
99649	Other mechanical complication of other internal orthopedic device, implant, and graft	227
99812	Hematoma complicating a procedure	214
0389	Unspecified septicemia	206
41519	Other pulmonary embolism and infarction	188
99813	Seroma complicating a procedure	155
7242	Lumbago	135
99709	Other nervous system complications	111
99832	Disruption of external operation (surgical) wound	109
99667	Infection and inflammatory reaction due to other internal ortho device, implant, graft	85
45341	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	84
00845	Intestinal infection due to Clostridium difficile	83
99851	Infected postoperative seroma	79
9974	Surgical complications, digestive system	78
41511	Iatrogenic pulmonary embolism and infarction	74
7244	Thoracic or lumbosacral neuritis or radiculitis, unspecified	69
72402	Spinal stenosis, lumbar region, without neurogenic claudication	64
5601	Paralytic ileus	63
7245	Backache, unspecified	62
99678	Other complications due to other internal orthopedic device, implant, and graft	58
9972	Peripheral vascular complications, not elsewhere classified	57
29281	Drug-induced delirium	55
45342	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	42
8054	Closed fracture of lumbar vertebra without mention of spinal cord injury	41
72210	Displacement of lumbar intervertebral disc without myelopathy	39
5070	Pneumonitis due to inhalation of food or vomitus	38

99701	Central nervous system complication	36
78062	Postprocedural fever	33
99831	Disruption of internal operation (surgical) wound	31
9975	Urinary complications, not elsewhere classified	30
45340	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	29
5789	Hemorrhage of gastrointestinal tract, unspecified	25
56400	Constipation, unspecified	24
34931	Accidental puncture or laceration of dura during a procedure	24
72283	Postlaminectomy syndrome, lumbar region	24
7384	Acquired spondylolisthesis	22
2851	Acute posthemorrhagic anemia	22
99889	Other specified complications of procedures not elsewhere classified	21
7213	Lumbosacral spondylosis without myelopathy	21
56409	Other constipation	18
99830	Disruption of wound, unspecified	17
99640	Unspecified mechanical complication of internal orthopedic device, implant, and graft	16
33828	Other chronic postoperative pain	14
99883	Non-healing surgical wound	11
71945	Pain in joint, pelvic region and thigh	*
99811	Hemorrhage complicating a procedure	*
33819	Other acute pain	*
99779	Vascular complications of other vessels	*
99674	Other complications due to other vascular device, implant, and graft	*
75612	Spondylolisthesis	*
3241	Intraspinal abscess	*
99663	Infection and inflammatory reaction due to nervous system device, implant, and graft	*
45829	Other iatrogenic hypotension	*
7248	Other symptoms referable to back	*
9962	Mechanical complication of nervous system device, implant, and graft	*
99679	Other complications due to other internal prosthetic device, implant, and graft	*
0388	Other specified septicemias	*
99799	Complications affecting other specified body systems, not elsewhere classified	*
73028	Unspecified osteomyelitis, other specified sites	*
34939	Other dural tear	*
7907	Bacteremia	*
9654	Poisoning by aromatic analgesics, not elsewhere classified	*
72293	Other and unspecified disc disorder, lumbar region	*
99702	Iatrogenic cerebrovascular infarction or hemorrhage	*
99666	Infection and inflammatory reaction due to internal joint prosthesis	*
72142	Spondylosis with myelopathy, lumbar region	*
99642	Dislocation of prosthetic joint	*
99675	Other complications due to nervous system device, implant, and graft	*
99939	Infection following other infusion, injection, transfusion, or vaccination	*
03810	Staphylococcal septicemia, unspecified	*
48242	Methicillin resistant pneumonia due to Staphylococcus aureus	*
99659	Mechanical complication due to other implant and internal device	*

9982	Accidental puncture or laceration during a procedure, not elsewhere classified	*
72992	Nontraumatic hematoma of soft tissue	*
9986	Persistent postoperative fistula	*
7231	Cervicalgia	*
03819	Other staphylococcal septicemia	*
3209	Meningitis due to unspecified bacterium	*
99931	Other and unspecified infection due to central venous catheter	*
5121	Iatrogenic pneumothorax	*
99644	Peri-prosthetic fracture around prosthetic joint	*
9678	Poisoning by other sedatives and hypnotics	*
99669	Infection and inflammatory react due to other internal prosth device, implant, graft	*
78722	Dysphagia, oropharyngeal phase	*
99641	Mechanical loosening of prosthetic joint	*
99643	Broken prosthetic joint implant	*
45383	Acute venous embolism and thrombosis of upper extremity, unspecified	*
9583	Posttraumatic wound infection not elsewhere classified	*
9659	Poisoning by unspecified analgesic and antipyretic	*
99665	Infection and inflammatory reaction due to other genitourinary device, implant, graft	*
99647	Other mechanical complication of prosthetic joint implant	*
99989	Other transfusion reaction	*
7292	Neuralgia, neuritis, and radiculitis, unspecified	*
9694	Poisoning by benzodiazepine-based tranquilizers	*
99660	Infection and inflammatory reaction due to unspecified device, implant, and graft	*
7220	Displacement of cervical intervertebral disc without myelopathy	*
48241	Methicillin susceptible pneumonia due to Staphylococcus aureus	*
81.51 Total hip replacement		14,434
99666	Infection and inflammatory reaction due to internal joint prosthesis	1,544
99859	Other postoperative infection	1,496
99642	Dislocation of prosthetic joint	1,469
99644	Peri-prosthetic fracture around prosthetic joint	1,319
99812	Hematoma complicating a procedure	950
0389	Unspecified septicemia	604
99677	Other complications due to internal joint prosthesis	571
41519	Other pulmonary embolism and infarction	483
6826	Cellulitis and abscess of leg, except foot	449
2851	Acute posthemorrhagic anemia	369
00845	Intestinal infection due to Clostridium difficile	346
82020	Closed fracture of trochanteric section of neck of femur	271
41511	Iatrogenic pulmonary embolism and infarction	262
45341	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	255
9972	Peripheral vascular complications, not elsewhere classified	230
99813	Seroma complicating a procedure	200
82101	Closed fracture of shaft of femur	195
99851	Infected postoperative seroma	184

82100	Closed fracture of unspecified part of femur	157
9974	Surgical complications, digestive system	144
99641	Mechanical loosening of prosthetic joint	134
99832	Disruption of external operation (surgical) wound	134
8208	Closed fracture of unspecified part of neck of femur	129
99647	Other mechanical complication of prosthetic joint implant	125
33818	Other acute postoperative pain	125
03842	Septicemia due to E. coli	116
99667	Infection and inflammatory reaction due to other internal ortho device, implant, graft	112
45342	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	108
99643	Broken prosthetic joint implant	103
71945	Pain in joint, pelvic region and thigh	100
72992	Nontraumatic hematoma of soft tissue	97
99811	Hemorrhage complicating a procedure	91
45340	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	87
99664	Infection and inflammatory reaction due to indwelling urinary catheter	80
99831	Disruption of internal operation (surgical) wound	72
82009	Other closed transcervical fracture of neck of femur	72
82021	Closed fracture of intertrochanteric section of neck of femur	69
43411	Cerebral embolism with cerebral infarction	56
56400	Constipation, unspecified	53
99649	Other mechanical complication of other internal orthopedic device, implant, and graft	53
03849	Other septicemia due to gram-negative organisms	48
9971	Cardiac complications, not elsewhere classified	43
82022	Closed fracture of subtrochanteric section of neck of femur	41
72981	Swelling of limb	41
92401	Contusion of hip	40
99889	Other specified complications of procedures not elsewhere classified	39
99678	Other complications due to other internal orthopedic device, implant, and graft	35
99739	Other respiratory complications	34
56409	Other constipation	34
9975	Urinary complications, not elsewhere classified	34
45829	Other iatrogenic hypotension	31
78062	Postprocedural fever	30
99779	Vascular complications of other vessels	27
83500	Closed dislocation of hip, unspecified site	27
7295	Pain in limb	25
0380	Streptococcal septicemia	24
0383	Septicemia due to anaerobes	23
70703	Pressure ulcer, lower back	23
4590	Hemorrhage, unspecified	21
99883	Non-healing surgical wound	21
48283	Pneumonia due to other gram-negative bacteria	20
73314	Pathologic fracture of neck of femur	16
03843	Septicemia due to pseudomonas	16
4829	Bacterial pneumonia, unspecified	16

73315	Pathologic fracture of other specified part of femur	16
71105	Pyogenic arthritis, pelvic region and thigh	15
99830	Disruption of wound, unspecified	15
03812	Methicillin resistant Staphylococcus aureus septicemia	15
0388	Other specified septicemias	15
03811	Methicillin susceptible Staphylococcus aureus septicemia	14
48242	Methicillin resistant pneumonia due to Staphylococcus aureus	13
44422	Arterial embolism and thrombosis of lower extremity	12
99702	Iatrogenic cerebrovascular infarction or hemorrhage	12
4536	Venous embolism and thrombosis of superficial vessels of lower extremity	11
99640	Unspecified mechanical complication of internal orthopedic device, implant, and graft	*
03840	Septicemia due to gram-negative organism, unspecified	*
70707	Pressure ulcer, heel	*
82129	Other closed fracture of lower end of femur	*
82120	Closed fracture of lower end of femur, unspecified part	*
82123	Closed supracondylar fracture of femur	*
99669	Infection and inflammatory react due to other internal prosth device, implant, graft	*
99709	Other nervous system complications	*
99799	Complications affecting other specified body systems, not elsewhere classified	*
99989	Other transfusion reaction	*
03844	Septicemia due to serratia	*
73396	Stress fracture of femoral neck	*
71905	Effusion of joint, pelvic region and thigh	*
45352	Chronic venous embolism and thrombosis of deep vessels of distal lower extremity	*
99645	Peri-prosthetic osteolysis	*
4510	Phlebitis and thrombophlebitis of superficial vessels of lower extremities	*
99659	Mechanical complication due to other implant and internal device	*
71906	Effusion of joint, lower leg	*
03841	Septicemia due to H. influenzae	*
99931	Other and unspecified infection due to central venous catheter	*
99631	Mechanical complication due to urethral (indwelling) catheter	*
03819	Other staphylococcal septicemia	*
99939	Infection following other infusion, injection, transfusion, or vaccination	*
83501	Closed posterior dislocation of hip	*
44481	Embolism and thrombosis of iliac artery	*
45182	Phlebitis and thrombophlebitis of superficial veins of upper extremities	*
48241	Methicillin susceptible pneumonia due to Staphylococcus aureus	*
71695	Arthropathy, unspecified, pelvic region and thigh	*
45389	Acute venous embolism and thrombosis of other specified veins	*
71946	Pain in joint, lower leg	*
0382	Pneumococcal septicemia	*
99701	Central nervous system complication	*
82003	Closed fracture of base of neck of femur	*
99646	Articular bearing surface wear of prosthetic joint	*
9980	Postoperative shock	*
03810	Staphylococcal septicemia, unspecified	*

99732	Postprocedural aspiration pneumonia	*
45111	Phlebitis and thrombophlebitis of femoral vein (deep) (superficial)	*
73382	Nonunion of fracture	*
71815	Loose body in joint, pelvic region and thigh	*
48289	Pneumonia due to other specified bacteria	*
99660	Infection and inflammatory reaction due to unspecified device, implant, and graft	*
82030	Open fracture of trochanteric section of neck of femur, unspecified	*
81220	Closed fracture of unspecified part of humerus	*
99932	Bloodstream infection due to central venous catheter	*
5121	Iatrogenic pneumothorax	*
43410	Cerebral embolism without mention of cerebral infarction	*
73342	Aseptic necrosis of head and neck of femur	*
48240	Pneumonia due to Staphylococcus, unspecified	*
99591	Sepsis	*
71835	Recurrent dislocation of joint, pelvic region and thigh	*
82002	Closed fracture of midcervical section of neck of femur	*
81.54 Total knee replacement		26,314
99859	Other postoperative infection	4,065
99666	Infection and inflammatory reaction due to internal joint prosthesis	3,057
6826	Cellulitis and abscess of leg, except foot	1,885
41519	Other pulmonary embolism and infarction	1,594
0389	Unspecified septicemia	1,342
99677	Other complications due to internal joint prosthesis	1,213
99812	Hematoma complicating a procedure	1,191
41511	Iatrogenic pulmonary embolism and infarction	1,090
00845	Intestinal infection due to Clostridium difficile	829
99832	Disruption of external operation (surgical) wound	776
9972	Peripheral vascular complications, not elsewhere classified	726
2851	Acute posthemorrhagic anemia	701
45341	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	530
99831	Disruption of internal operation (surgical) wound	524
45342	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	499
33818	Other acute postoperative pain	369
99644	Peri-prosthetic fracture around prosthetic joint	306
45340	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	294
99642	Dislocation of prosthetic joint	274
99667	Infection and inflammatory reaction due to other internal ortho device, implant, graft	240
71916	Hemarthrosis, lower leg	238
99811	Hemorrhage complicating a procedure	226
78060	Fever, unspecified	215
71946	Pain in joint, lower leg	206
9974	Therapeutic plateletpheresis	195
9971	Cardiac complications, not elsewhere classified	185
2800	Iron deficiency anemia secondary to blood loss (chronic)	169

71906	Effusion of joint, lower leg	164
99889	Other specified complications of procedures not elsewhere classified	132
82123	Closed supracondylar fracture of femur	117
43411	Cerebral embolism with cerebral infarction	116
78062	Postprocedural fever	113
82021	Closed fracture of intertrochanteric section of neck of femur	112
99739	Other respiratory complications	109
71106	Pyogenic arthritis, lower leg	107
99830	Disruption of wound, unspecified	105
03849	Other septicemia due to gram-negative organisms	102
8220	Closed fracture of patella	98
82101	Closed fracture of shaft of femur	81
99647	Other mechanical complication of prosthetic joint implant	78
72981	Swelling of limb	78
45829	Other iatrogenic hypotension	77
99883	Non-healing surgical wound	69
8208	Closed fracture of unspecified part of neck of femur	68
82009	Other closed transcervical fracture of neck of femur	64
99678	Other complications due to other internal orthopedic device, implant, and graft	63
92411	Contusion of knee	61
96509	Poisoning by other opiates and related narcotics	59
82120	Closed fracture of lower end of femur, unspecified part	59
0383	Septicemia due to anaerobes	58
99813	Seroma complicating a procedure	58
0380	Streptococcal septicemia	50
9975	Urinary complications, not elsewhere classified	50
71856	Ankylosis of joint, lower leg	50
48283	Pneumonia due to other gram-negative bacteria	47
7295	Pain in limb	46
99851	Infected postoperative seroma	43
27650	Volume depletion, unspecified	41
72766	Nontraumatic rupture of patellar tendon	40
99649	Other mechanical complication of other internal orthopedic device, implant, and graft	40
7907	Bacteremia	39
44422	Arterial embolism and thrombosis of lower extremity	38
99643	Broken prosthetic joint implant	36
82300	Closed fracture of upper end of tibia alone	35
4829	Bacterial pneumonia, unspecified	34
03843	Septicemia due to pseudomonas	28
8363	Dislocation of patella, closed	27
0388	Other specified septicemias	27
9642	Poisoning by anticoagulants	26
99641	Mechanical loosening of prosthetic joint	24
99833	Disruption of traumatic injury wound repair	24
71956	Stiffness of joint, not elsewhere classified, lower leg	24
03812	Methicillin resistant Staphylococcus aureus septicemia	23

03840	Septicemia due to gram-negative organism, unspecified	23
99799	Complications affecting other specified body systems, not elsewhere classified	22
48242	Methicillin resistant pneumonia due to Staphylococcus aureus	22
99702	Iatrogenic cerebrovascular infarction or hemorrhage	22
03819	Other staphylococcal septicemia	21
4536	Venous embolism and thrombosis of superficial vessels of lower extremity	21
9654	Poisoning by aromatic analgesics, not elsewhere classified	20
03811	Methicillin susceptible Staphylococcus aureus septicemia	19
45119	Phlebitis and thrombophlebitis of deep veins of lower extremities, other	16
8910	Open wound of knee, leg [except thigh], and ankle, without mention of complication	12
99939	Infection following other infusion, injection, transfusion, or vaccination	12
99931	Other and unspecified infection due to central venous catheter	11
71846	Contracture of joint, lower leg	*
99662	Infection and inflammatory reaction due to other vascular device, implant, and graft	*
9658	Poisoning by other specified analgesics and antipyretics	*
92400	Contusion of thigh	*
8912	Open wound of knee, leg [except thigh], and ankle, with tendon involvement	*
9986	Persistent postoperative fistula	*
4512	Phlebitis and thrombophlebitis of lower extremities, unspecified	*
4538	Venous Thrombosis	*
71945	Pain in joint, pelvic region and thigh	*
99669	Infection and inflammatory react due to other internal prosth device, implant, graft	*
45389	Acute venous embolism and thrombosis of other specified veins	*
8911	Open wound of knee, leg [except thigh], and ankle, complicated	*
2875	Thrombocytopenia, unspecified	*
71836	Recurrent dislocation of joint, lower leg	*
7179	Unspecified internal derangement of knee	*
48241	Methicillin susceptible pneumonia due to Staphylococcus aureus	*
99679	Other complications due to other internal prosthetic device, implant, and graft	*
73342	Aseptic necrosis of head and neck of femur	*
03810	Staphylococcal septicemia, unspecified	*
82302	Closed fracture of upper end of fibula with tibia	*
44421	Arterial embolism and thrombosis of upper extremity	*
99646	Articular bearing surface wear of prosthetic joint	*
4519	Phlebitis and thrombophlebitis of unspecified site	*
5121	Iatrogenic pneumothorax	*
99591	Sepsis	*
83650	Dislocation of knee, unspecified, closed	*
99989	Other transfusion reaction	*
99670	Other complications due to unspecified device, implant, and graft	*
99659	Mechanical complication due to other implant and internal device	*
99985	Delayed hemolytic transfusion reaction, incompatibility unspecified	*
45383	Acute venous embolism and thrombosis of upper extremity, unspecified	*
45111	Phlebitis and thrombophlebitis of femoral vein (deep) (superficial)	*
28749	Other secondary thrombocytopenia	*
8221	Open fracture of patella	*

99640	Unspecified mechanical complication of internal orthopedic device, implant, and graft	*
44481	Embolism and thrombosis of iliac artery	*
45352	Chronic venous embolism and thrombosis of deep vessels of distal lower extremity	*
99709	Other nervous system complications	*
0382	Pneumococcal septicemia	*
2874	Secondary thrombocytopenia	*
71789	Other internal derangement of knee	*
99791	Complications affecting other specified body systems, hypertension	*
9580	Air embolism	*
7388	Acquired deformity of other specified site	*
71908	Effusion of joint, other specified sites	*
71886	Other joint derangement, not elsewhere classified, lower leg	*
99660	Infection and inflammatory reaction due to unspecified device, implant, and graft	*
9581	Fat embolism	*

Appendix C

We included the following comorbidities, as defined by Elixhauser et al, in calculating a patient's health score for risk adjustment.

Comorbidities
Congestive Heart Failure
Valvular disease
Pulmonary Circulation disorders
Peripheral vascular disease
Hypertension (combine uncomplicated and complicated)
Paralysis
Other neurological disorders
Chronic pulmonary disease
Diabetes without chronic complications
Hypothyroidism
Renal failure
Liver Disease
Chronic Peptic ulcer disease (includes bleeding only if obstruction is also present)
HIV and AIDS (Acquired immune deficiency syndrome)
Lymphoma
Metastatic cancer
Solid tumor without metastasis
Rheumatoid arthritis/collagen vascular diseases
Coagulation deficiency
Obesity
Weight loss
Fluid and electrolyte disorders
Blood loss anemia
Deficiency anemias
Drug abuse
Psychoses
Depression

Table 17: Elixhauser Comorbidities Variables Accounted for in risk adjustment. Source: Healthcare Cost and Utilization Project (HCUP). June 2015. Agency for Healthcare Research and Quality.

Appendix D

Adjusted complication rate, unadjusted complication rate, and raw rate for each surgeon for each procedure. The x-axis is surgeons ranked by adjusted rate, and the y-axis is the adjusted complication rate (here labeled Adjusted Expected Rate). The light-gray shaded area around each surgeon's ACR is the 95% confidence interval, based on posterior variance. The dark-gray area around each ACR is the 1σ confidence interval. The solid line is the median, and the dashed lines are the chosen boundaries of the low and high risk regions. The modeled complication rate without adjustment for patient characteristics is shown in light circles, plotted under the dark circles of the adjusted rate. The raw rates are plotted as dots. (Higher raw rates stratify because they are typically produced by small ratios.)

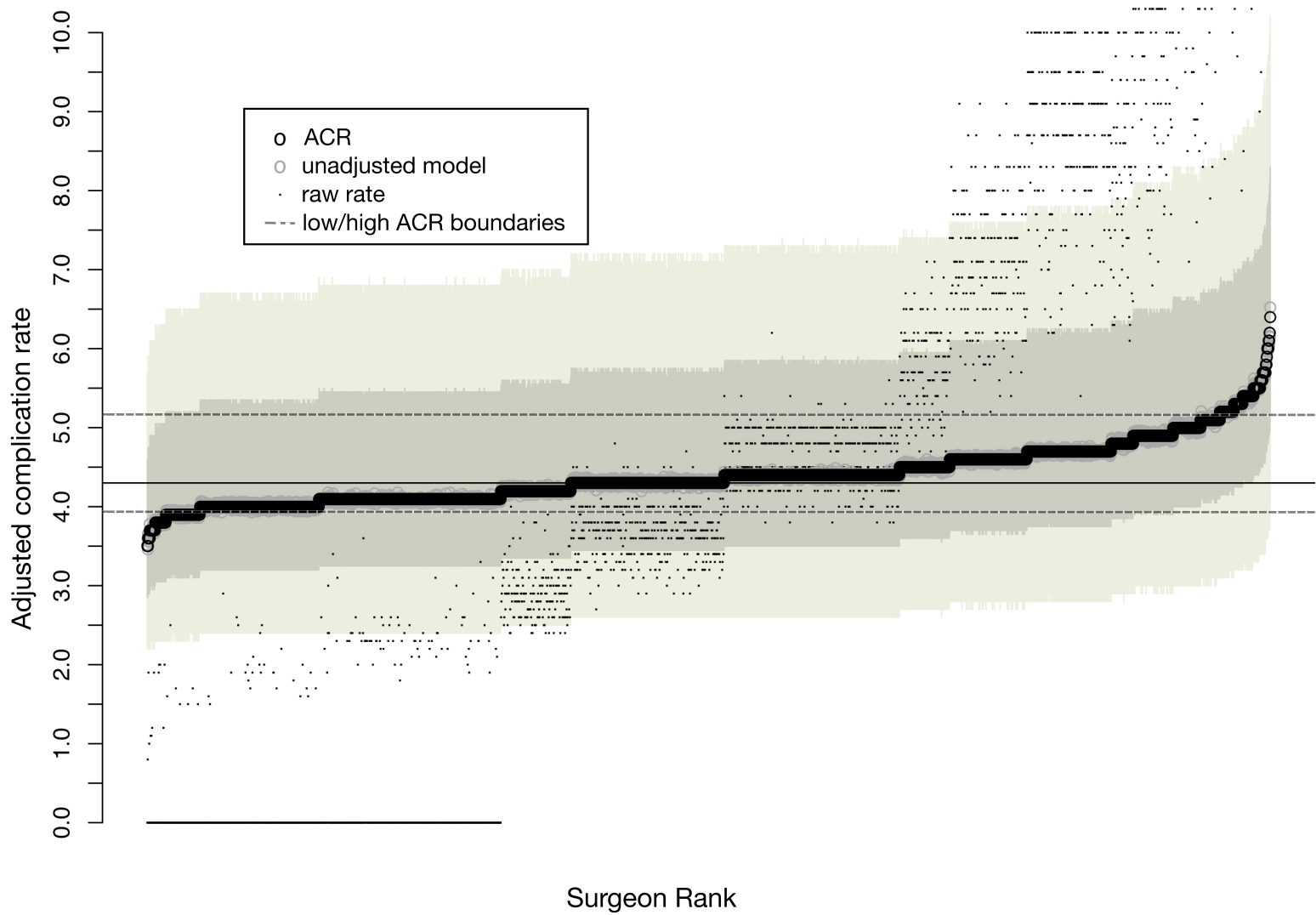


Figure 5: Adjusted, unadjusted, and raw complication rates for procedure 51.23 laparoscopic cholecystectomy, N=3,068 surgeons

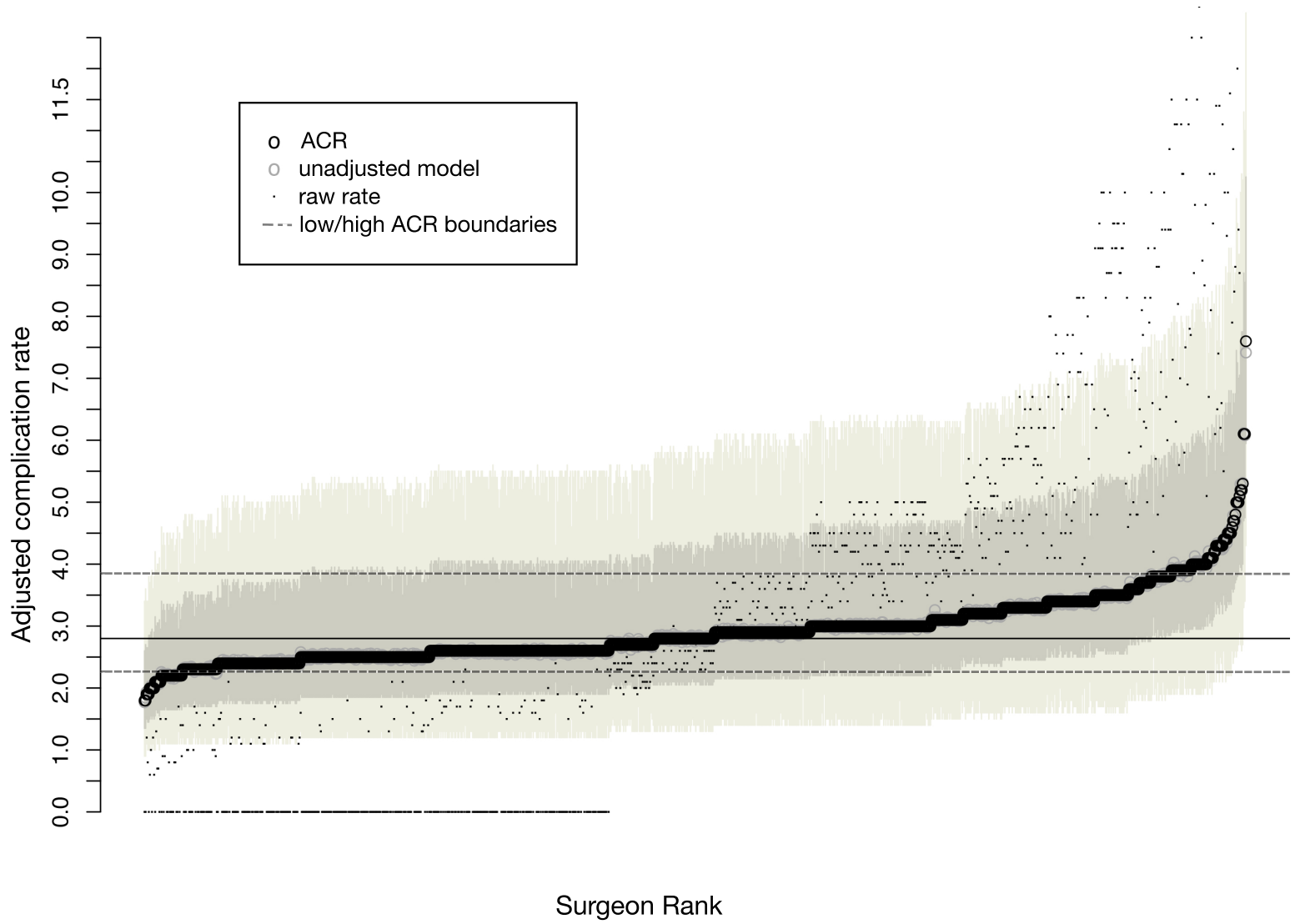


Figure 6: Adjusted, unadjusted, and raw complication rates for procedure 60.5 radical prostatectomy, N=1,038 surgeons

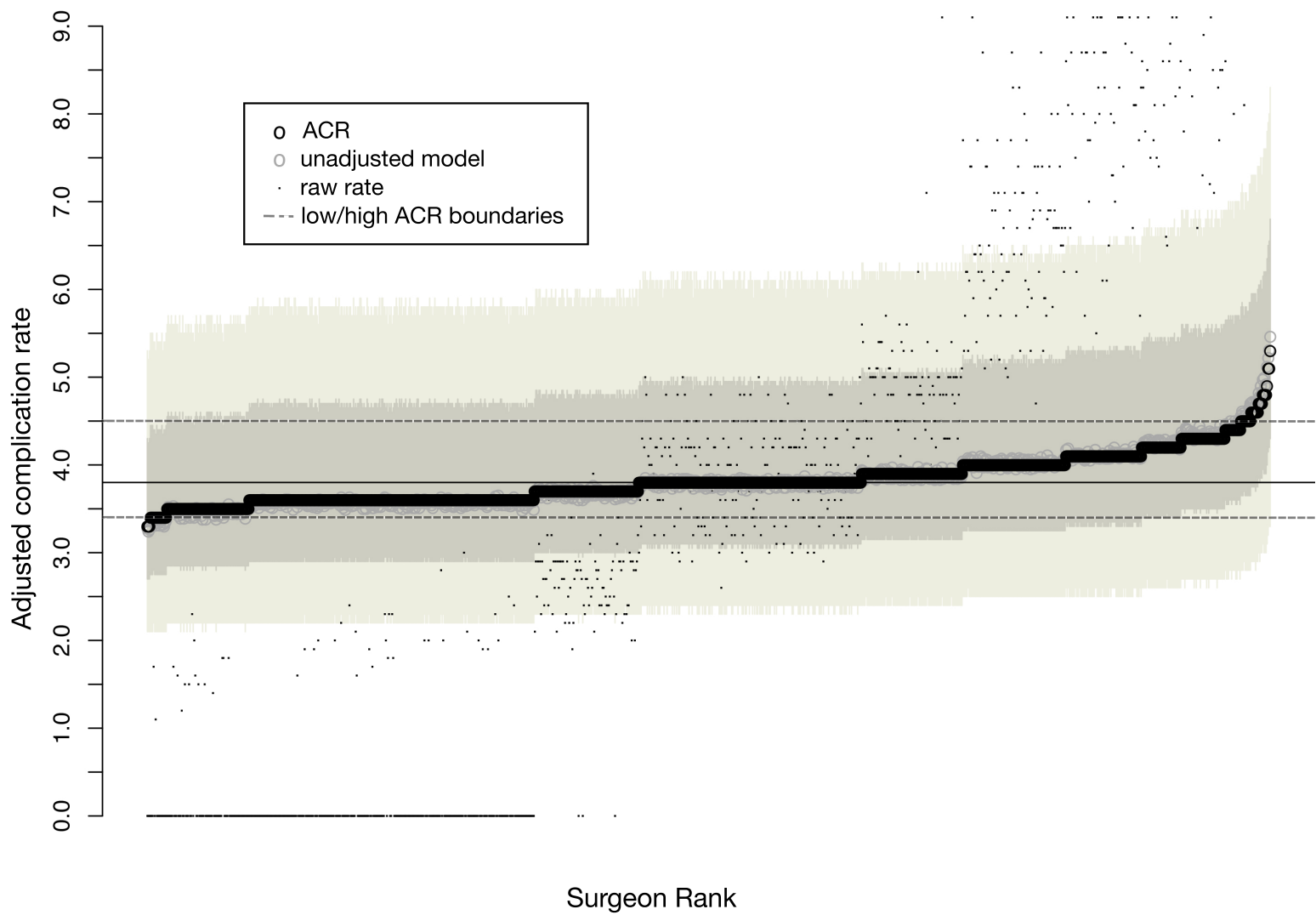


Figure 7: Adjusted, unadjusted, and raw complication rates for procedure 60.29 transurethral prostatectomy (TURP), N=1,079 surgeons

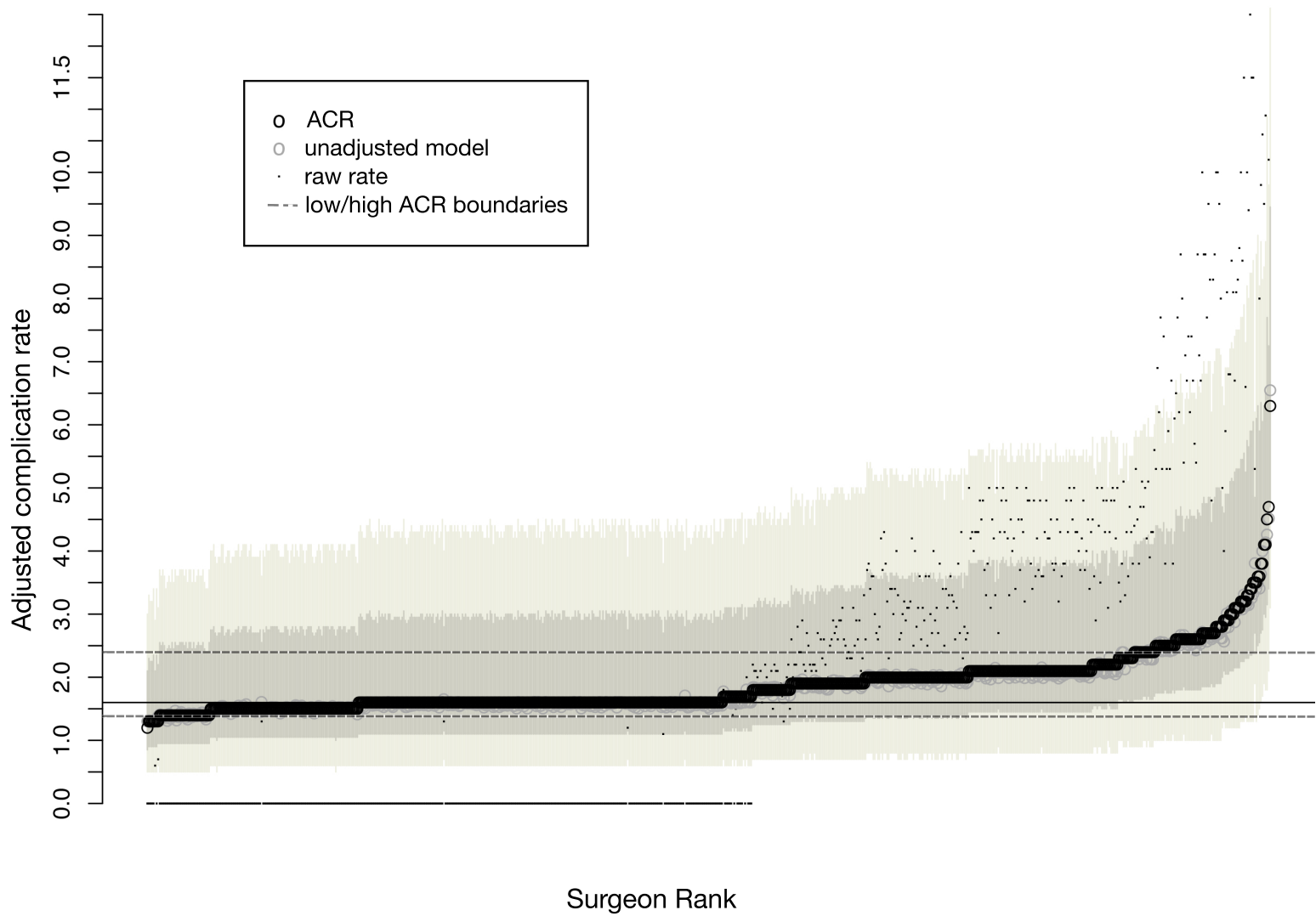


Figure 8: Adjusted, unadjusted, and raw complication rates for procedure 81.02 cervical fusion of the anterior column, anterior technique, N=728 surgeons

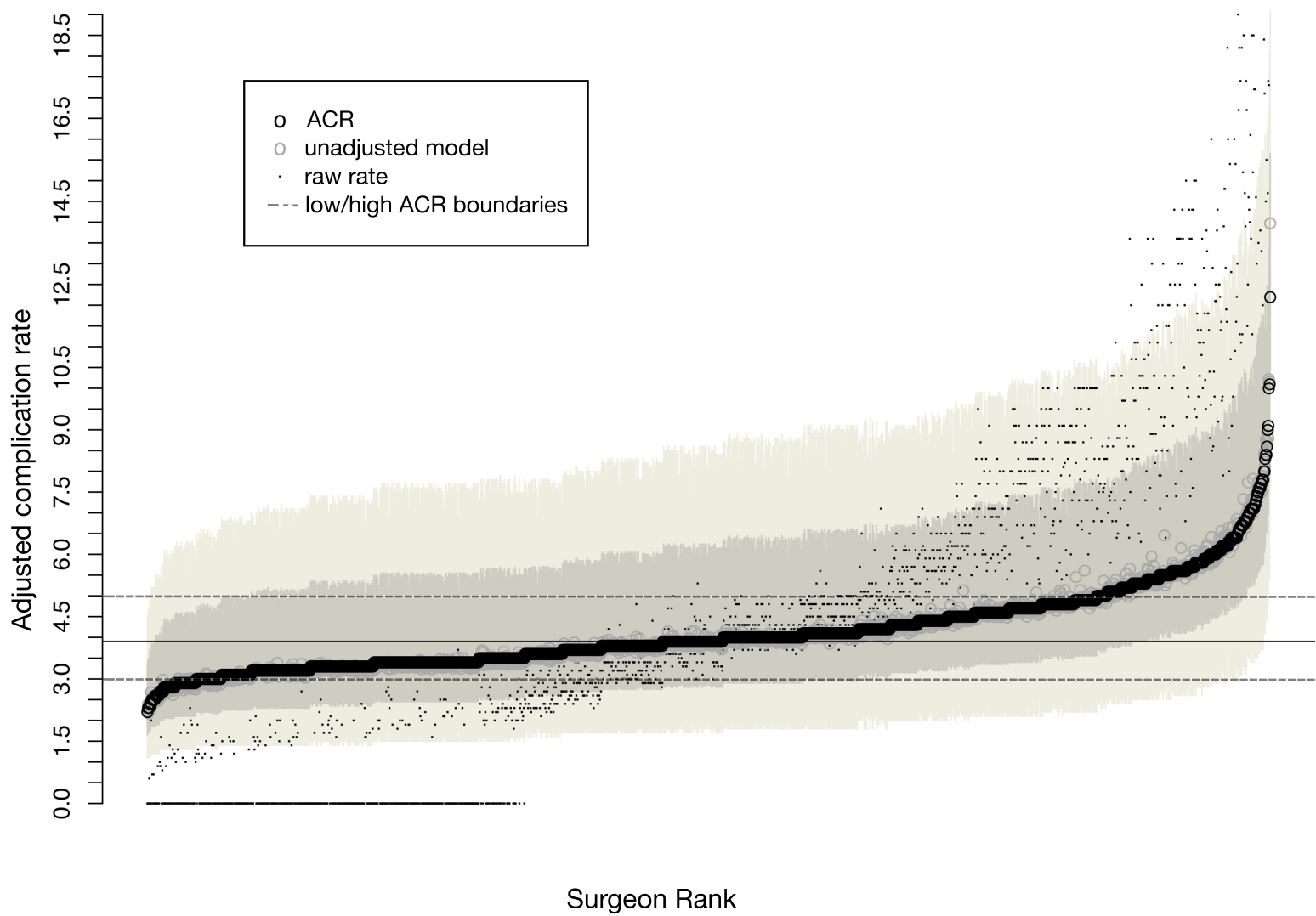


Figure 9: Adjusted, unadjusted, and raw complication rates for procedure 81.07 lumbar and lumbosacral fusion of posterior column, posterior technique, N=1,815 surgeons

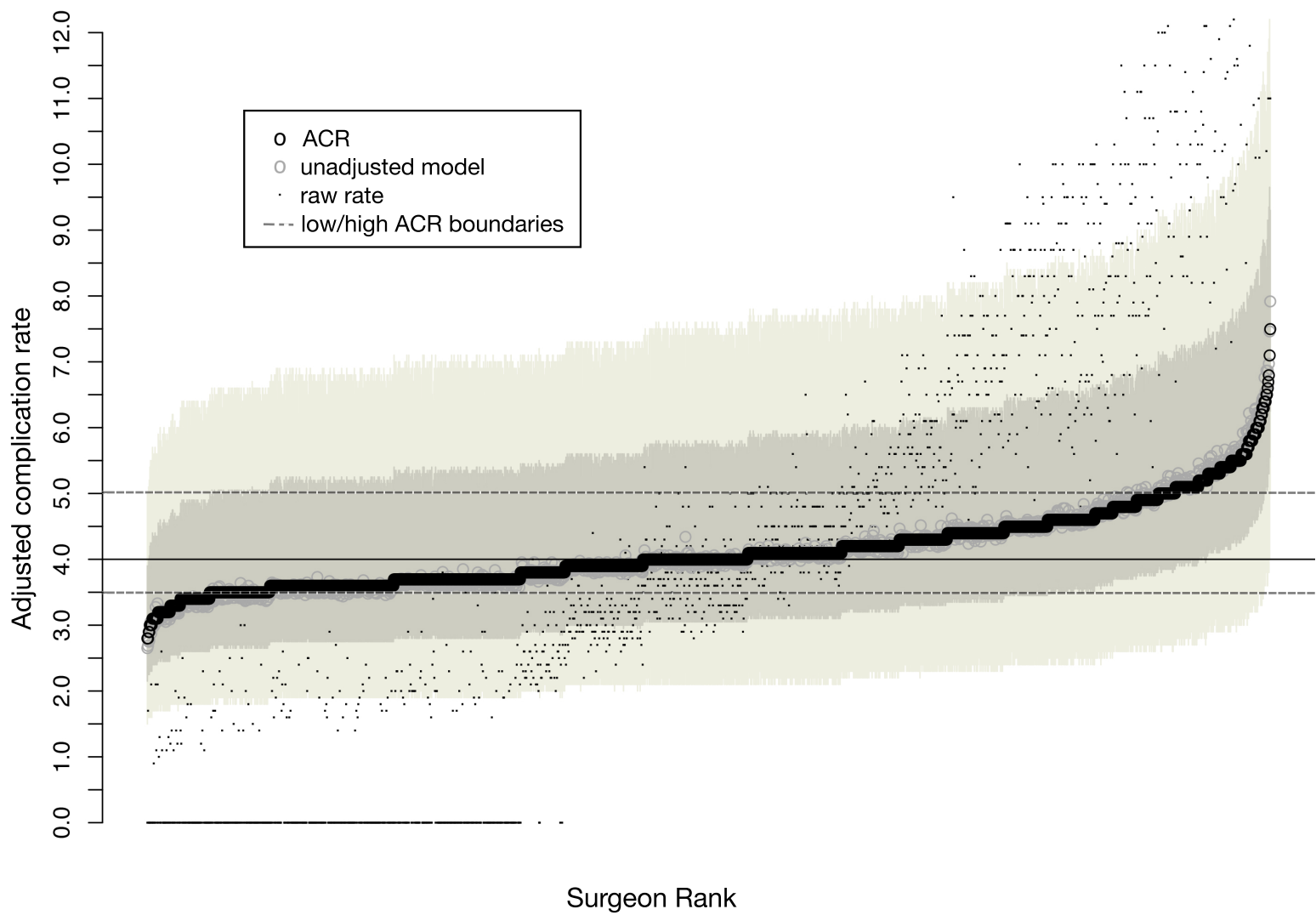


Figure 10: Adjusted, unadjusted, and raw complication rates for procedure 81.08 lumbar and lumbosacral fusion of the anterior column, posterior technique, N=1,758 surgeons

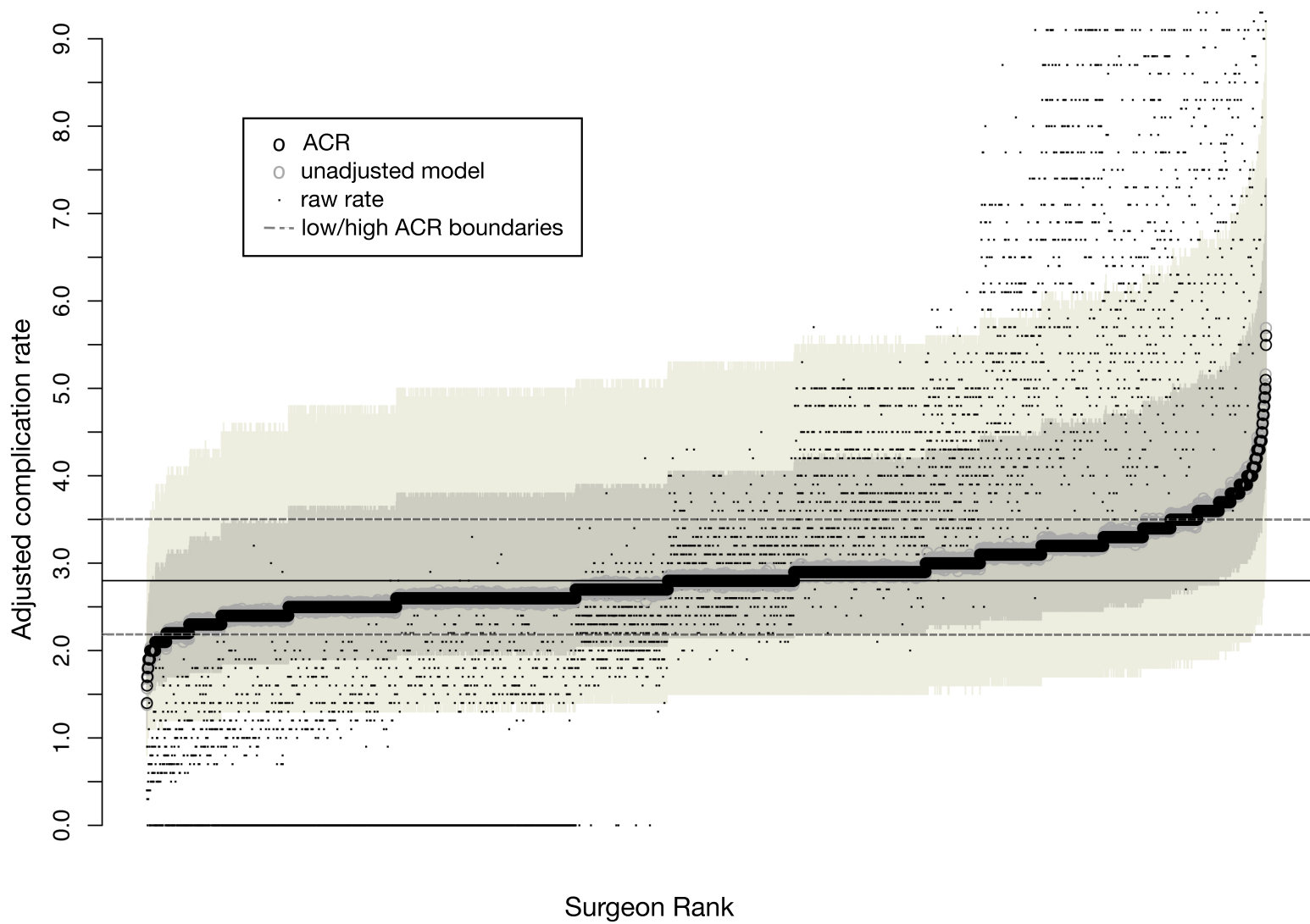


Figure 11: Adjusted, unadjusted, and raw complication rates for procedure 81.51 total hip replacement, N=5,790 surgeons

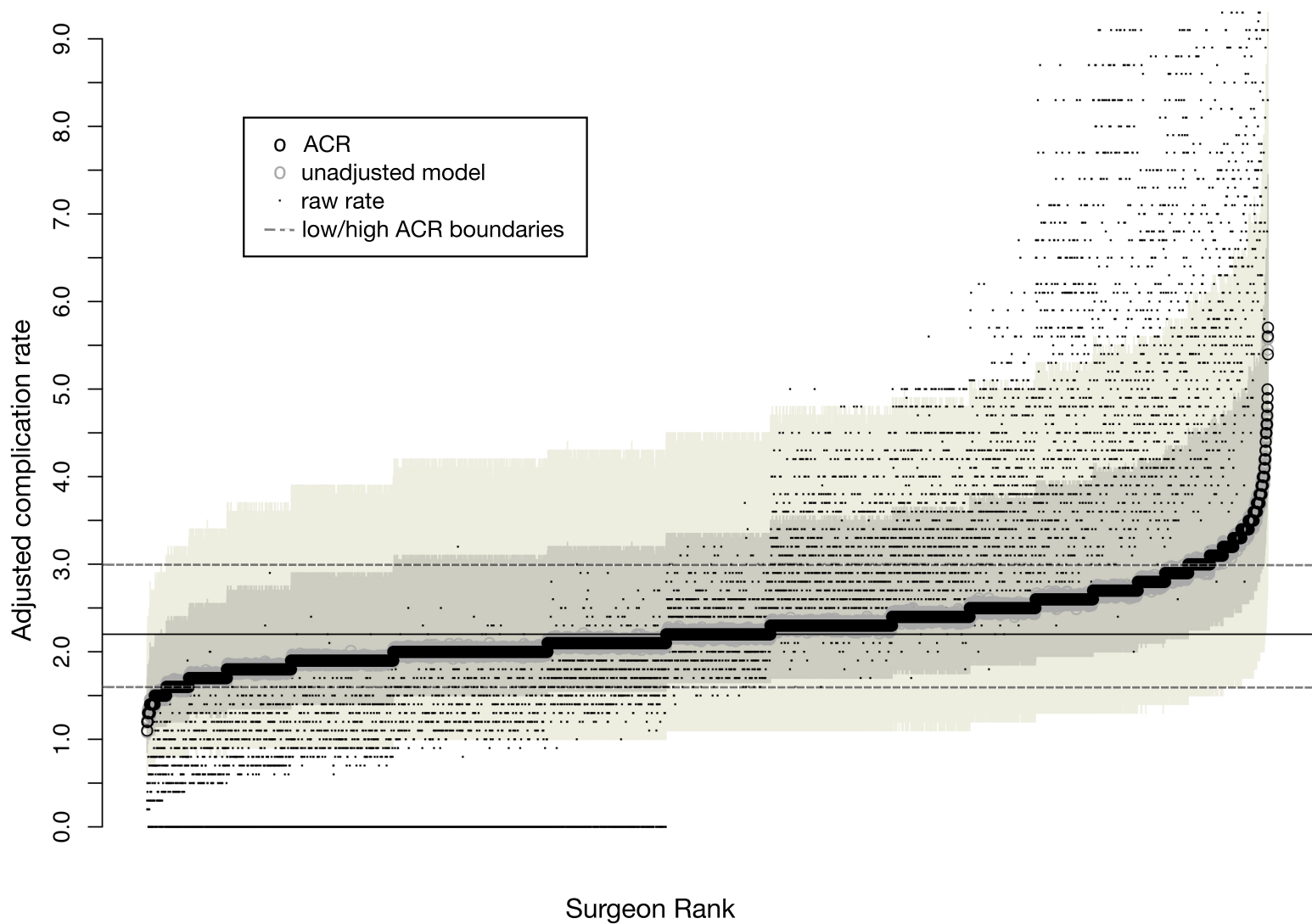


Figure 12: Adjusted, unadjusted, and raw complication rates for procedure 81.54 total knee replacement, N=9,601 surgeons