

TABLE E-1 Diagnoses and ICD-9 Diagnostic Codes

Fracture of Humerus		Osteoarthritis*	
Malunion	733.81	Localized-primary-shoulder	715.11
Nonunion	733.82	Localized-secondary	715.21
Proximal end	812.00	Localized-secondary-upper arm	715.22
Surgical neck	812.01	Shoulder localized	715.31
Anatomical neck	812.02	>1 site not generalized	715.89
Greater tuberosity	812.03	Shoulder unspecified	715.91
Head of humerus	812.09	Unspecified	715.92
Shaft	812.21	Rheumatoid Arthritis	714.0
Lower end	812.49	Juvenile Rheumatoid Arthritis NOS	714.30

\*NOS = not otherwise specified.

TABLE E-2 Complications by ICD-9-CM Diagnosis Codes and Procedure (P) Codes\*

Cardiovascular/Hematologic		Surgical Mishaps	
458.2	Iatrogenic Hypotension	996.1	Malfunc Vasc Device/Graft
997.1	Surg Compl-Heart	996.4	Mech Compl of Intern Orth Device
997.91	Surg Compl-Hypertensions	996.59	Mech Compl Due to Implant NEC
998.1	Hemorr Complic Procedure	996.62	React-Oth Vasc Dev/Graft
998.11	Hemorrhage Complic Proc	996.66	React-Inter Joint Prost
998.12	Hematoma Complic Proc	996.77	Other Complication due to Internal Joint Prosthesis
998.13	Seroma Complicating Proc	996.78	Compl Due to Ortho Device/Implant
Drug Reaction		996.79	Comp-Int Prost Device NEC
E938.6	Adv Eff Nerve-Block Anes	997.9	Surg Compl-Body Syst NEC
Gastrointestinal		998.2	Accidental Op Laceration
997.4	Surg Compl of Digestive System	998.8	Surgical Complicat NEC
Infection		998.89	Other Specified Complication
996.66	Infection due to Prosthesis	998.9	Surgical Complicat NOS
998.5	Postoperative Infection	999.9	Unspec Compl of Med Care NEC
Neurologic		E870.0	Accidental Cut During Operation
997.09	Surg Compl Nerv System NEC	E876.8	Misadventure Specified Type NEC
Respiratory		E878.1	React-Artificial Prosthesis
997.3	Surg Compl-Respir Syst	E878.2	React-Implant for Bypass or Anastomosis
Revision/Failure		E878.8	React-Surgical Procedure NEC
80.01 (P)	Arthrot/Pros Remov-Shldr	E879.8	React-Procedure NEC
81.97 (P)	Rev Jt Repl Upper Extrem	Urologic	
		997.5	Surg Compl-Urinary Tract

\*NOS = Not otherwise specified, NEC = Not elsewhere classified.

TABLE E-3 Characteristics of Provider Groups

	Surgeon Volume Groups				Hospital Volume Groups			
	Low	Med	High	P value	Low	Med	High	P value
Group Characteristics*								
No. of cases	1-5	6-30	>30		1-49	50-100	>100	
No. of providers	297	71	9		38	7.0	5.0	
Percent of providers	78.8	18.8	2.4		76.0	14.0	10.0	
Total No. of patients	594	799	475		731	539.0	598.0	
Percent of patients	31.8	42.8	25.4		39.1	28.7	32.0	
Ave. No. of cases per year	0.29	1.6	7.5		2.7	11.0	17.1	
Patient Demographics								
Average age (yrs)	67.7	67.4	69.9		65.9	71.0	68.2	
Female (%)	71.9	68.0	64.2	<0.05†	69.5	66.6	68.2	
White (%)	89.7	91.1	94.1	<0.05†	90.8	93.0	90.8	
Married (%)	48.0	54.4	58.1	<0.01†	50.5	56.6	53.9	
Comorbidity Index								
0	59.8	61.0	62.7		59.6	63.6	60.4	
1	27.6	26.2	28.2		27.2	26.4	27.8	
•2	12.6	12.9	9.1		13.1	10.0	11.8	
Procedure (%)				<0.01‡				<0.01‡
Total shoulder arthroplasty	26.5	39.9	63.6		33.4	42.6	50.9	
Hemiarthroplasty	73.5	60.1	36.4		66.6	57.4	49.1	
Primary Diagnosis (%)								
Osteoarthritis	24.8	48.4	56.8	<0.01‡	35.4	45.6	50.0	<0.01‡
Fracture of Humerus	47.5	28.5	20.0	<0.01‡	39.0	32.9	23.9	<0.01‡
Rheumatoid Arthritis	1.5	3.3	8.8	<0.01‡	2.3	2.6	7.7	<0.01‡
Other	27.7	23.1	23.2		25.6	21.5	26.1	

\*Group characteristics were constructed for this paper. †P value for individual variable based on one-way analysis of variance. ‡P value for entire group based on chi-square analysis.