



Supplementary Material

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Table i. CCI and ICD-10 codes used to create surgical subgroups for analysis.

Surgery	CCI codes	ICD-10 codes
Upper limb arthroplasty		
Total shoulder arthroplasty	1TA53LAPN, 1TA53LAPQ	
Shoulder hemiarthroplasty	1TA53LAPM	
Shoulder arthroplasty revision	1TA53LASL, 1TA53LAPM, 1TA55LAPN	
Elbow arthroplasty	1TM53LAPM, 1TM53LAPN	
Elbow arthroplasty revision	1TM53LASL, 1TM55LAPM, 1TM55LAPN	
Upper limb fracture fixation		
Clavicle fracture	1SM74, 1TB74	
Shoulder ORIF	1TA74	
Humerus ORIF	1TK74	
Elbow ORIF	1TM74	
Radius/ulna ORIF	1TV74	
Distal radioulnar ORIF	1UC74	
Wrist ORIF	1UB74	
Pelvis ORIF	1SQ74, 1SI74	
Hip arthroplasty		
Total hip arthroplasty	1VA53LAPN, 1VA53LLPN	M13, M16, M17, M19, M87, C, T8413, M841, M009, M06, M08, M45, M46, M844, Q
Hip arthroplasty revision	1VA53LASL, 1VA53LLSL 1VA53	T8403, T8453, M966, T848
Hip fracture surgery		
Hip ORIF	1VA74	

	1VC74	S72100, S72190
Total hip arthroplasty (fracture)	1VA53LAPN, 1VA53LLPN	S72010, S72080, S72081, S72090, S72091, S72100, S72101, S72190, S72200, S72900
Hip hemiarthroplasty (fracture)	1VA53LAPM, 1VA53LLPM	S72010, S72080, S72081, S72090, S72091, S72100, S72101, S72190, S72200, S72900
Femur ORIF	1VC74 1VG74	S2200, S2300, C, S2490 S72410
Knee arthroplasty		
Total knee arthroplasty	1VG53LAPP	
Knee arthroplasty revision	1VG53LAPN, 1VG53LASL, 1VG55LAPM, 1VG55LAPN, 1VGLAPP	
Patella ORIF	1VP74	
Tibia/fibula ORIF	1VQ74 1VG74	S82200, S82201, S82100 S82100
Ankle arthroplasty	1WA53	
Ankle and foot ORIF	1VQ74 1WA74, 1WI74, 1WE74, 1WJ74	S82300, S828, S824, S825, S826, S82301
Amputation		
Forearm amputation	1TV93	
Above-knee amputation	1VC93	
Below-knee amputation	1VQ93	
Midfoot and toe amputation	1WM93, 1WL93, 1WJ93, 1WN93, 1WI93, 1WK93	

Table ii. Location-specific transfusion outcomes.

Surgery	Total number of surgeries	Number of surgeries performed in Winnipeg	Number of surgeries performed in Ottawa	Proportion of total cohort receiving RBCs (% transfused)	Proportion receiving RBCs in Winnipeg (% transfused)	Proportion receiving RBCs in Ottawa (% transfused)
Upper limb arthroplasty	766	483	283	3.9	3.5	4.6

Upper limb fracture fixation	1,175	758	417	5.1	5.7	4.1
Pelvis ORIF	99	56	43	31.3	26.8	37.2
Hip arthroplasty	3,594	1,733	1,861	8.1	8.7	7.5
Hip fracture surgery	2,540	1,011	1,529	25.0	28.2	23.0
Femur ORIF	95	50	45	25.3	12.0	40.0
Knee arthroplasty	3,613	2,030	1,583	3.3	4.0	2.3
Patella ORIF	85	56	29	3.5	3.6	3.5
Tibia/fibula ORIF	416	240	176	5.1	4.2	6.3
Ankle arthroplasty	24	12	12	0.0	0.0	0.0
Ankle and foot ORIF	1,388	842	546	1.5	1.4	1.7
Amputation	789	448	341	33.1	35.7	29.6
Total	14,584	7,719	6,865	10.3	10.1	10.4

Table iii. RBC, platelet, and plasma transfusion outcomes in orthopaedic surgery.

Surgery	Number of surgeries	Proportion receiving RBCs (% transfused)	Mean number of RBC units transfused* (SD)	Median number of RBC units transfused* (IQR)	Proportion receiving platelets (% transfused)	Mean platelet units transfused* (SD)	Median platelet units transfused* (IQR)	Proportion receiving plasma (% transfused)	Mean plasma units transfused* (SD)	Median plasma units transfused* (IQR)
Upper limb arthroplasty	766	3.9	2.1 (1.5)	2 (1 to 2)	0.1	2.0	2 (2 to 2)	0.1	1.0	1 (1 to 1)
Total shoulder arthroplasty	604	4.5	2.0 (1.5)	2 (1 to 2)	0.2	2.0	2 (2 to 2)	0.0	-	-
Shoulder hemiarthroplasty	60	0.0	-	-	0.0	-	-	1.7	1.0	1 (1 to 1)
Shoulder arthroplasty revision	13	0.0	-	-	0.0	-	-	0.0	-	-
Elbow arthroplasty	84	3.6	2.7 (1.2)	2 (2 to 3)	0.0	-	-	0.0	-	-
Elbow arthroplasty revision	5	0.0	-	-	0.0	-	-	0.0	-	-
Upper limb fracture fixation	1,175	5.1	3.1 (2.7)	2 (2 to 4)	0.2	2.0	2 (2 to 2)	0.6	3.0 (1.9)	2 (2 to 4)
Clavicle fracture	114	1.8	3.5 (0.7)	3.5 (3 to 4)	0.0	-	-	0.0	-	-

Shoulder ORIF	110	12.7	3.1 (2.5)	2 (2 to 3)	0.0	-	-	0.9	4.0	4 (4 to 4)
Humerus ORIF	332	8.7	3.4 (3.4)	2 (2 to 4)	0.6	2.0	2 (2 to 2)	1.2	3.5 (3.0)	2 (2 to 5)
Elbow ORIF	168	3.6	2.0 (0.6)	1.5 (1 to 3)	0.0	-	-	0.0	-	-
Radius/ulna ORIF	358	2.2	2.6 (1.2)	2.5 (2 to 4)	0.0	-	-	0.6	1.5 (0.7)	1.5 (1 to 2)
Distal radioulnar ORIF	33	3.0	4.0	4 (4 to 4)	0.0	-	-	0.0	-	-
Wrist ORIF	60	0.0	-	-	0.0	-	-	0.0	-	-
Pelvis ORIF	99	31.3	4.1 (3.5)	2 (2 to 5)	2.0	1.5 (0.7)	1.5 (1 to 2)	7.1	3.1 (1.6)	2 (2 to 4)
Hip arthroplasty	3,594	8.1	3.2 (2.6)	2 (2 to 4)	0.3	2.4 (0.5)	2.5 (2 to 3)	0.4	4.3 (2.4)	3.5 (2 to 6)
Total hip arthroplasty	3,079	4.5	3.0 (2.4)	2 (1 to 4)	0.1	3.0 (1.2)	3 (2 to 4)	0.1	2.7 (1.2)	2 (2 to 4)
Hip arthroplasty revision	515	29.7	3.4 (2.7)	2 (2 to 4)	1.0	2.0	2 (2 to 2)	2.3	4.7 (2.7)	4 (2 to 7)
Hip fracture surgery	2,540	25.0	3.1 (2.5)	2 (2 to 4)	0.7	3.0 (2.2)	2 (2 to 3)	0.8	3.3 (1.9)	3 (2 to 4)
Hip ORIF	1,447	31.0	3.2 (2.7)	2 (2 to 4)	0.6	4.0 (4.0)	2 (2 to 4)	0.8	4.1 (2.2)	4 (2 to 5)
Total hip arthroplasty (fracture)	288	14.2	3.1 (2.1)	2 (2 to 4)	2.1	2.0	2 (2 to 2)	0.4	1.0	1 (1 to 1)
Hip hemiarthroplasty (fracture)	805	18.3	2.7 (1.9)	2 (2 to 3.5)	0.5	2.5 (1.7)	2.5 (1 to 4)	0.9	2.4 (1.6)	2 (2 to 2)
Femur ORIF	95	25.3	4.8 (2.4)	4 (3 to 6)	2.1	6.0 (2.8)	6 (4 to 8)	2.1	3.0 (1.4)	3 (2 to 4)
Knee arthroplasty	3,613	3.3	3.3 (4.4)	2 (1 to 2.5)	0.2	2.8	3 (3 to 3)	0.1	0.7	1 (1 to 1)
Total knee arthroplasty	3,140	2.8	2.9 (4.0)	2 (1 to 2)	0.0	-	-	0.0	-	-
Knee arthroplasty revision	473	6.3	5.4 (6.7)	2 (2 to 5)	0.2	20.0	20 (20 to 20)	0.2	2.0	2 (2 to 2)
Patella ORIF	85	3.5	3.0 (1.0)	3 (2 to 4)	0.0	-	-	0.0	-	-
Tibia/fibula ORIF	416	5.1	3.1 (2.0)	2 (2 to 4)	0.2	2.0	2 (2 to 2)	0.5	1.5 (0.7)	1.5 (1 to 2)
Ankle arthroplasty	24	0.0	-	-	0.0	-	-	0.0	-	-
Ankle and foot ORIF	1,388	1.5	3.9 (3.0)	2 (2 to 6)	0.1	2.0	2 (2 to 4)	0.0	-	-

Amputation	789	33.1	4.4 (4.2)	3 (2 to 6)	0.9	3.3 (1.4)	3 (2 to 4)	2.4	3.0 (1.8)	2.5 (2 to 3)
Forearm amputation	7	14.3	1.0	1 (1 to 1)	0.0	-	-	0.0	-	-
Above-knee amputation	186	43.6	4.2 (3.8)	3 (2 to 5)	2.2	3.3 (1.0)	3.5 (2.5 to 4)	4.3	4.1 (3.3)	3.5 (2 to 4)
Below-knee amputation	364	38.5	4.6 (4.6)	3 (2 to 6)	0.3	2.0	2 (2 to 2)	2.2	2.0 (0.5)	2 (2 to 2)
Midfoot and toe amputation	232	16.8	4.6 (3.3)	3 (2 to 6)	0.9	4.0 (2.8)	4 (2 to 6)	1.3	2.7 (1.2)	2 (2 to 4)
Total	14,584	10.3	3.3 (3.1)	2 (2 to 4)	0.4	2.5 (0.6)	2 (2 to 3)	0.5	2.3 (1.2)	2 (1 to 3)

Table iv. Non-transfusion clinical outcomes.

Surgery	Number of surgeries	Median hospital stay, days (IQR)	ICU admission (%)	In-hospital mortality (%)
Upper limb arthroplasty	766	2 (1 to 4)	0.8	0.0
Total shoulder arthroplasty	604	2 (1 to 3)	0.7	0.0
Shoulder hemiarthroplasty	60	2 (1 to 5.5)	1.7	0.0
Shoulder arthroplasty revision	13	5 (3 to 6)	0.0	0.0
Elbow arthroplasty	84	2 (1 to 4)	1.2	0.0
Elbow arthroplasty revision	5	2 (1 to 8)	0.0	0.0
Upper limb fracture fixation	1,175	3 (1 to 6)	6.6	0.3
Clavicle fracture	114	2 (1 to 4)	6.1	0.0
Shoulder ORIF	110	3 (1 to 8)	1.8	0.0
Humerus ORIF	332	3 (2 to 6.5)	5.7	0.6
Elbow ORIF	168	3 (1 to 6)	5.4	0.0
Radius/ulna ORIF	358	3 (1 to 5)	8.9	0.3
Distal radioulnar ORIF	33	2 (1 to 5)	9.1	0.0
Wrist ORIF	60	2 (1 to 4.5)	10.0	0.0
Pelvis ORIF	99	11 (6 to 19)	21.2	0.0
Hip arthroplasty	3,594	3 (2 to 4)	0.4	0.2
Total hip arthroplasty	3,079	2 (2 to 4)	0.3	0.2
Hip arthroplasty revision	515	5 (3 to 9)	1.4	0.6
Hip fracture surgery	2,540	9 (5 to 16)	3.3	3.7
Hip ORIF	1,447	9 (5 to 17)	3.7	4.0

Total hip arthroplasty (fracture)	288	8 (5 to 12)	2.8	2.4
Hip hemiarthroplasty (fracture)	805	9 (6 to 16)	2.7	3.6
Femur ORIF	95	8 (5 to 17)	1.1	6.3
Knee arthroplasty	3,613	3 (2 to 5)	0.8	0.2
Total knee arthroplasty	3,140	3 (2 to 5)	0.7	0.1
Knee arthroplasty revision	473	3 (2 to 6)	1.3	0.4
Patella ORIF	85	5 (3 to 9)	2.4	0.0
Tibia/fibula ORIF	416	5 (3 to 9)	4.1	0.2
Ankle arthroplasty	24	2 (2 to 3.5)	0.0	0.0
Ankle and foot ORIF	1,388	3 (2 to 7)	2.0	0.4
Amputation	789	12 (6 to 23)	7.0	5.6
Forearm amputation	7	5 (1 to 48)	14.3	14.3
Above-knee amputation	186	11.5 (6 to 28)	11.3	10.8
Below-knee amputation	364	14 (7 to 26.5)	6.9	4.7
Midfoot and toe amputation	232	10 (6 to 17)	3.5	2.6
Total	14,584	4.5 (3 to 8)	2.3	1.2