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Appendix 1. Inclusion and Exclusion Codes for Degenerative Lumbar Fusion and Lumbar Disc Replacement Cohort Identification

CCI – Canadian Classification of Interventions
ICD-10 – International Classification of Diseases (10th revision)
OHIP – Ontario Health Insurance Plan Procedural Billing Codes

Retrospective descriptive study with time points from April 1, 1993 to March 31, 2012.

- Each eligible procedure must be done on patients aged 20 years or older with valid IKN, as defined using the algorithm involving OHIP and CIHI-DAD/SDS; the codes for this algorithm are provided below, as well as in the "Exclusions" section.

Inclusion Criteria

1A. Lumbar fusion surgery

Each eligible lumbar fusion procedure must be a spinal fusion procedure with at least 1 code from each of the CCP, ICD-9 and OHIP codes containing A fee suffix (any field) *from April 1, 1993 through March 31, 2002* (Table 1)*:*

Table 1. CCP/ICD-9/OHP Inclusion codes for lumbar fusion surgeries (Part 1A)

CCP Procedure Code				
1609	8978	8988	9058	9231
9309				
ICD-9 Diagnostic Code				
721.3	721.4	721.5	722.1	722.2
722.3	722.5	722.6	722.7	722.8
722.9	724.0	724.2	724.3	724.4
724.5	724.6	724.8	724.9	738.4
739.3	739.4	756.1	847.2	847.3
847.9	721.9	846		
OHIP Procedure Code (containing fee suffix "A")				
E365	E367	E370	E372	E373
E375	E387	E548	E567	E568
E574	N513	N533	N539	N540
N541	N559	N568	N574	N575
N576	N580	N581	N582	R271
R296	R303	R310	R336	R346
R362	R369	R371	R459	R493
R494	R636			

Each eligible lumbar fusion procedure must be a spinal fusion procedure with at least 1 code from each of the CCI,ICD-10 and OHIP codes containing A fee suffix from *April 1, 2002 through March 31, 2012* (Table 2)*:*

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Table 2. CCI/ICD-10/OHIP Inclusion codes for lumbar fusion surgeries (Part 1A)

CCI Procedure Code				
1.SC.74	1.SC.75	1.SC.80	1.SC.87	1.SC.89
1.SE.53	1.SE.87	1.SE.89		
ICD-10 Diagnostic Code				
M40.(1-5)	M41.(5,8)	M43.(0,1,2,5)	M47.(1,2,8,9)	M47.89
M48.0	M48.09	M48.25-M48.28	M51.(0-4,9)	M53.(2,8,9)
M54.(1,8,9)	M54.9	M79.25-M79.28	M79.3	M96.1
M99				
OHIP Procedure Code (containing fee suffix "A")				
E365	E367	E370	E372	
E375	E387	E548	E567	E568
E574	N513	N533	N539	N540
N541	N559	N568	N574	N575
N576	N580	N581	N582	R271
R296	R303	R310	R336	R346
R362	R369	R371	R459	R493
R494	R636			

To exclude urgent/emergent procedures, the Admission Category in DAD must be elective, Admcat = "L".

Each CIHI diagnosis and procedure inclusion codes must occur in the same admission for a case to be included. In cases where there is discrepancy between OHIP and CIHI **admission** date, the CIHI date will prevail as procedure date given its validated accuracy.

1B. Knee arthroplasty

Each eligible knee arthroplasty procedure must be a procedure with the following CCP/CCI procedure codes:
93.40, 93.41 (*April 1, 1993 through March 31, 2002*), 1.VG.53 (*April 1, 2002 through March 31, 2012*)
In combination with the procedure code above (via operator "and"), at least one of the following OHIP codes containing fee suffix "A" must be present in the same admission:
R441, R248 or R244.
To exclude urgent/emergent procedures, the Admission Category in DAD must be elective, Admcat = "L".

1C. Total hip replacement

Each eligible hip replacement procedure must be a procedure with the following CCP/CCI procedure codes:
93.5193.52, 93.53, or 93.59 (*April 1, 1993 through March 31, 2002*); 1.VA.53.LA-PN or 1.VA.53.PN-PN (*April 1, 2002 through March 31, 2012*).
In combination with the procedure code above (via operator "and"), at least one of the following OHIP codes containing fee suffix "A" must be present in the same admission:
R440, R553 or R241.

To exclude urgent/emergent procedures, the Admission Category must be elective, Admcat = "L".

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Note that spinal fusion, knee arthroplasty and total hip replacements are independent events with separate procedure dates and outcomes**.** A patient can be included as a case multiple times in each of the three procedures, and being included in one procedure does not preclude inclusion in other procedures.

Exclusion Criteria

-Following exclusions apply for all procedures:

- Death on or prior to procedure date
- Invalid IKN in RPDB (i.e. valikn ~= "V")
- IKN not found in RPDB (i.e. missing age and sex)
- Invalid age (<20 years as of procedure date)
- Procedures cancelled, previous, "out of hospital" or "abandoned after onset" from discharge records.
- Exclusion criteria apply to the admission, but not the patient; in other words, presence of a code below will exclude the particular admission associated with the code, but the patient may be eligible if s/he undergoes an admission with the inclusion codes at a later date.

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In addition, tables 3 and 4 below apply to lumbar fusion procedures **only**, as patients with the exclusion criteria in these tables are not excluded from procedures in parts 1B and 1C.

Table 3 ICD-9/OHIP Exclusion codes for spinal fusion surgeries (Part 1A)
From April 1, 1993 through March 31, 2002:

ICD-9 CM Diagnosis Code	
Exclude if listed in *any* diagnosis field:	Exclude if listed as *main* diagnosis; do not exclude if it is a secondary diagnosis
140-239.9 324.1 630-676 720.0-720.9 730-730.99 733.1 733.8, 733.9 805-806.9 839.0-839.5 E800-E849.9	353.2, 353.3 721.0, 721.2 721.1, 722.0, 722.4 723.0 723.4

OHIP Procedure Code				
Exclude if listed in any OHIP procedure field:				
E562	E900	E913	E924	E929
E978	F103	F103	F105	F107
N126	N182	N313	N314	N317
N318	N319	N320	N321	N500
N501	N502	N503	N504	N505
N509	N510	N514	N515	N516
N517	N518	N519	N520	N528
N532	N548	N549	N550	N553
N554	N560	N561	N569	N570
N572	N573	N583	R234	R251
R252	R254	R264	R270	R419
R447	R451	R634	R635	R993

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Table 4 ICD-10/OHIPO Exclusion codes for spinal fusion surgeries (Part 1A)
April 1, 2002 through March 31, 2012:

ICD-10 Diagnosis Code	
Exclude if listed in *any* diagnosis field:	Exclude if listed as *main* diagnosis; do not exclude if it is a secondary diagnosis
C00-D48	G54.2, G54.3
G00-G09	M47.81-M47.84
O00-O99	M47.11-M47.14
M45-M46	M47.21-M47.24
M86	M50, M51.21-M51.24
M80	M51.31-M51.34
M84	M51.01-M51.04
S12, S22, S32	M51.11-M51.14
S13.1, S23.1, S33.1	M96.11-M96.14
V01-X59	M51.91-M51.94
	M51.81-M51.84
	M48.01-M48.04, M54.2
	M53.1

OHIP Procedure Code				
Exclude if listed in any OHIP procedure field:				
E562	E900	E913	E924	E929
E978	F103	F103	F105	F107
N126	N182	N313	N314	N317
N318	N319	N320	N321	N500
N501	N502	N503	N504	N505
N509	N510		N514	N515
N516	N517	N518	N519	N520
N528	N532	N548	N549	N550
N553	N554	N560	N561	N569
N570	N572	N573	N583	R234
R251	R252	R254	R264	R270
R419	R447	R451		
R634	R635	R993		

Urgency Code
Exclude if listed in *Method of Entry in Hospital (ENTRY)* in DAD:
E

Abandonment Codes
Exclude if listed in *Intervention Attribute Status (INATSTAT, 1-20)* in DAD:
A

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Tables 5 and 6 below apply to knee arthroplasty and total hip replacement procedures **only**, as patients with these exclusion criteria are not excluded from procedures in part 1A. These include procedures for fractures, tumours and injury, as follows (**hip and knee procedures only**).

Table 5 ICD-9 Diagnostic code exclusions for knee arthroplasty and total hip replacement
Through March 31, 2002:

ICD-9 Diagnosis Code
Exclude if listed in *any* diagnosis field:
170.7-170.9
198.5
808.0, 808.1
820-823, 827, 828
E800-E848
E880-E888

Urgency Code
Exclude if listed in *Method of Entry in Hospital (ENTRY)* in DAD:
E

Abandonment Codes
Exclude if listed in *Intervention Attribute Status (INATSTAT, 1-20)* in DAD:
A

Table 6 ICD-10 Diagnostic code exclusions for knee arthroplasty and total hip replacement
April 1, 2002 onwards:

ICD-10 Diagnosis Code
Exclude if listed in *any* diagnosis field:
C40.2, C40.3, C40.8, C40.9
C79.5
S32.4
S72.x
S82.0-S82.2, S82.4, S82.7, S82.9
V01.x-V99.x
W00.x-W19.x

Urgency Code
Exclude if listed in *Method of Entry in Hospital (ENTRY)* in DAD:
E

Abandonment Codes
Exclude if listed in *Intervention Attribute Status (INATSTAT, 1-20)* in DAD:
A