



# Model Specifications Clinical Indicators

November 2019



Canadian Institute  
for Health Information

Institut canadien  
d'information sur la santé

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ISBN 978-1-77109-857-1

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How to cite this document:

Canadian Institute for Health Information. *Model Specifications — Clinical Indicators, November 2019*. Ottawa, ON: CIHI; 2019.

Cette publication est aussi disponible en français sous le titre *Spécifications du modèle des indicateurs cliniques, novembre 2019*.

ISBN 978-1-77109-858-8

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# Model Specifications for Clinical Indicators

Please note that all coefficients were developed based on 3 years of pooled data (2015–2016 to 2017–2018) unless otherwise specified. Please email [hsp@cihi.ca](mailto:hsp@cihi.ca) if further details are required.

## 1 Hip Fracture Surgery Within 48 Hours

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA codes	Qualifier
<b>Intercept</b>	2.22409692742789	<0.0001	—	—
<b>Sex (male = 1, female = 0)</b>	-0.19001877768229	<0.0001	—	—
<b>Heart failure or pulmonary edema</b>	-1.02912908681354	<0.0001	I50, J81	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Chronic obstructive pulmonary disease</b>	-0.547803580196536	<0.0001	J41, J42, J43, J44, J47	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Ischemic heart disease (acute)</b>	-1.28601236084857	<0.0001	I20, I21, I22, I24,	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Cardiac dysrhythmias</b>	-0.888498091956136	<0.0001	I47, I48, I49	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Ischemic heart disease (chronic)</b>	-0.302569711800539	0.0345	I25	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Hypertension</b>	-0.25443152633929	<0.0001	I10, I11, I12, I13, I15	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Diabetes with complications</b>	-0.344204940967108	<0.0001	E10.0–E10.7, E11.0–E11.7, E13.0–E13.7, E14.0–E14.7	Type (1), (3) or [(W), (X) or (Y) but not (2)]
<b>Age 18 to 54 (vs. 65 to 74)</b>	0.396199578144508	<0.0001	—	—
<b>Age 55 to 64 (vs. 65 to 74)</b>	0.0887995914508238	0.1019	—	—
<b>Age 75 to 84 (vs. 65 to 74)</b>	-0.099824589275521	0.0071	—	—
<b>Age 85 to 94 (vs. 65 to 74)</b>	-0.151580999454333	0.00 0.0000 00	—	—
<b>Age 95 and older (vs. 65 to 74)</b>	-0.119470850399291	0.0330	—	—

### Note

— Not applicable.

## 2 Medical Patients Readmitted to Hospital

Risk factor	Regression coefficient	Pr > ChiSq (Wald)
Intercept	-3.094648127	<0.0001
Age 45 to 64 (vs. 18 to 44)	0.075363351	<0.0001
Age 65 to 84 (vs. 18 to 44)	0.127869852	<0.0001
Age 85 and older (vs. 18 to 44)	0.144010018	<0.0001
Male (vs. female)	0.028824438	0.0000
1 acute care hospitalization in previous 6 months (vs. none)	0.520614498	<0.0001
2 or more acute care hospitalizations in previous 6 months (vs. none)	1.149118445	<0.0001
Urgent admission	0.636225862	<0.0001
Charlson score group 1* (vs. 0)	0.268189205	<0.0001
Charlson score group 2* (vs. 0)	0.416382251	<0.0001
CMG 026	-0.503124283	<0.0001
CMG 029	-0.403271286	<0.0001
CMG 040	-0.192130748	<0.0001
CMG 097	-0.344478618	<0.0001
CMG 130	0.296530074	<0.0001
CMG 132	0.409766022	<0.0001
CMG 135	0.251958359	<0.0001
CMG 136	0.032588695	0.1933
CMG 138	0.012485229	0.1847
CMG 139	0.424272267	<0.0001
CMG 142	0.277653158	<0.0001
CMG 143	0.495016944	<0.0001
CMG 149	0.175095439	<0.0001
CMG 193	-0.105593586	<0.0001
CMG 194	0.30938591	<0.0001
CMG 196	0.365538256	<0.0001
CMG 200	-0.138798012	<0.0001
CMG 202	0.121712661	<0.0001
CMG 204	0.111212443	<0.0001
CMG 205	-0.344446298	<0.0001
CMG 208	-0.328761388	<0.0001
CMG 209	0.042044952	0.0025
CMG 213	0.1117604	<0.0001
CMG 248	0.283756791	<0.0001
CMG 249	-0.029276832	0.0161

Risk factor	Regression coefficient	Pr > ChiSq (Wald)
CMG 250	0.449174458	<0.0001
CMG 253	0.351024458	<0.0001
CMG 254	0.089407829	<0.0001
CMG 255	0.23782935	<0.0001
CMG 256	0.164576691	<0.0001
CMG 257	0.289003446	<0.0001
CMG 258	0.265944679	<0.0001
CMG 284	0.443569458	<0.0001
CMG 285	0.824208758	<0.0001
CMG 287	0.215805365	<0.0001
CMG 288	0.38490944	<0.0001
CMG 360	0.114079984	<0.0001
CMG 364	0.127546593	<0.0001
CMG 405	0.100034443	<0.0001
CMG 436	0.162622595	<0.0001
CMG 437	0.172806781	<0.0001
CMG 477	0.280296058	<0.0001
CMG 484	0.177783475	<0.0001
CMG 486	0.099159262	0.0001
CMG 487	0.087829371	<0.0001
CMG 488	-0.209044488	<0.0001
CMG 628	0.778497227	<0.0001
CMG 633	0.089927688	<0.0001
CMG 635	0.264947457	<0.0001
CMG 638	-0.060981901	0.0075
CMG 654	0.143685451	<0.0001
CMG 660	0.207475425	<0.0001
CMG 662	0.13389283	<0.0001
CMG 776	-0.163151115	<0.0001
CMG 778	-0.419369909	<0.0001
CMG 780	-0.112667986	<0.0001
CMG 805	-0.299248438	<0.0001
CMG 806	-0.237566613	<0.0001
CMG 811	0.024427934	0.0249
CMG 815	0.253626268	<0.0001

**Notes**

\* Charlson score group 1 = Charlson score 1–2 outside Quebec and 2–4 in Quebec; Charlson score group 2 = Charlson score 3 or higher outside Quebec and 5 or higher in Quebec (reference category is Charlson score group 0 = Charlson score 0 outside Quebec and 0–1 in Quebec). For further details on the Charlson Index, please refer to the [General Methodology Notes](#) document.

CMGs included in the model are those that account for the top 80% of the total number of readmissions among medical patients.

### 3 Surgical Patients Readmitted to Hospital

Risk factor	Regression coefficient	Pr > ChiSq (Wald)
Intercept	-3.277938622	<0.0001
Age 45 to 64 (vs. 18 to 44)	0.041142633	<0.0001
Age 65 to 84 (vs. 18 to 44)	0.232141412	<0.0001
Age 85 and older (vs. 18 to 44)	0.391958153	<0.0001
Male (vs. female)	0.020798701	0.0004
1 acute care hospitalization in previous 6 months (vs. none)	0.418083775	<0.0001
2 or more acute care hospitalizations in previous 6 months (vs. none)	0.891938934	<0.0001
Urgent admission	0.437826011	<0.0001
Charlson score group 1* (vs. 0)	0.432302012	<0.0001
Charlson score group 2* (vs. 0)	0.562214347	<0.0001
CMG 009	0.598825896	<0.0001
CMG 086	0.174867082	0.0002
CMG 114	-0.064096678	0.0778
CMG 117	0.468118702	<0.0001
CMG 121	0.362415799	<0.0001
CMG 161	-0.044064756	0.2471
CMG 162	0.620654722	<0.0001
CMG 163	0.742005438	<0.0001
CMG 166	0.364772345	<0.0001
CMG 170	0.157550828	0.0006
CMG 172	0.231630422	<0.0001
CMG 175	0.000100622	0.9949
CMG 176	-0.198252882	<0.0001
CMG 178	0.349497992	<0.0001
CMG 179	-0.247712825	<0.0001
CMG 180	0.387040583	<0.0001
CMG 181	0.292689358	<0.0001
CMG 182	0.568112711	<0.0001
CMG 185	0.426285529	<0.0001
CMG 187	-0.051540903	0.0113
CMG 194	0.186746914	<0.0001
CMG 220	0.84606739	<0.0001
CMG 221	1.044698366	<0.0001
CMG 222	0.311801158	<0.0001
CMG 223	0.475455881	<0.0001

<b>Risk factor</b>	<b>Regression coefficient</b>	<b>Pr &gt; ChiSq (Wald)</b>
CMG 225	0.41120328	<0.0001
CMG 226	0.487557648	<0.0001
CMG 227	0.297096417	<0.0001
CMG 228	-0.426749107	<0.0001
CMG 229	-0.246624571	<0.0001
CMG 231	0.648774947	<0.0001
CMG 232	0.349851318	<0.0001
CMG 233	-0.052815327	0.0785
CMG 234	-0.807943165	<0.0001
CMG 237	0.457705231	<0.0001
CMG 274	0.600880288	<0.0001
CMG 275	0.443972201	<0.0001
CMG 278	-0.25401633	<0.0001
CMG 280	0.583386032	<0.0001
CMG 281	0.017419481	0.5798
CMG 282	0.454508904	<0.0001
CMG 313	-0.112918974	<0.0001
CMG 317	0.067139578	0.1526
CMG 320	-0.422607351	<0.0001
CMG 321	-0.511440061	<0.0001
CMG 381	0.501337629	<0.0001
CMG 382	0.207980754	<0.0001
CMG 422	0.326701957	<0.0001
CMG 424	-0.829850596	<0.0001
CMG 450	1.15860516	<0.0001
CMG 452	1.340197428	<0.0001
CMG 454	0.174400766	<0.0001
CMG 455	0.478327148	<0.0001
CMG 456	0.206588386	<0.0001
CMG 458	0.489717972	<0.0001
CMG 459	0.031590721	0.3088
CMG 462	-0.067663989	0.0835
CMG 464	0.102817214	<0.0001
CMG 501	-0.128457822	0.0002
CMG 502	-0.169571353	<0.0001
CMG 610	0.511359539	<0.0001
CMG 615	0.645776338	<0.0001
CMG 617	0.322030201	<0.0001



Risk factor	Regression coefficient	Pr > ChiSq (Wald)
CMG 650	0.591507033	<0.0001
CMG 726	-0.220326805	<0.0001
CMG 727	-0.419131135	<0.0001
CMG 729	-0.731585352	<0.0001
CMG 733	0.565671825	<0.0001
CMG 734	0.386378559	<0.0001
CMG 737	-0.084463629	0.0452
CMG 739	-0.942563007	<0.0001
CMG 747	-0.972810107	<0.0001
CMG 752	0.351012136	<0.0001
CMG 801	0.181641029	<0.0001
CMG 805	-0.154999993	<0.0001
CMG 806	0.16331041	<0.0001
CMG 904	0.54978269	<0.0001
CMG 905	0.656845293	<0.0001
CMG 906	0.650000629	<0.0001
CMG 910	0.639950718	<0.0001

**Notes**

\* Charlson score group 1 = Charlson score 1–2 outside Quebec and 2–4 in Quebec; Charlson score group 2 = Charlson score 3 or higher outside Quebec and 5 or higher in Quebec (reference category is Charlson score group 0 = Charlson score 0 outside Quebec and 0–1 in Quebec). For further details on the Charlson Index, please refer to the [General Methodology Notes](#) document.

CMGs included in the model are those that account for the top 80% of the total number of readmissions among surgical patients.

## 4 Pediatric Patients Readmitted to Hospital

Risk factor	Regression coefficient	Pr > ChiSq (Wald)
Intercept	-3.418204045	<0.0001
Age 5 to 9 (vs. 0 to 4)	-0.21257241	<0.0001
Age 10 to 14 (vs. 0 to 4)	-0.103455518	<0.0001
Age 15 to 17 (vs. 0 to 4)	-0.079091595	<0.0001
Male (vs. female)	0.013412358	0.2389
1 acute care hospitalization in previous 6 months (vs. none)	0.81526892	<0.0001
2 or more acute care hospitalizations in previous 6 months (vs. none)	1.608039656	<0.0001
Urgent admission	0.45586918	<0.0001
CMG 005	1.016332302	<0.0001
CMG 011	1.217517664	<0.0001
CMG 039	0.464011597	<0.0001

<b>Risk factor</b>	<b>Regression coefficient</b>	<b>Pr &gt; ChiSq (Wald)</b>
CMG 040	0.350653207	<0.0001
CMG 041	0.297769175	0.0003
CMG 042	0.567589094	<0.0001
CMG 086	0.131684615	0.0007
CMG 097	0.138456762	0.0003
CMG 102	-0.088718201	0.2313
CMG 103	-0.311912611	0.0002
CMG 104	-0.151063279	0.0240
CMG 105	-0.01797087	0.7528
CMG 135	0.93459165	<0.0001
CMG 136	0.177725706	0.0161
CMG 138	-0.061944608	0.0441
CMG 141	0.103894088	0.0002
CMG 147	-0.415782903	<0.0001
CMG 148	-0.077791392	0.1175
CMG 149	0.422869609	<0.0001
CMG 163	0.469043137	<0.0001
CMG 202	0.574361967	<0.0001
CMG 209	0.709779011	<0.0001
CMG 231	0.090551068	0.3956
CMG 233	0.491396354	<0.0001
CMG 234	-0.553526559	<0.0001
CMG 237	0.576459069	<0.0001
CMG 248	0.650084345	<0.0001
CMG 249	0.011635624	0.7426
CMG 253	0.739112995	<0.0001
CMG 254	0.752439349	<0.0001
CMG 255	0.652129312	<0.0001
CMG 256	0.361326758	<0.0001
CMG 257	0.3900155	<0.0001
CMG 258	0.57881828	<0.0001
CMG 287	0.758268526	<0.0001
CMG 288	1.109575032	<0.0001
CMG 361	0.486828638	<0.0001
CMG 405	-0.417353218	<0.0001
CMG 407	-0.187132772	0.0110
CMG 432	0.110618716	0.2412
CMG 433	0.558015414	<0.0001

<b>Risk factor</b>	<b>Regression coefficient</b>	<b>Pr &gt; ChiSq (Wald)</b>
CMG 434	0.948581092	<0.0001
CMG 435	0.82452264	<0.0001
CMG 436	0.702019992	<0.0001
CMG 437	-0.00704118	0.8988
CMG 438	0.092623504	0.2768
CMG 454	0.648342331	<0.0001
CMG 480	0.61377411	<0.0001
CMG 487	0.160367051	0.0014
CMG 488	-0.103164342	0.1152
CMG 588	0.168695277	0.0738
CMG 589	0.419450528	<0.0001
CMG 591	0.387447395	<0.0001
CMG 592	0.154814913	0.0244
CMG 594	0.247630795	<0.0001
CMG 600	0.417884124	<0.0001
CMG 601	0.292819602	<0.0001
CMG 602	0.803245692	<0.0001
CMG 610	1.078922454	<0.0001
CMG 625	1.705815985	<0.0001
CMG 633	0.170728786	<0.0001
CMG 634	0.49542373	<0.0001
CMG 635	0.374469753	0.0003
CMG 636	1.022334485	<0.0001
CMG 637	0.708276874	<0.0001
CMG 638	0.432905205	<0.0001
CMG 654	0.301164427	0.0007
CMG 660	-0.021476695	0.8110
CMG 661	-0.158259802	0.0012
CMG 662	0.223073176	<0.0001
CMG 778	-0.751396056	<0.0001
CMG 780	-0.031614106	0.7303
CMG 782	0.13838017	0.1163
CMG 806	0.126872373	0.0768
CMG 811	0.044239449	0.4686
CMG 812	0.024749426	0.7800
CMG 993	-0.100651151	0.2828

**Note**

CMGs included in the model are those that account for the top 80% of the total number of readmissions among patients age 17 and younger.

## 5 Obstetric Patients Readmitted to Hospital

Risk factor	Regression coefficient	Pr > ChiSq (Wald)
Intercept	-4.419510733	<0.0001
Age 24 and younger (vs. 25 to 34)	0.136893766	<0.0001
Age 35 and older (vs. 25 to 34)	0.138952506	<0.0001
1 acute care hospitalization in previous 6 months (vs. none)	0.533621248	<0.0001
2 or more acute care hospitalizations in previous 6 months (vs. none)	1.24892944	<0.0001
Urgent admission	1.408585107	<0.0001

## 6 Hospital Deaths Following Major Surgery

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA/other codes	Qualifier
Intercept	-7.1108044421	<0.0001	—	—
Male (vs. female)	0.1692957136	<0.0001	sex_code = M	—
Age 45 to 64 (vs. 18 to 44)	0.494221356	<0.0001	45 ≤ age_years ≤ 64	—
Age 65 to 74 (vs. 18 to 44)	0.9031442746	<0.0001	65 ≤ age_years ≤ 74	—
Age 75 to 84 (vs. 18 to 44)	1.3734346676	<0.0001	75 ≤ age_years ≤ 84	—
Age 85+ (vs. 18 to 44)	1.9562659809	<0.0001	85 ≤ age_years	—
Emergent surgery (vs. elective)	1.4997693937	<0.0001	admission_category_code = U and major surgery within 1 day of admission (same day or next day)	—
Urgent surgery (vs. elective)	1.4811819309	<0.0001	admission_category_code = U and major surgery not within 1 day of admission (not same day or next day)	—
Transfer patients	0.4137605494	<0.0001	Patients who are transferred in from another acute institution	—
Charlson Index score of 1 or 2 (vs. 0) (modified for Quebec records)*	0.8973571959	<0.0001	Please refer to <a href="#">General Methodology Notes</a> for details	—
Charlson Index score of 3 or more (vs. 0) (modified for Quebec records)*	1.3732408918	<0.0001	Please refer to <a href="#">General Methodology Notes</a> for details	—
CMG 004	2.6258066142	<0.0001	—	—
CMG 005	2.874154848	<0.0001	—	—
CMG 009	1.0838461296	<0.0001	—	—
CMG 015	2.3494667369	<0.0001	—	—
CMG 162	0.9713145921	<0.0001	—	—

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA/other codes	Qualifier
CMG 163	2.0575979884	<0.0001	—	—
CMG 164	2.1778431148	<0.0001	—	—
CMG 166	0.576387425	<0.0001	—	—
CMG 180	1.5475283909	<0.0001	—	—
CMG 181	1.9000489845	<0.0001	—	—
CMG 182	1.0636629522	<0.0001	—	—
CMG 221	1.674102992	<0.0001	—	—
CMG 222	1.1050187806	<0.0001	—	—
CMG 223	0.6317980449	<0.0001	—	—
CMG 225	1.4531093163	<0.0001	—	—
CMG 274	1.3553217228	<0.0001	—	—
CMG 618	1.9655633928	<0.0001	—	—
CMG 726	0.5579375574	<0.0001	—	—
CMG 727	0.5167541211	<0.0001	—	—
CMG 733	1.8705473306	<0.0001	—	—
CMG 752	2.1809602062	<0.0001	—	—

**Notes**

\* Charlson score group 1 = Charlson score 1–2 outside Quebec and 2–4 in Quebec; Charlson score group 2 = Charlson score 3 or higher outside Quebec and 5 or higher in Quebec (reference category is Charlson score group 0 = Charlson score 0 outside Quebec and 0–1 in Quebec). For further details on the Charlson Index, please refer to the [General Methodology Notes](#) document.

— Not applicable.

CMGs included in the model are those that account for the top 80% of the total number of deaths among major surgery patients.

## 7 In-Hospital Sepsis

Risk factor	Children (age 17 and younger)		Adults (age 18 and older)		ICD-10-CA codes or qualifier	
	Regression coefficient	Pr > ChiSq (Wald)	Regression coefficient	Pr > ChiSq (Wald)		
Intercept	-7.260678045	<0.0001	-7.340849673	<0.0001	—	—
Age 1 to 4 (vs. 5 to 9)	0.145291088	0.2337	—	—	—	—
Age 10 to 14 (vs. 5 to 9)	0.124313138	0.3604	—	—	—	—
Age 15 to 17 (vs. 5 to 9)	0.259661119	0.0597	—	—	—	—
Age 30 to 44 (vs. 18 to 29)	—	—	-0.151847469	0.0001	—	—
Age 45 to 59 (vs. 18 to 29)	—	—	0.026584564	0.4545	—	—

Risk factor	Children (age 17 and younger)		Adults (age 18 and older)		ICD-10-CA codes or qualifier	
	Regression coefficient	Pr > ChiSq (Wald)	Regression coefficient	Pr > ChiSq (Wald)		
Age 60 to 74 (vs. 18 to 29)	—	—	0.136551428	0.0001	—	—
Age 75 to 89 (vs. 18 to 29)	—	—	0.078355857	0.0229	—	—
Age 90 and older (vs. 18 to 29)	—	—	-0.216742817	<0.0001	—	—
Male (vs. female)	0.022500772	0.8025	0.271006699	<0.0001	—	—
Urgent admission	-0.173898181	0.0860	0.710003116	<0.0001	—	—
Modified Charlson score group 1* (vs. 0)	0.908795823	<0.0001	0.873696664	<0.0001	Please refer to <a href="#">General Methodology Notes</a> for details	
Modified Charlson score group 2* (vs. 0)	1.117149865	<0.0001	1.356157271	<0.0001	Please refer to <a href="#">General Methodology Notes</a> for details	
Immunocompromised states <sup>†</sup> (Quebec records)	1.88574931	<0.0001	0.653772503	<0.0001	ICD-10-CA codes: B24, B485, B59, D47.1, D70.–, D71, D72.0, D80.– to D86.–, D89.8, D89.9, E40 to E43, K91.2, N18.–, O98.7–, T86.–, Y83.0, Z49.–, Z94.0 to Z94.4, Z94.8–, Z94.9, Z99.2	For ICD-10-CA codes: Type (M), (1), (C), (2), (9) or [(W), (X) or (Y) but not (2)]
Immunocompromised states <sup>†</sup> (non-Quebec records)	2.566928058	<0.0001	1.589184972	<0.0001	CCI codes: 1.GJ.85.^, 1.GR.85.^, 1.GT.85.^, 1.HY.85.^, 1.HZ.85.^, 1.LZ.19. HH-U7-A, 1.LZ.19. HH-U7-J, 1.LZ.19.HH-U8-A, 1.LZ.19.HH-U8-J, 1.NK.85.^, 1.NP.85.^, 1.OA.85.^, 1.OB.85.^, 1.OJ.85.^, 1.OK.85.^, 1.PC.85.^, 1.WY.19.^	
Surgical patients	1.261943314	<0.0001	1.176811753	<0.0001	Major clinical category partition code = I (intervention)	

**Notes**

\* Modified Charlson score group 1 = modified Charlson score 1–2 outside Quebec and 2–4 in Quebec; modified Charlson score group 2 = modified Charlson score 3 or higher outside Quebec and 5 or higher in Quebec (reference category is modified Charlson score group 0 = modified Charlson score 0 outside Quebec and 0–1 in Quebec). For further details on the modified Charlson Index, please refer to the [General Methodology Notes](#) document.

† Based on the list of codes developed by the Agency for Healthcare Research and Quality (AHRQ) and Organisation for Economic Co-operation and Development (OECD) for patient safety indicators. This risk factor has 2 coefficients — 1 for the data submitted by Quebec and 1 for all other jurisdictions. Quebec-specific coefficients were included in the model to address differences in data collection.

— Not applicable.

## 8 Obstetric Trauma (With Instrument)

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA/other codes	Qualifier
<b>Intercept</b>	-1.493893749568	<0.0001	—	—
<b>Age 19 and younger (vs. 25 to 29)</b>	-0.532783839	<0.0001	age_years ≤ 19	—
<b>Age 20 to 24 (vs. 25 to 29)</b>	-0.357999113	<0.0001	20 ≤ age_years ≤ 24	—
<b>Age 30 to 34 (vs. 25 to 29)</b>	-0.090199259	<0.0001	30 ≤ age_years ≤ 34	—
<b>Age 35 to 39 (vs. 25 to 29)</b>	-0.223847671	<0.0001	35 ≤ age_years ≤ 39	—
<b>Age 40 and older (vs. 25 to 29)</b>	-0.353896594	<0.0001	age_years ≥ 40	—
<b>Malposition/malpresentation of the fetus</b>	0.179711802	<0.0001	O32.001, O32.201, O32.301, O32.401, O32.501, O32.601, O32.801, O32.901, O64.001, O64.201, O64.301, O64.401, O64.501, O64.801, O64.901	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Gestational age at delivery ≥41 weeks</b>	0.182205808	<0.0001	Gestational age at delivery >40 completed weeks	—
<b>Diabetes (pre-existing/gestational)</b>	0.116996724	<0.0001	O24.501, O24.601, O24.701, O24.801	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Fetal heart rate anomaly/asphyxia during labour and delivery</b>	-0.032491413	0.0630	O68.001, O68.201, O68.301	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Shoulder dystocia</b>	0.115299895	<0.0001	O66.001	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Prolonged second-stage labour</b>	0.326137291	<0.0001	O63.101	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Large fetus</b>	0.321011778	<0.0001	If newborn weight ≥4,000 g (requires mom/newborn linkage)	—

**Note**

— Not applicable.

## 9 Obstetric Trauma: Vaginal Delivery Without Instrument

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA/other codes	Qualifier
<b>Intercept</b>	-3.353968657	<0.0001	—	—
<b>Age 19 and younger (vs. 25 to 29)</b>	-0.344418597	<0.0001	—	—
<b>Age 20 to 24 (vs. 25 to 29)</b>	-0.285198311	<0.0001	—	—
<b>Age 30 to 34 (vs. 25 to 29)</b>	-0.0933412	<0.0001	—	—
<b>Age 35 to 39 (vs. 25 to 29)</b>	-0.247884653	<0.0001	—	—
<b>Age 40 and older (vs. 25 to 29)</b>	-0.542384564	<0.0001	—	—
<b>Malpresentation/ malpresentation of the fetus</b>	0.239694567	<0.0001	O32.001, O32.201, O32.301, O32.401, O32.501, O32.601, O32.801, O32.901, O64.001, O64.201, O64.301, O64.401, O64.501, O64.801, O64.901	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Large fetus</b>	0.37317963	<0.0001	Newborn weight ≥4,000 g (requires mom/ newborn linkage)	—
<b>Gestational age at delivery ≥41 weeks</b>	0.288279146	<0.0001	Gestational age at delivery >40 completed weeks	—
<b>Diabetes (pre-existing/ gestational)</b>	0.118168657	<0.0001	O24.501, O24.601, O24.701, O24.801	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Fetal heart rate anomaly/asphyxia during labour and delivery</b>	0.388991611	<0.0001	O68.001, O68.201, O68.301	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Shoulder dystocia</b>	0.52650494	<0.0001	O66.001	Type (M), (1), (C), (2), (W), (X) or (Y)
<b>Prolonged second-stage labour</b>	0.795195534	<0.0001	O63.101	Type (M), (1), (C), (2), (W), (X) or (Y)

**Note**

— Not applicable.



## 10 Low-Risk Caesarean Sections

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA/ other codes	Qualifier
<b>Intercept</b>	-1.777391496	<0.0001	—	—
<b>Age 19 and younger (vs. 25 to 29)</b>	-0.584671686	<0.0001	age_years ≤ 19	—
<b>Age 20 to 24 (vs. 25 to 29)</b>	-0.254906165	<0.0001	20 ≤ age_years ≤ 24	—
<b>Age 30 to 34 (vs. 25 to 29)</b>	0.280862137	<0.0001	30 ≤ age_years ≤ 34	—
<b>Age 35 to 39 (vs. 25 to 29)</b>	0.627739144	<0.0001	35 ≤ age_years ≤ 39	—
<b>Age 40 and older (vs. 25 to 29)</b>	0.756853226	<0.0001	age_years ≥ 40	—

### Notes

— Not applicable.

Coefficients for this indicator were developed based on 2 years of pooled data (2015–2016 to 2016–2017).

## 11 Repeat Hospital Stays for Mental Illness

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA codes; DSM-IV codes
<b>Intercept</b>	-2.066688282	<0.0001	—
<b>Sex (male = 1, female = 0)</b>	-0.047631948	<0.0001	—
<b>Age 0 to 19 (vs. 20 to 44)</b>	-0.16756792	<0.0001	—
<b>Age 45 to 64 (vs. 20 to 44)</b>	-0.13939052	<0.0001	—
<b>Age 65 to 84 (vs. 20 to 44)</b>	-0.551990226	<0.0001	—
<b>Age 85 and older (vs. 20 to 44)</b>	-1.651381882	<0.0001	—
<b>Discharged against medical advice (yes = 1)</b>	0.193649857	<0.0001	—
<b>Substance abuse–related disorder (vs. mood disorders)</b>	0.266524374	<0.0001	Refer to the <a href="#">Technical Notes</a> for details
<b>Schizophrenia (vs. mood disorders)</b>	0.621073742	<0.0001	Refer to the <a href="#">Technical Notes</a> for details
<b>Anxiety disorder (vs. mood disorders)</b>	-0.343279714	<0.0001	Refer to the <a href="#">Technical Notes</a> for details
<b>Personality disorder (vs. mood disorders)</b>	0.783771179	<0.0001	Refer to the <a href="#">Technical Notes</a> for details
<b>Other disorder (vs. mood disorders)</b>	-0.323063467	<0.0001	—
<b>Hospital type (psychiatric hospital = 1, general hospital = 0)</b>	0.117013061	<0.0001	—

### Notes

— Not applicable.

Coefficients for this indicator were developed based on 3 years of pooled data (2014–2015 to 2016–2017).

## 12 30-Day Readmission for Mental Illness

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA codes; DSM-IV codes
<b>Intercept</b>	-2.177154369	<0.0001	—
<b>Sex (male = 1, female = 0)</b>	0.0157564101726331	0.0858	—
<b>Age 0 to 19 (vs. 20 to 44)</b>	-0.101923752	<0.0001	—
<b>Age 45 to 64 (vs. 20 to 44)</b>	-0.171761454	<0.0001	—
<b>Age 65 to 84 (vs. 20 to 44)</b>	-0.357306418	<0.0001	—
<b>Age 85 and older (vs. 20 to 44)</b>	-0.822458469	<0.0001	—
<b>Multiple previous admissions for a selected mental illness (2 and more) during the past 12 months</b>	1.209997336	<0.0001	Refer to the <a href="#">Technical Notes</a> for details
<b>Discharged against medical advice (yes = 1)</b>	0.78333606	<0.0001	—
<b>Substance abuse–related disorder (vs. mood disorders)</b>	-0.052974412	0.4057	Refer to the <a href="#">Technical Notes</a> for details
<b>Schizophrenia (vs. mood disorders)</b>	0.146734	<0.0001	Refer to the <a href="#">Technical Notes</a> for details
<b>Anxiety disorder (vs. mood disorders)</b>	-0.066686526	0.0069	Refer to the <a href="#">Technical Notes</a> for details
<b>Personality disorder (vs. mood disorders)</b>	0.314420962	<0.0001	Refer to the <a href="#">Technical Notes</a> for details
<b>Other disorder (vs. mood disorders)</b>	-0.231938621	<0.0001	—
<b>Hospital type (psychiatric hospital = 1, general hospital = 0)</b>	-0.164866168	<0.0001	—

### Notes

— Not applicable.

Coefficients for this indicator were developed based on 3 years of pooled data (2014–2015 to 2016–2017).

# 13 30-Day Acute Myocardial Infarction (AMI) In-Hospital Mortality

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA codes	Qualifier
Intercept	-4.444253276	<0.0001	—	—
Male (vs. female)	-0.040695211	0.0834	—	—
Age 45 to 64 (vs. 20 to 44)	0.319817531	0.0047	—	—
Age 65 to 74 (vs. 20 to 44)	1.02917053	<0.0001	—	—
Age 75 to 84 (vs. 20 to 44)	1.722909306	<0.0001	—	—
Age 85 and older (vs. 20 to 44)	2.450987219	<0.0001	—	—
Shock	2.909557087	<0.0001	R57	Type (1), (C) or [(W), (X) or (Y) but not (2)]
Diabetes with complications	0.188492694	<0.0001	E100–E107, E110–E117, E130–E137, E140–E147	Type (1), (C), (3) or [(W), (X) or (Y) but not (2)]
Heart failure or pulmonary edema	0.631851177	<0.0001	I50, J81	Type (1), (C) or [(W), (X) or (Y) but not (2)]
Cancer (non-Quebec records)*	1.058119464	<0.0001	C00–C26, C30–C44, C45–C97, Z51.0, Z51.1	Type (1) or [(W), (X) or (Y) but not (2)]
Cancer (Quebec records)*	0.424650431	<0.0001	C00–C26, C30–C44, C45–C97, Z51.0, Z51.1	Type (C) or [(W), (X) or (Y) but not (2)]
Cerebrovascular disease (non-Quebec records)*	1.125829326	<0.0001	I60, I61, I62, I63, I64, I65, I66, I67, I69, G45	Type (1) or [(W), (X) or (Y) but not (2)]
Cerebrovascular disease (Quebec records)*	0.292960701	0.0027	I60, I61, I62, I63, I64, I65, I66, I67, I69, G45	Type (C) or [(W), (X) or (Y) but not (2)]
Renal failure (non-Quebec records)*	0.955482382	<0.0001	N17, N18, N19	Type (1) or [(W), (X) or (Y) but not (2)]
Renal failure (Quebec records)*	0.362379009	<0.0001	N17, N18, N19	Type (C) or [(W), (X) or (Y) but not (2)]

## Notes

\* This risk factor has 2 coefficients — 1 for the data submitted by Quebec and 1 for all other jurisdictions. Quebec-specific coefficients were included in the model to address differences in data collection.

— Not applicable.

Coefficients for this indicator were developed based on 3 years of pooled data (2012–2013 to 2014–2015).

## 14 30-Day Stroke In-Hospital Mortality

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA codes	Qualifier
<b>Intercept</b>	-3.287674205	<0.0001	—	—
<b>Male (vs. female)</b>	-0.045314475	0.0226	—	—
<b>Age 45 to 64 (vs. 20 to 44)</b>	0.324781822	<0.0001	—	—
<b>Age 65 to 74 (vs. 20 to 44)</b>	0.663561084	<0.0001	—	—
<b>Age 75 to 84 (vs. 20 to 44)</b>	1.088658765	<0.0001	—	—
<b>Age 85 and older (vs. 20 to 44)</b>	1.637612288	<0.0001	—	—
<b>Heart failure or pulmonary edema</b>	0.69338302	<0.0001	I50, J81	Type (1), (C) or [(W), (X) or (Y) but not (2)]
<b>Cancer</b>	0.65987594	<0.0001	C00–C26, C30–C44, C45–C97, Z51.0, Z51.1	Type (1), (C) or [(W), (X) or (Y) but not (2)]
<b>Renal failure (non-Quebec records)*</b>	0.387562222	<0.0001	N17, N18, N19	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Renal failure (Quebec records)*</b>	0.171873931	0.0001	N17, N18, N19	Type (C) or [(W), (X) or (Y) but not (2)]
<b>Ischemic heart disease (acute) (non-Quebec records)*</b>	0.920302598	<0.0001	I20, I21, I22, I24	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Ischemic heart disease (acute) (Quebec records)*</b>	0.826101927	<0.0001	I20, I21, I22, I24	Type (C) or [(W), (X) or (Y) but not (2)]
<b>Intracerebral hemorrhage (vs. ischemic stroke)</b>	1.502027941	<0.0001	I61, I62.9 (applies only to years prior to 2015–2016)	Refer to the <a href="#">Technical Notes</a> for details
<b>Stroke, not specified as hemorrhage or infarction (vs. ischemic stroke)</b>	0.175680575	<0.0001	I64	Refer to the <a href="#">Technical Notes</a> for details
<b>Subarachnoid hemorrhage (vs. ischemic stroke)</b>	1.255302663	<0.0001	I60	Refer to the <a href="#">Technical Notes</a> for details
<b>Venous sinus/cortical vein thrombosis (vs. ischemic stroke)</b>	-0.291009269	0.1889	I63.6, I67.6, G08	Refer to the <a href="#">Technical Notes</a> for details

### Notes

\* This risk factor has 2 coefficients — 1 for the data submitted by Quebec and 1 for all other jurisdictions. Quebec-specific coefficients were included in the model to address differences in data collection.

— Not applicable.

Coefficients for this indicator were developed based on 3 years of pooled data (2012–2013 to 2014–2015).

# 15 30-Day Acute Myocardial Infarction Readmission

Risk factor	Regression coefficient	Pr > ChiSq (Wald)	ICD-10-CA codes	Qualifier
<b>Intercept</b>	-2.6345491910	<0.0001	—	—
<b>Male (vs. female)</b>	-0.2214844020	<0.0001	—	—
<b>Age 45 to 64 (vs. 20 to 44)</b>	0.0687327770	0.2160	—	—
<b>Age 65 to 74 (vs. 20 to 44)</b>	0.3577854083	<0.0001	—	—
<b>Age 75 and older (vs. 20 to 44)</b>	0.7543563961	<0.0001	—	—
<b>1 acute care hospitalization in previous 6 months (vs. none)</b>	0.5292792797	<0.0001	—	—
<b>COPD (Quebec records)*</b>	0.2640121252	<0.0001	J41, J42, J43, J44, J47	Type (C) or [(W), (X) or (Y) but not (2)]
<b>COPD (non-Quebec records)*</b>	0.5035022940	<0.0001	J41, J42, J43, J44, J47	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Renal failure (Quebec records)*</b>	0.2693334310	<0.0001	N17, N18, N19	Type (C) or [(W), (X) or (Y) but not (2)]
<b>Renal failure (non-Quebec records)*</b>	0.4404659825	<0.0001	N17, N18, N19	Type (1) or [(W), (X) or (Y) but not (2)]
<b>Diabetes with complications</b>	0.3079585937	<0.0001	E100–E107, E110–E117, E130–E137, E140–E147	Type (1), (C), (3) or [(W), (X) or (Y) but not (2)]
<b>Heart failure</b>	0.5273903965	<0.0001	I50	Type (1), (C) or [(W), (X) or (Y) but not (2)]

## Notes

\* This risk factor has 2 coefficients — 1 for the data submitted by Quebec and 1 for all other jurisdictions. Quebec-specific coefficients were included in the model to address differences in data collection.

— Not applicable.

Coefficients for this indicator were developed based on 3 years of pooled data (2012–2013 to 2014–2015).

## 16 High Users of Hospital Beds

Risk factor	Regression coefficient	Pr > ChiSq (Wald)
Intercept	-4.02087100837773	<0.0001
Age 25 to 49 (vs. 18 to 24)	0.190179260505997	<0.0001
Age 50 to 64 (vs. 18 to 24)	0.592611864166163	<0.0001
Age 65 and older (vs. 18 to 24)	0.917598868524694	<0.0001
Male (vs. female)	0.0417134027161559	<0.0001
Urgent admission	0.681802320900795	<0.0001
Mental illness (vs. medical)*	0.576704969819233	<0.0001
Obstetric (vs. medical)*	-3.30610632874785	<0.0001
Palliative care (vs. medical)*	0.975056993775975	<0.0001
Surgical (vs. medical)*	-0.734096954478988	<0.0001

### Notes

\* Refer to the [Technical Notes](#) for details.

Coefficients for this indicator were developed based on 2016–2017 data.



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