

Supplemental material for

McDonald T, Ronksley PE, Cook LL, Patel AB, Seidel J, Cord Lethebe B, Green LA. The impact of primary care clinic and family physician continuity on patient health outcomes: a retrospective analysis from Alberta, Canada. *Ann Fam Med*. 2024;22(3):223-229.

Supplemental Appendix

Clinical Risk Grouper Categories (20)
‘1’ = Healthy/Health Care Non-users
‘2-4’ where 2 = History of Significant Acute Diseases 3 = Single Minor Chronic Diseases 4 = Minor Chronic Disease in Multiple Organ Systems
‘5-9’ where 5 = Single Dominant or Moderate Chronic Disease, 6 = Significant Chronic diseases in Multiple Organ Systems, 7 = Dominant Chronic Diseases in 3 or More Organ Systems Dominant, 8 = Metastatic & Complicated Malignancies and 9 = Catastrophic Conditions

Five-Step Panel Methodology (17)
We used the Health Quality Council of Alberta’s five-step method for family physician panel identification (14). This method is widely used across the province. The Health Quality Council of Alberta has worked closely with other organizations across the province to ensure the panel measures are accurate, including the Alberta College of Family Physicians, Alberta Health, Alberta Health Services, the Alberta Medical Association, the College of Physicians and Surgeons of Alberta, the Physician Learning Program, and Primary Care Networks
1. Sole visits. Identify patients who visited only one family physician.
2. Visits for high probability codes. Determine the family physician visited most frequently by the patient, where one visit is represented by for seven diagnostic codes and one procedure code.
3. Visits excluding low probability codes. Determine the family physician visited most frequently by the patient, excluding 142 diagnostic codes and 143 procedure codes, which are not commonly linked to family physician visits.
4. Most frequently visited. Subsequently, identify the family physician the patient visited most frequently.
5. Most recent visit. Finally, determine the family physician most recently visited by the patient.

Hospitalization Modeling

CRG 1-2

Count portion

	var	irr	p_val
1	Intercept	0.165882577	0
2	Age (5-yr Category)	0.932841639	0
3	Gender (M)	0.860653279	5.68022773894939e-23
4	KPC	1.002581452	1.17787935066072e-33
5	GCR NA (100% KPC)	0.765542974	7.6688469306276e-113
6	GCR Low (1-50%)	1.125836557	1.37896814688462e-27
7	GCR High (51-99%)	0.964370701	0.000510454
8	GCR 100%	0.765954969	2.14348589640604e-157
9	Total Visits	1.052723968	0
10	Physician Average Daily Visits	0.996163368	1.51110669178776e-52
11	Rural	1.747778627	0
12	Urban (town/small city)	1.406911014	2.17326528432708e-268
13	Log(theta)	1.045257037	0.020732831

Zero portion

	var	or	p_val
1	Intercept	0.012713929	9.75040275067576e-40
2	Age (5-yr Category)	25.58561278	3.161301750399e-24

Confidence Intervals

	X2.5..	X97.5..
Intercept	0.160001451	0.171979873
Age (5-yr Category)	0.931356275	0.934329371
Gender (M)	0.835381914	0.886689136
KPC	1.002162545	1.003000534
GCR NA (100% KPC)	0.747989847	0.783508021
GCR Low (1-50%)	1.10206069	1.150125366
GCR High (51-99%)	0.944839136	0.984306021
GCR 100%	0.751125157	0.781077572
Total Visits	1.051772196	1.053676601
Physician Average Daily Visits	0.995671525	0.996655454
Rural	1.719664802	1.776352069
Urban (town/small city)	1.380270116	1.434066114
Zero Intercept	0.006647058	0.024318124
Zero Gender (M)	13.68468845	47.83620642

CRG 3-4

Count portion

	var	irr	p_val
1	Intercept	0.157249092	0
2	Age (5-yr Category)	1.005427397	0.000552279
3	Gender (M)	1.085180701	0.000874922
4	KPC	0.999824653	0.630632439
5	GCR NA (100% KPC)	0.768826078	6.95386910273003e-35
6	GCR Low (1-50%)	1.10894293	7.36238396359477e-9
7	GCR High (51-99%)	1.022501182	0.215571286
8	GCR 100%	0.830830357	9.38357452758094e-25
9	Total Visits	1.021948606	0
10	Physician Average Daily Visits	0.998269591	5.07935E-05
11	Rural	1.637452939	1.97001429156406e-235
12	Urban (town/small city)	1.356518705	1.30424255309707e-66
13	Log(theta)	0.627290922	6.41599408000598e-103

Zero portion

	var	or	p_val
1	Intercept	0.003889482	5.29824E-06
2	Age (5-yr Category)	104.7872646	0.000113487

Confidence Intervals

	X2.5..	X97.5..
Intercept	0.147379738	0.167779352
Age (5-yr Category)	1.002344054	1.008520224
Gender (M)	1.034173424	1.138703747
KPC	0.999110231	1.000539586
GCR NA (100% KPC)	0.737338122	0.801658724
GCR Low (1-50%)	1.070747784	1.148500554
GCR High (51-99%)	0.987118246	1.059152407
GCR 100%	0.801964971	0.860734704
Total Visits	1.021005098	1.022892986
Physician Average Daily Visits	0.99743365	0.999106232
Rural	1.589852345	1.686478706
Urban (town/small city)	1.310302883	1.40436461
Zero Intercept	0.000356703	0.042410765
Zero Gender (M)	9.872195248	1112.252193

CRG 5-9

Count portion

	var	irr	p_val
1	Intercept	0.31739524	0
2	Age (5-yr Category)	1.033789373	7.34824598939569e-232
3	Gender (M)	1.031948747	0.003271174
4	KPC	0.998642101	1.28445926355344e-8
5	GCR NA (100% KPC)	0.677353849	1.640446065295e-191
6	GCR Low (1-50%)	1.100713366	2.72678626547145e-16
7	GCR High (51-99%)	0.967463767	0.004930623
8	GCR 100%	0.685697567	1.35411312147168e-240
9	Total Visits	1.016396507	0
10	Physician Average Daily Visits	0.998049316	7.88794527495709e-13
11	Rural	1.734805858	0
12	Urban (town/small city)	1.345586716	2.22953411052938e-139
13	Log(theta)	0.577827706	0

Zero portion

	var	or	p_val
1	Intercept	2.30469417059043e-8	0.917637488
2	Age (5-yr Category)	960121.6299	0.935441548

Confidence Intervals

	X2.5..	X97.5..
Intercept	0.303495885	0.331931151
Age (5-yr Category)	1.031720409	1.035862487
Gender (M)	1.010545986	1.053804804
KPC	0.998174634	0.999109786
GCR NA (100% KPC)	0.660058355	0.695102536
GCR Low (1-50%)	1.075709011	1.126298935
GCR High (51-99%)	0.945410526	0.990031435
GCR 100%	0.670558093	0.701178851
Total Visits	1.015957714	1.01683549
Physician Average Daily Visits	0.997516234	0.998582684
Rural	1.703875741	1.766297444
Urban (town/small city)	1.314795592	1.377098935
Zero Intercept	4.06300559316904e-153	1.30731181588426e+137
Zero Gender (M)	1.69188828741404e-139	5.44854852986096e+150

ED Modeling

CRG 1-2

Count portion

	var	irr	p_val
1	Intercept	1.143703128	7.32660733107652e-46
2	Age (5-yr Category)	0.977600179	0
3	Gender (M)	1.098837073	2.69970961029861e-162
4	KPC	0.996463733	7.03796190401909e-220
5	GCR NA (100% KPC)	0.804717454	2.19911514545613e-287
6	GCR Low (1-50%)	1.042517097	5.30596359949134e-12
7	GCR High (51-99%)	0.943767197	1.17837383008839e-25
8	GCR 100%	0.789514671	0
9	Total Visits	1.050307482	0
10	Physician Average Daily Visits	0.999056499	1.13381566445542e-13
11	Rural	2.678064834	0
12	Urban (town/small city)	1.406530699	0
13	Log(theta)	0.832602234	0

Zero portion

	var	or	p_val
1	Intercept	0.000178149	7.70835563342258e-16
2	Age (5-yr Category)	0.449708584	0.636503319

Confidence Intervals

	X2.5..	X97.5..
Intercept	1.122725119	1.165073109
Age (5-yr Category)	0.976811615	0.97838938
Gender (M)	1.091385208	1.106339819
KPC	0.996245173	0.996682341
GCR NA (100% KPC)	0.795314074	0.814232015
GCR Low (1-50%)	1.0302544	1.054925753
GCR High (51-99%)	0.933598018	0.954047142
GCR 100%	0.781846177	0.797258379
Total Visits	1.049722917	1.050892373
Physician Average Daily Visits	0.998807569	0.99930549
Rural	2.655391068	2.700932205
Urban (town/small city)	1.392177507	1.421031871
Zero Intercept	2.18242E-05	0.001454219
Zero Gender (M)	0.016351182	12.36839098

CRG 3-4

Count portion

	var	irr	p_val
1	Intercept	1.945511188	0
2	Age (5-yr Category)	0.995877714	9.86360535447575e-8
3	Gender (M)	0.982656333	0.004608982
4	KPC	0.995637627	1.31698386519245e-123
5	GCR NA (100% KPC)	0.79203061	2.81797811230217e-111
6	GCR Low (1-50%)	1.053618591	1.83066544568611e-8
7	GCR High (51-99%)	0.969233649	0.000652694
8	GCR 100%	0.811747294	3.82191574437095e-122
9	Total Visits	1.026462117	0
10	Physician Average Daily Visits	0.998247938	2.0072945068204e-16
11	Rural	2.460996587	0
12	Urban (town/small city)	1.44071676	0
13	Log(theta)	0.894609064	7.30839173653752e-103

Zero portion

	Var	or	p_val
1	Intercept	2.86827E-05	1.90831E-05
2	Age (5-yr Category)	2.083275468	0.850187632

Confidence Intervals

	X2.5..	X97.5..
Intercept	1.883720656	2.009328598
Age (5-yr Category)	0.99436591	0.997391816
Gender (M)	0.970834438	0.994622184
KPC	0.995276885	0.995998499
GCR NA (100% KPC)	0.776046837	0.808343592
GCR Low (1-50%)	1.034624762	1.072961112
GCR High (51-99%)	0.951973922	0.986806304
GCR 100%	0.797750692	0.825989467
Total Visits	1.025911027	1.027013503
Physician Average Daily Visits	0.997830716	0.998665334
Rural	2.423991901	2.498566186
Urban (town/small city)	1.415309433	1.466580193
Zero Intercept	2.37270603355577e-7	0.003467333
Zero Gender (M)	0.001026051	4229.844319

Count portion

	var	irr	p_val
1	Intercept	3.370208658	0
2	Age (5-yr Category)	0.997421021	0.000134886
3	Gender (M)	1.068429178	2.9178906062331e-39
4	KPC	0.995295272	6.84701658019426e-187
5	GCR NA (100% KPC)	0.683698703	0
6	GCR Low (1-50%)	1.040843475	7.44437758017926e-7
7	GCR High (51-99%)	0.937469147	7.15117724161821e-16
8	GCR 100%	0.716802285	0
9	Total Visits	1.018165423	0
10	Physician Average Daily Visits	0.998017344	1.5636559766116e-28
11	Rural	2.332321072	0
12	Urban (town/small city)	1.283373244	4.60334652296428e-212
13	Log(theta)	0.807041922	0

Zero portion

	var	or	p_val
1	Intercept	5.60733E-06	0.000354472
2	Age (5-yr Category)	4.456483359	0.726462954

Confidence Intervals

	X2.5..	X97.5..
Intercept	3.271809419	3.471567242
Age (5-yr Category)	0.99609947	0.998744325
Gender (M)	1.057908086	1.079054904
KPC	0.994979808	0.995610836
GCR NA (100% KPC)	0.672146523	0.69544943
GCR Low (1-50%)	1.024473635	1.057474885
GCR High (51-99%)	0.922878229	0.95229075
GCR 100%	0.706362271	0.727396603
Total Visits	1.017833796	1.018497157
Physician Average Daily Visits	0.997667047	0.998367765
Rural	2.303788329	2.361207197
Urban (town/small city)	1.263338864	1.303725335
Zero Intercept	7.36656023559238e-9	0.00426823
Zero Gender (M)	0.001030344	19275.35139

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