

Appendix 3

Supplemental Table S1. Rates of Major Amputation related to Diabetes

Region ^a	Major Amputations related to Diabetes per 100,000 person-quarters ^a (95% Confidence Interval) ^b
6- MISSISSAUGA HALTON	1.95 (1.75-2.15)
8- CENTRAL	2.65 (2.46-2.84)
5- CENTRAL WEST	3.34 (3.02-3.66)
11- CHAMPLAIN	3.38 (3.12-3.64)
7- TORONTO CENTRAL	3.43 (3.16-3.71)
9- CENTRAL EAST	4.34 (4.08-4.61)
3- WATERLOO WELLINGTON	4.35 (3.95-4.76)
1- ERIE ST. CLAIR	4.36 (3.94-4.78)
12- NORTH SIMCOE MUSKOKA	5.00 (4.47-5.53)
2- SOUTH WEST	5.20 (4.81-5.59)
10- SOUTH EAST	5.33 (4.80-5.86)
4- HAMILTON NIAGARA	5.72 (5.39-6.04)
13- NORTH-EAST	7.21 (6.64-7.79)
14- NORTH-WEST	10.45 (9.37-11.52)

^a Rate reflects average over 2007-2017 study period and among residents ≥ 40 years old

^b Ninety-five percent confidence intervals around the amputation rates were calculated assuming a negative binomial distribution accounting for recurrent events (i.e. repeat amputations in distinct quarters) over the study period (Glynn RJ, et al. Am J Epidemiol. 1993 Apr 1;137(7):776-86).

Supplemental Table S2. Major Diabetic Amputee Cohort Characteristics by Region

Region ^a	No. of major amputees	Lowest income quintile - N (%)	Rural residence - N (%)	Comorbidity index ^b - Median (interquartile range)	Death on index amputation admission - N (%)
6- MISSISSAUGA HALTON	350	58 (16.6%)	≤5 (≤1.1%)	13 (7-24)	41 (11.7%)
8- CENTRAL	722	190 (26.4%)	10 (1.4%)	13 (6-21)	96 (13.3%)
5- CENTRAL WEST	389	85 (21.9%)	10 (2.6%)	13 (5-22)	48 (12.3%)
11- CHAMPLAIN	709	176 (25.1%)	137 (19.3%)	14 (7-21)	80 (11.3%)
7- TORONTO CENTRAL	649	230 (35.9%)	0 (0.0%)	15 (7-23)	72 (11.1%)
9- CENTRAL EAST	1,146	370 (32.3%)	95 (8.3%)	13 (5-21)	129 (11.3%)
3- WATERLOO WELLINGTON	482	129 (26.8%)	51 (10.6%)	13 (6-21)	37 (7.7%)
1- ERIE ST. CLAIR	483	140 (29.4%)	63 (13.0%)	11 (4-18)	46 (9.5%)
12- NORTH SIMCOE MUSKOKA	398	94 (23.7%)	150 (37.8%)	13 (4-23)	39 (9.8%)
2- SOUTH WEST	834	234 (28.8%)	293 (35.1%)	12 (4-22)	78 (9.4%)
10- SOUTH EAST	487	160 (33.1%)	209 (42.9%)	12 (4-21)	45 (9.2%)
4- HAMILTON NIAGARA	1,399	450 (32.6%)	84 (6.0%)	12 (5-20)	159 (11.4%)
13- NORTH-EAST	769	248 (33.7%)	318 (41.4%)	11 (3-20)	86 (11.2%)
14- NORTH-WEST	415	142 (34.8%)	178 (42.9%)	11 (4-19)	49 (11.8%)

^a Regions are ordered from lowest to highest major amputation rate

^b Aggregated Diagnosis Group Comorbidity Index

Supplemental Table S3. Regional provider counts, per 100,000 residents at least 40 years old, in 2013

Region ^a	Vascular Surgeons	Orthopedic Surgeons	General Surgeons	Vascular, Orthopedic or General Surgeons	Podiatrists-Chiroprodists
6- MISSISSAUGA HALTON	0.70	5.61	9.63	15.94	20.49
8- CENTRAL	0.56	8.31	11.90	20.77	14.82
5- CENTRAL WEST	0.00	5.78	8.29	14.07	18.59
11- CHAMPLAIN	1.23	10.89	14.27	26.39	3.68
7- TORONTO CENTRAL	1.86	15.02	16.54	33.42	36.63
9- CENTRAL EAST	0.50	7.77	9.39	17.66	14.40
3- WATERLOO WELLINGTON	0.83	6.64	9.96	17.44	12.73
1- ERIE ST. CLAIR	0.30	6.53	12.17	18.99	12.76
12- NORTH SIMCOE MUSKOKA	0.40	5.53	11.46	17.38	14.22
2- SOUTH WEST	0.80	12.44	14.25	27.49	9.63
10- SOUTH EAST	0.72	12.56	9.69	22.97	25.12
4- HAMILTON NIAGARA	0.93	9.21	13.75	23.89	14.15
13- NORTH-EAST	0.00	8.50	14.80	23.30	11.02
14- NORTH-WEST	0.00	9.73	15.40	25.13	7.30

^a Regions are ordered from lowest to highest major amputation rate

Supplemental Table S4. Physician and Publicly-Funded Podiatry Visits within 30-365 days prior to Index Diabetic Amputation Admission

Region ^a	No. of Amputees	GP ^b	Vascular Surgeon	Orthopedic Surgeon	General Surgeon	Vascular, Orthopedic or General Surgeon	Other Specialist Physician	Publicly-Funded Podiatry ^c
		At least 1 Visit - N (%)						
6- MISSISSAUGA HALTON	350	326 (93.1%)	215 (61.4%)	87 (24.9%)	57 (16.3%)	269 (76.9%)	332 (94.9%)	≤5 (≤1.4%)
8- CENTRAL	722	687 (95.2%)	367 (50.8%)	190 (26.3%)	184 (25.5%)	516 (71.5%)	681 (94.3%)	59 (8.2%)
5- CENTRAL WEST	389	362 (93.1%)	167 (42.9%)	89 (22.9%)	151 (38.8%)	269 (69.2%)	359 (92.3%)	14 (3.6%)
11- CHAMPLAIN	709	665 (93.8%)	350 (49.4%)	151 (21.3%)	170 (24.0%)	488 (68.8%)	654 (92.2%)	6 (0.8%)
7- TORONTO CENTRAL	649	587 (90.4%)	369 (56.9%)	155 (23.9%)	63 (9.7%)	443 (68.3%)	599 (92.3%)	46 (7.1%)
9- CENTRAL EAST	1,146	1,097 (95.7%)	631 (55.1%)	233 (20.3%)	183 (16.0%)	789 (68.8%)	1,069 (93.3%)	41 (3.6%)
3- WATERLOO WELLINGTON	482	468 (97.1%)	237 (49.2%)	137 (28.4%)	113 (23.4%)	338 (70.1%)	459 (95.2%)	34 (7.1%)
1- ERIE ST. CLAIR	483	455 (94.2%)	217 (44.9%)	117 (24.2%)	139 (28.8%)	350 (72.5%)	451 (93.4%)	≤5 (≤1.0%)
12- NORTH SIMCOE MUSKOKA	398	388 (97.5%)	115 (28.9%)	117 (29.4%)	141 (35.4%)	266 (66.8%)	379 (95.2%)	6 (1.5%)
2- SOUTH WEST	834	794 (95.2%)	314 (37.6%)	166 (19.9%)	277 (33.2%)	570 (68.3%)	784 (94.0%)	13 (1.6%)
10- SOUTH EAST	487	457 (93.8%)	208 (42.7%)	147 (30.2%)	85 (17.5%)	325 (66.7%)	454 (93.2%)	≤5 (≤1%)
4- HAMILTON NIAGARA	1,399	1,333 (95.3%)	585 (41.8%)	503 (36.0%)	417 (29.8%)	987 (70.6%)	1,330 (95.1%)	48 (3.4%)
13- NORTH-EAST	769	739 (96.1%)	447 (58.1%)	137 (17.8%)	346 (45.0%)	644 (83.7%)	739 (96.1%)	18 (2.3%)
14- NORTH-WEST	415	379 (91.3%)	17 (4.1%)	123 (29.6%)	151 (36.4%)	233 (56.1%)	396 (95.4%)	0 (0.0%)

^a Regions are ordered from lowest to highest major amputation rate

^b General Practitioner

^c The majority of podiatry and chiropody services are not publicly funded in Ontario

Supplemental Table S5. Health Services within 365 Days Prior to Index Diabetic Amputation Admission

Region ^a	No. of Amputees	At least one Hospitalization - N (%)	At least one ED ^b visit - N (%)	Home care nursing - N (%)	Revascularization - N (%)			Minor ^c Amputation - N (%)	Total Health Care Costs ^d - Mean
					Open surgery	Endovascular	Open or endovascular		
6- MISSISSAUGA HALTON	350	256 (73.1%)	297 (84.9%)	257 (73.4%)	55 (15.7%)	59 (16.9%)	91 (26.0%)	41 (11.7%)	\$74,532
8- CENTRAL	722	514 (71.2%)	633 (87.7%)	546 (75.6%)	100 (13.9%)	106 (14.7%)	172 (23.8%)	84 (11.6%)	\$67,711
5- CENTRAL WEST	389	266 (68.4%)	326 (83.8%)	259 (66.6%)	38 (9.8%)	69 (17.7%)	86 (22.1%)	44 (11.3%)	\$65,705
11- CHAMPLAIN	709	452 (63.8%)	615 (86.7%)	472 (66.6%)	67 (9.4%)	123 (17.3%)	153 (21.6%)	100 (14.1%)	\$75,650
7- TORONTO CENTRAL	649	431 (66.4%)	574 (88.4%)	457 (70.4%)	55 (8.5%)	94 (14.5%)	129 (19.9%)	57 (8.8%)	\$72,772
9- CENTRAL EAST	1,146	701 (61.2%)	1,020 (89.0%)	834 (72.8%)	101 (8.8%)	91 (7.9%)	168 (14.7%)	155 (13.5%)	\$57,051
3- WATERLOO WELLINGTON	482	319 (66.2%)	408 (84.6%)	365 (75.7%)	50 (10.4%)	79 (16.4%)	107 (22.2%)	74 (15.4%)	\$56,284
1- ERIE ST. CLAIR	483	333 (68.9%)	420 (87.0%)	390 (80.7%)	65 (13.5%)	38 (7.9%)	90 (18.6%)	110 (22.8%)	\$72,535
12- NORTH SIMCOE MUSKOKA	398	268 (67.3%)	370 (93.0%)	322 (80.9%)	62 (15.6%)	31 (7.8%)	79 (19.8%)	55 (13.8%)	\$54,793
2- SOUTH WEST	834	569 (68.2%)	726 (87.1%)	631 (75.7%)	77 (9.2%)	47 (5.6%)	110 (13.2%)	171 (20.5%)	\$58,745
10- SOUTH EAST	487	306 (62.8%)	415 (85.2%)	346 (71.0%)	38 (7.8%)	35 (7.2%)	69 (14.2%)	94 (19.3%)	\$51,189
4- HAMILTON NIAGARA	1,399	940 (67.2%)	1,220 (87.2%)	1,076 (76.9%)	215 (15.4%)	139 (9.9%)	290 (20.7%)	142 (10.2%)	\$59,288
13- NORTH-EAST	769	552 (71.8%)	679 (88.3%)	534 (69.4%)	67 (8.7%)	24 (3.1%)	81 (10.5%)	184 (23.9%)	\$61,716
14- NORTH-WEST	415	285 (68.7%)	376 (90.6%)	201 (48.4%)	18 (4.3%)	10 (2.4%)	22 (5.3%)	50 (12.0%)	\$63,113

^a Regions are ordered from lowest to highest major amputation rate

^b ED – Emergency Department

^c Minor amputation – below ankle

^d Costs in 2017 Canadian dollars from the perspective of Ontario Ministry of Health & Long Term Care

Supplemental Table S6. Revascularization on Index Hospitalization – Diabetes-related Amputations

Region ^a	No. of amputees	Revascularization – N (%)		
		Open surgery	Endovascular	Open or endovascular
6- MISSISSAUGA HALTON	350	35 (10.0%)	31 (8.9%)	56 (16.0%)
8- CENTRAL	722	46 (6.4%)	44 (6.1%)	82 (11.4%)
5- CENTRAL WEST	389	39 (10.0%)	29 (7.5%)	61 (15.7%)
11- CHAMPLAIN	709	89 (12.6%)	46 (6.5%)	120 (16.9%)
7- TORONTO CENTRAL	649	43 (6.6%)	28 (4.3%)	62 (9.6%)
9- CENTRAL EAST	1,146	62 (5.4%)	51 (4.5%)	102 (8.9%)
3- WATERLOO WELLINGTON	482	25 (5.2%)	27 (5.6%)	45 (9.3%)
1- ERIE ST. CLAIR	483	20 (4.1%)	37 (7.7%)	54 (11.2%)
12- NORTH SIMCOE MUSKOKA	398	21 (5.3%)	24 (6.0%)	42 (10.6%)
2- SOUTH WEST	834	20 (2.4%)	36 (4.3%)	50 (6.0%)
10- SOUTH EAST	487	21 (4.3%)	14 (2.9%)	34 (7.0%)
4- HAMILTON NIAGARA	1,399	54 (3.9%)	119 (8.5%)	151 (10.8%)
13- NORTH-EAST	769	8 (1.0%)	35 (4.6%)	43 (5.6%)
14- NORTH-WEST	415	10 (2.4%)	10 (2.4%)	16 (3.9%)

^a Regions are ordered from lowest to highest major amputation rate

Supplemental Table S7. Correlation of Regional Health Provider Counts and Health Care Utilization Among Diabetic Amputees with Regional Rates of Diabetes-related Major Amputation

	Range of Values Across 14 Regions	Pearson Correlation Coefficient ⁴ [95% CI]
Health Providers Per Capita within Each Region¹		
Count of Vascular Surgeons	0 – 1.9	- 0.44 [-0.78; 0.13]
Count of Chiropractors-Podiatrists	3.7 – 36.6	- 0.37 [-0.75; 0.21]
Count of Orthopedic Surgeons	5.5 – 15.0	0.16 [-0.41; 0.63]
Count of Vascular, General and Orthopedic Surgeons	14.1 – 33.4	0.27 [-0.31; 0.69]
Count of General Surgeons	8.3 – 16.5	0.45 [-0.12; 0.78]
Health Provider Visit Among Amputees – At least 1 Visit Within 1 Year Prior to Index Amputation Hospitalization²		
Vascular Surgeon Visit	4.1% – 61.4%	- 0.74 [-0.91; -0.31]
Publicly-Funded Podiatry Visit ³	0.0% – 8.2%	- 0.41 [-0.77; 0.16]
Vascular, General or Orthopedic Surgeon Visit	56.1% – 83.7%	- 0.40 [-0.76; 0.18]
General Practitioner Physician Visit	90.4% – 97.5%	- 0.06 [-0.57; 0.49]
Orthopedic Surgeon Visit	17.8% – 36.0%	0.21 [-0.37; 0.66]
Specialist Physician Visit	92.2% – 96.1%	0.51 [-0.05; 0.81]
General Surgeon Visit	9.7% – 45.0%	0.54 [-0.01; 0.83]
Health Services and Interventions Among Amputees - Within 1 Year Prior to Index Amputation Hospitalization		
Endovascular or Open Vascular Intervention	5.3% – 26.0%	- 0.89 [-0.96; -0.67]
Endovascular Intervention	2.4% – 17.7%	- 0.81 [-0.93; -0.47]
Outpatient Nursing Care	48.4% – 80.9%	- 0.60 [-0.85; -0.07]
Open Vascular Intervention	4.3% – 15.7%	- 0.56 [-0.83; -0.01]
Total Health Care Costs	\$51,189 – \$75,650	- 0.42 [-0.77; 0.16]
Hospitalization (at least one)	61.2% – 73.1%	- 0.01 [-0.54; 0.52]
Minor Amputation	8.8% – 23.9%	0.25 [-0.33; 0.68]
Emergency Department visit (at least one)	83.9% – 90.0%	0.47 [-0.01; 0.79]
Intervention - Index Amputation Hospitalization		
Endovascular or Open Vascular Intervention	3.9% – 16.9 %	- 0.78 [-0.92; -0.39]
Open Vascular Intervention	1.0% – 12.6%	- 0.71 [-0.89; -0.26]
Endovascular Intervention	2.4% – 8.9%	- 0.60 [-0.85; -0.08]

¹ Counts of providers per 100,000 residents ≥40 years of age

² Excluding 30 days prior to amputation

³ The majority of podiatry and chiropractic visits are not publicly funded in Ontario

⁴ Negative coefficient denotes an inverse relationship. The magnitude of specific correlations can be interpreted according to the following criteria (where r is the absolute value of the coefficient): 0.1 < r ≤ 0.3 denotes weak correlation; 0.3 < r ≤ 0.5 denotes moderate correlation; r > 0.5 denotes strong correlation.²²