

SUPPLEMENTAL MATERIAL

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Section 1. Supplemental Methods

Section 1.1. Summary of included businesses and municipal locations

Supplemental Table 1. Summary of businesses and municipal locations included in the study.

Location Category, (number of businesses in each category)	Location Type‡	Total Number of Facilities	Number of Facilities Downtown
Bank (n = 5)	BMO Branch	96	16
	CIBC Branch	108	17
	RBC Branch	103	18
	Scotiabank Branch	98	15
	TD Branch	144	22
Bank ATM (n = 5)	BMO ATM	142	30
	CIBC ATM	187	32
	RBC ATM	264	66
	Scotiabank ATM	181	33
	TD ATM	178	39
Coffee Shop (n = 3)	Second Cup	80	41
	Starbucks	166	75
	Tim Hortons	312	73
Convenience Store (n = 2)	7-Eleven	24	6
	Mac's	37	2
Gas Station (n = 3)	Esso	77	4
	Petrocan	74	3
	Shell	57	2
Grocery Store (n = 1)	Metro	28	4
Library (n = 1)	Library	101	12
Liquor/Beer Store (n = 2)	BeerStore	66	8
	LCBO	84	17
Parking Lot (n = 1)	Green P Parking	229	39
Pharmacy (n = 2)	Rexall	51	13
	Shoppers Drug Mart	132	25
Recreational Facility (n = 2)	Goodlife Fitness	42	13
	Swimming Pool	117	7
Restaurant Chain (n = 9)	Burger King	22	4
	Dairy Queen	23	3
	Harvey's	25	4
	McDonald's	94	15
	Pizza Nova	52	6
	Pizza Pizza	100	14
	Subway	281	71
	Swiss Chalet	35	7
	Wendy's	20	3
Retail Store (n = 2)	Canadian Tire	65	7
	UPS Store	36	8
School (n = 3)	Private School	211	19
	Public School	584	29
	Separate School	223	9

Shows the summary of businesses and municipal locations included in the study. The summary breaks down the number of businesses and municipal locations in each broadly defined Location Category, as well as the number of facilities in all of Toronto and downtown Toronto.

Section 1.2. Data collection assumptions

Hours of operation could not be confirmed for 91 of the 223 Separate Schools, schools with students from a particular religious group, and 453 of the 952 Automated Teller Machines (ATMs), corresponding to the subset of ATMs located in bank branches, included in this study. We performed sensitivity analyses to determine the assumed hours of operations for these missing entries as described below.

Section 1.2.1. Separate School assumptions

We conducted a sensitivity analysis where the hours of operation for the 91 schools with missing hours were set to: 1) the 90th percentile; and 2) 10th percentile of the known 132 entries to determine the impact of hours of operation on actual coverage. The average hours of operation of the 132 collected/known separate schools was calculated and found to be almost exactly 8:00am – 5:00pm for weekdays, in line with our original assumption, with the majority of separate schools closed on Saturday (69/132) and Sunday (74/132). Supplemental Table 2 shows the average and standard deviation of the collected hours. Supplemental Table 3 shows the 90th percentiles of collected separate school hours.

Supplemental Table 2. Average hours of operations of the 132 known Separate School facilities.

	Hours	Mon. Open	Mon. Close	Tues. Open	Tues. Close	Wed. Open	Wed. Close	Thu. Open	Thu. Close	Fri. Open	Fri. Close
Separate School (n =132)	Average	7:58 AM	5:07 PM	8:01 AM	5:13 PM	8:01 AM	5:15 PM	8:01 AM	5:08 PM	8:01 AM	5:05 PM
	Std. Dev.	0:52	2:02	1:05	2:14	1:05	2:17	1:05	2:11	1:05	2:05

Supplemental Table 3. Hours of operations of the 132 known Separate School facilities based on the upper and lower 90th percentiles.

	Mon. Open	Mon. Close	Tues. Open	Tues. Close	Wed. Open	Wed. Close	Thu. Open	Thu. Close	Fri. Open	Fri. Close
90th percentile	7:00 AM	7:57 PM	7:00 AM	8:00 PM	7:00 AM	8:27 PM	7:00 AM	6:27 PM	7:00 AM	6:27 PM
10th percentile	9:00 AM	3:00 PM	9:00 AM	3:00 PM	9:00 AM	3:00 PM	9:00 AM	3:00 PM	9:00 AM	3:00 PM

We found hours of operations of the missing entries have a minimal effect on actual coverage (Supplemental Table 4). Based on the sensitivity analysis, we used the average of 8:00am – 5:00pm as the hours of operations for missing Separate School entries to determine the rankings and results in the manuscript.

Supplemental Table 4. Sensitivity analysis on actual coverage provided by Separate Schools using 3 hours of operations cases.

Operating Hour Assumption	Actual Coverage
Base case: 8:00 AM – 5:00 PM	16
Sensitivity case 1: 90 th Percentile	16
Sensitivity case 2: 10 th Percentile	15

Section 1.2.2. In Branch ATM assumptions

Supplemental Table 5. Summary of the collected and missing data hours of operations for the 5 ATM categories.

Location Type	Total In Branch Facilities	Missing In Branch Facilities	Total Out of Branch Facilities	Missing Out of Branch Facilities	Total ATM facilities
BMO ATM	96	0	46	0	142
CIBC ATM	108	108	79	0	187
RBC ATM	103	103	161	0	264
Scotiabank ATM	98	98	84	0	181
TD ATM	144	144	34	0	178
Total	549	453	404	0	952

The hours of operation of the 453 missing ATMs are associated with ATMs co-located with a branch (Supplemental Table 5). Hours information for all standalone ATMs (i.e., not located in a branch) have been collected. To assess the impact of the hours of operation of these missing in-branch ATMs on OHCA coverage, we performed a sensitivity analysis where their hours are set to: 1) branch hours of the locations housing each ATM; 2) 8:00am – 11:00pm; and 3) 24/7. We then calculate actual coverage for each of these three cases. The first case is a conservative estimate since in-branch ATMs should have hours of operation of at least the actual branch hours. Online hours of operation information, site visits conducted past midnight, and phone calls to local branches indicated 89 of 96 collected in-branch ATMs were available 24/7, which suggests that the third case is a reasonable, if slightly optimistic estimate of in-branch ATM hours. The intermediate case, 8:00am – 11:00pm, is what was in the original submission and based on sampling branch hours from site visits and online searching.

Our sensitivity analysis revealed that in all three cases, the five ATM categories remained in the top 10 location types ranked by actual coverage (Supplemental Tables 6 and 7). Furthermore, we found that the relative order of the rankings for the five ATM categories did not change for all of Toronto (i.e., RBC ATMs had the highest actual coverage in all three cases, followed by Scotiabank, CIBC, TD and BMO ATMs). No more than two of the ATM categories changed their relative order when examining the downtown Toronto subgroup, relative to the 8:00am – 11:00pm rankings (Supplemental Table 7). Based on these results, we used the 8:00am – 11:00pm assumption for in-branch ATMs as it is the middle ground between the 24/7 and branch hour estimates, and has similar results to the two other scenarios.

Supplemental Table 6. In Branch ATM Sensitive Analysis: Top 10 businesses and municipal locations based on actual coverage with varying hours of operations for In Branch ATMs for all of Toronto

Rank	In Branch ATMs: 24/7				In Branch ATMs: 8:00pm – 11:00pm				In Branch ATMs: Branch Hours			
	Location Type	Actual Coverage	Facilities	Coverage Efficiency	Location Type	Actual Coverage	Facilities	Coverage Efficiency	Location Type	Actual Coverage	Facilities	Coverage Efficiency
1	Tim Hortons	286	312	0.9	Tim Hortons	286	312	0.9	Tim Hortons	286	312	0.9
2	RBC ATM	260	264	1.0	RBC ATM	243	264	0.9	Subway	228	281	0.8
3	Scotiabank ATM	229	181	1.3	Subway	228	281	0.8	RBC ATM	214	264	0.8
4	Subway	228	281	0.8	Scotiabank ATM	216	181	1.2	Green P Parking	177	229	0.8
5	CIBC ATM	216	187	1.2	CIBC ATM	198	187	1.1	Starbucks	169	166	1.0
6	TD ATM	202	178	1.1	TD ATM	183	178	1.0	Scotiabank ATM	157	181	0.9
7	Green P Parking	177	229	0.8	Green P Parking	177	229	0.8	CIBC ATM	154	187	0.8
8	Starbucks	169	166	1.0	Starbucks	169	166	1.0	TD ATM	148	178	0.8
9	BMO ATM	141	142	1.0	BMO ATM	141	142	1.0	BMO ATM	141	142	1.0
10	Second Cup	111	80	1.4	Second Cup	111	80	1.4	Second Cup	111	80	1.4

Supplemental Table 7. In Branch ATM Sensitive Analysis: Top 10 businesses and municipal locations based on actual coverage with varying hours of operations for In Branch ATMs for downtown Toronto

Rank	In Branch ATMs: 24/7				In Branch ATMs: 8:00pm – 11:00pm				In Branch ATMs: Branch Hours			
	Location Type	Actual Coverage	Facilities	Coverage Efficiency	Location Type	Actual Coverage	Facilities	Coverage Efficiency	Location Type	Actual Coverage	Facilities	Coverage Efficiency
1	Starbucks	110	75	1.5	Starbucks	110	75	1.5	Starbucks	110	75	1.5
2	RBC ATM	101	66	1.5	Tim Hortons	97	73	1.3	Tim Hortons	97	73	1.3
3	Tim Hortons	97	73	1.3	RBC ATM	94	66	1.4	RBC ATM	89	66	1.3
4	TD ATM	84	39	2.2	Scotiabank ATM	77	33	2.3	Subway	77	71	1.1
5	Scotiabank ATM	82	33	2.5	Subway	77	71	1.1	Second Cup	67	41	1.6
6	Subway	77	71	1.1	TD ATM	75	39	1.9	TD ATM	64	39	1.6
7	CIBC ATM	70	32	2.2	Second Cup	67	41	1.6	Scotiabank ATM	62	33	1.9
8	Second Cup	67	41	1.6	CIBC ATM	64	32	2.0	BMO ATM	56	30	1.9
9	BMO ATM	56	30	1.9	BMO ATM	56	30	1.9	CIBC ATM	54	32	1.7
10	Shoppers Drug Mart	53	25	2.1	Shoppers Drug Mart	53	25	2.1	Shoppers Drug Mart	53	25	2.1

Section 2. Supplemental Tables

Section 2.1. Coverage of location types and categories while taking account registered AEDs in Toronto.

Supplemental Table 8 shows the coverage of downtown Toronto of the 41 businesses and municipal locations with respect to the public OHCAs that are not already covered by a registered AED in Toronto. The Top 9 ranked location types are the same as the downtown rankings without considering registered AEDs (Table 3). All 3 Coffee Shops and 5 Bank ATM location types are within the Top 10 location types in terms of actual coverage. Supplemental Supplemental Tables 9 and 10 show the coverage for the 14 broadly defined location categories in all of Toronto and downtown respectively when considering the registered AED network in Toronto. In both cases, Bank ATMs, Coffee Shops and Restaurant Chains are in the Top 3 location categories in terms of actual coverage, with Bank ATMs ranked first.

Supplemental Table 8. Businesses and municipal locations ranked by actual coverage in downtown Toronto based on public OHCAs not already covered by a registered AED.

Downtown Rank	Location Type†	Location category	Actual Coverage	Assumed 24/7 Coverage, (Rank)	Number of Facilities, (Rank)	Coverage Efficiency, (Rank)	Coverage Loss, % (Rank)
1	RBC ATM	Bank ATM	56	67 (2)	66 (4)	0.85 (19)	16.4 (16)
2	Starbucks	Coffee Shop	55	70 (1)	75 (1)	0.73 (22)	21.4 (17)
3	Tim Hortons	Coffee Shop	45	59 (3)	73 (2)	0.62 (27)	23.7 (20)
4	TD ATM	Bank ATM	44	58 (4)	39 (6)	1.13 (11)	24.1 (21)
5	Subway	Restaurant Chain	40	51 (5)	71 (3)	0.56 (30)	21.6 (18)
6	CIBC ATM	Bank ATM	37	44 (6)	32 (9)	1.16 (9)	15.9 (15)
7	Second Cup	Coffee Shop	33	43 (7)	41 (5)	0.80 (20)	23.3 (19)
8	BMO ATM	Bank ATM	31	33 (9)	30 (10)	1.03 (12)	6.1 (9)
9	Scotiabank ATM	Bank ATM	30	34 (8)	33 (8)	0.91 (18)	11.8 (13)
10	Green P Parking	Parking Lot	26	28 (12)	39 (6)	0.67 (24)	7.1 (10)
11	Shoppers Drug Mart	Pharmacy	24	27 (13)	25 (12)	0.96 (16)	11.1 (11)
12	Rexall	Pharmacy	22	31 (10)	13 (22)	1.69 (4)	29.0 (25)
13	Pizza Nova	Restaurant Chain	19	20 (18)	6 (31)	3.17 (2)	5.0 (7)
14	Pizza Pizza	Restaurant Chain	18	26 (14)	14 (21)	1.29 (7)	30.8 (26)
15	McDonald's	Restaurant Chain	17	20 (18)	15 (19)	1.13 (10)	15.0 (14)
16	7-Eleven	Convenience Store	16	16 (22)	6 (31)	2.67 (3)	0.0 (1)
17	CIBC Branch	Bank	16	29 (11)	17 (16)	0.94 (17)	44.8 (30)
18	Burger King	Restaurant Chain	16	17 (21)	4 (33)	4.00 (1)	5.9 (8)
19	TD Branch	Bank	15	23 (15)	22 (13)	0.68 (23)	34.8 (27)
20	BMO Branch	Bank	10	18 (20)	16 (18)	0.63 (26)	44.4 (29)

21	Swiss Chalet	Restaurant Chain	10	21 (17)	7 (28)	1.43 (6)	52.4 (33)
22	LCBO	Liquor/Beer Store	10	14 (24)	17 (16)	0.59 (29)	28.6 (23)
23	RBC Branch	Bank	9	23 (15)	18 (15)	0.50 (31)	60.9 (36)
24	Goodlife Fitness	Recreational Facility	8	9 (27)	13 (22)	0.62 (28)	11.1 (11)
25	BeerStore	Liquor/Beer Store	8	11 (26)	8 (26)	1.00 (13)	27.3 (22)
26	Private School	School	6	13 (25)	19 (14)	0.32 (35)	53.8 (34)
27	UPS Store	Retail Store	6	15 (23)	8 (26)	0.75 (21)	60.0 (35)
28	Harvey's	Restaurant Chain	5	7 (32)	4 (33)	1.25 (8)	28.6 (23)
29	Dairy Queen	Restaurant Chain	5	8 (30)	3 (37)	1.67 (5)	37.5 (28)
30	Metro	Grocery Store	4	4 (33)	4 (33)	1.00 (13)	0.0 (1)
31	Swimming Pool	Recreational Facility	3	8 (30)	7 (28)	0.43 (33)	62.5 (37)
32	Scotiabank Branch	Bank	2	9 (27)	15 (19)	0.13 (38)	77.8 (40)
33	Public School	School	2	9 (27)	29 (11)	0.07 (41)	77.8 (40)
34	Mac's	Convenience Store	2	2 (36)	2 (40)	1.00 (13)	0.0 (1)
35	Petrocan	Gas Station	2	2 (36)	3 (37)	0.67 (24)	0.0 (1)
36	Library	Library	1	3 (35)	12 (24)	0.08 (40)	66.7 (38)
37	Separate School	School	1	4 (33)	9 (25)	0.11 (39)	75.0 (39)
38	Wendy's	Restaurant Chain	1	2 (36)	3 (37)	0.33 (34)	50.0 (31)
39	Canadian Tire	Retail Store	1	2 (36)	7 (28)	0.14 (37)	50.0 (31)
40	Shell	Gas Station	1	1 (40)	2 (40)	0.50 (31)	0.0 (1)
41	Esso	Gas Station	1	1 (40)	4 (33)	0.25 (36)	0.0 (1)
Average			16.0	21.5	20.3	1.07	21.5

Coverage Efficiency: the actual coverage divided by the number of facilities; Coverage loss: the assumed 24/7 coverage minus actual coverage all divided by assumed 24/7 coverage

***Overall average (averaged over all 41 businesses and municipal locations)**

†Weighted average (over all 41 businesses and municipal locations, weighted by the *actual coverage* values of each location type)

‡ATM, Automated Teller Machine; BMO, Bank of Montreal; CIBC, Canadian Imperial Bank of Commerce; LCBO, Liquor Control Board of Ontario; RBC, Royal Bank of Canada; Separate School, religious schools (students from a religious group); Scotiabank, Bank of Nova Scotia; TD, Toronto-Dominion Bank.

The ATM locations consist of stand-alone ATMS and ATMs located in their respective bank branches.

Supplemental Table 9. Broad location categories ranked by actual coverage in Toronto on public OHCA not already covered by a registered AED.

Rank	Location category‡	Actual Coverage	Assumed 24/7 Coverage, (Rank)	Number of Facilities, (Rank)	Coverage Efficiency, (Rank)	Coverage Loss, % (Rank)
1	Bank ATM	466	512 (1)	952 (2)	0.49 (7)	9.0 (5)
2	Restaurant Chain	330	393 (2)	652 (3)	0.51 (5)	16.0 (7)
3	Coffee Shop	309	367 (3)	558 (4)	0.55 (4)	15.8 (6)
4	Bank	176	336 (4)	549 (5)	0.32 (10)	47.6 (11)
5	Parking Lot	127	135 (6)	229 (6)	0.55 (3)	5.9 (3)
6	Pharmacy	113	151 (5)	183 (8)	0.62 (2)	25.2 (8)
7	Gas Station	103	103 (8)	208 (7)	0.50 (6)	0.0 (1)
8	Convenience Store	58	58 (10)	61 (13)	0.95 (1)	0.0 (1)
9	Liquor/Beer Store	51	84 (9)	150 (10)	0.34 (9)	39.3 (10)
10	School	49	124 (7)	1018 (1)	0.05 (14)	60.5 (13)
11	Recreational Facility	29	46 (11)	159 (9)	0.18 (11)	37.0 (9)
12	Retail Store	15	33 (12)	101 (11)	0.15 (12)	54.5 (12)
13	Grocery Store	12	13 (14)	28 (14)	0.43 (8)	7.7 (4)
14	Library	9	27 (13)	101 (11)	0.09 (13)	66.7 (14)
	Average	131.9	170.1	353.5	0.49	18.3

Coverage Efficiency: the actual coverage divided by the number of facilities; **Coverage loss:** the assumed 24/7 coverage minus actual coverage all divided by assumed 24/7 coverage

*Overall average (averaged over all 14 broad location categories)

†Weighted average (over all 14 broad location categories, weighted by the *actual coverage* values of each location category)

‡ATM, Automated Teller Machine; BMO, Bank of Montreal; CIBC, Canadian Imperial Bank of Commerce; LCBO, Liquor Control Board of Ontario; RBC, Royal Bank of Canada; Separate School, religious schools (students from a religious group); Scotiabank, Bank of Nova Scotia; TD, Toronto-Dominion Bank.
The ATM locations consist of stand-alone ATMS and ATMs located in their respective bank branches.

Supplemental Table 10. Broad location categories ranked by actual coverage in downtown Toronto on public OHCA's not already covered by a registered AED.

Downtown Rank	Location category‡	Actual Coverage	Assumed 24/7 Coverage, (Rank)	Number of Facilities, (Rank)	Coverage Efficiency, (Rank)	Coverage Loss, % (Rank)
1	Bank ATM	128	147 (1)	200 (1)	0.64 (7)	12.9 (5)
2	Coffee Shop	103	131 (2)	189 (2)	0.54 (9)	21.4 (6)
3	Restaurant Chain	92	118 (3)	127 (3)	0.72 (4)	22.0 (8)
4	Pharmacy	44	56 (5)	38 (7)	1.16 (2)	21.4 (7)
5	Bank	41	73 (4)	88 (4)	0.47 (11)	43.8 (11)
6	Parking Lot	26	28 (6)	39 (6)	0.67 (6)	7.1 (4)
7	Convenience Store	18	18 (9)	8 (13)	2.25 (1)	0.0 (1)
8	Liquor/Beer Store	17	24 (8)	25 (8)	0.68 (5)	29.2 (9)
9	Recreational Facility	11	16 (11)	20 (9)	0.55 (8)	31.3 (10)
10	School	9	26 (7)	57 (5)	0.16 (13)	65.4 (13)
11	Retail Store	7	17 (10)	15 (10)	0.47 (10)	58.8 (12)
12	Gas Station	4	4 (12)	9 (12)	0.44 (12)	0.0 (1)
13	Grocery Store	4	4 (12)	4 (14)	1.00 (3)	0.0 (1)
14	Library	1	3 (14)	12 (11)	0.08 (14)	66.7 (14)
	Average	36.1	47.5	59.4	0.71	21.2

Coverage Efficiency: the actual coverage divided by the number of facilities; Coverage loss: the assumed 24/7 coverage minus actual coverage all divided by assumed 24/7 coverage

***Overall average (averaged over all 14 broad location categories)**

†Weighted average (over all 14 broad location categories, weighted by the *actual coverage* values of each location category)

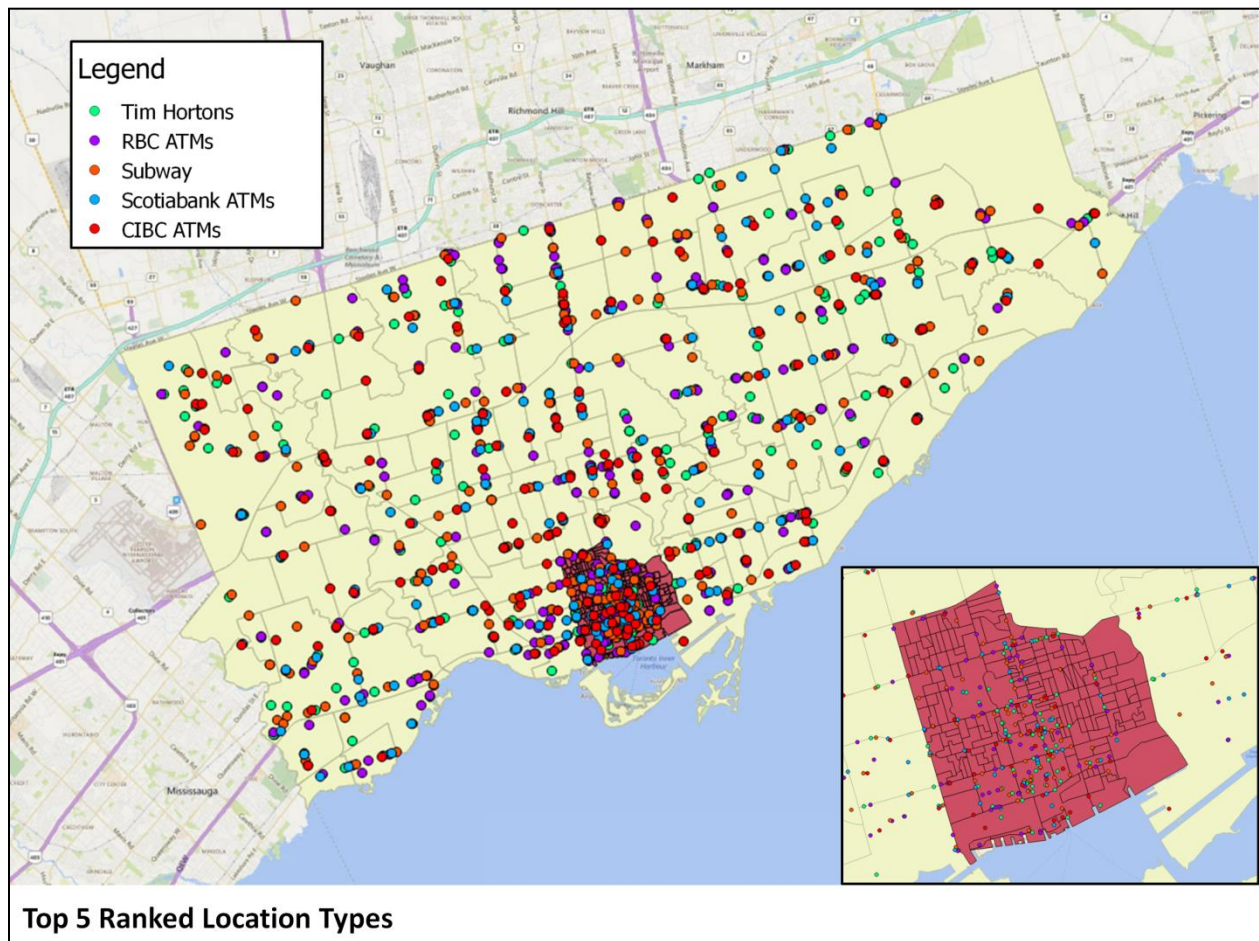
‡ATM, Automated Teller Machine; BMO, Bank of Montreal; CIBC, Canadian Imperial Bank of Commerce; LCBO, Liquor Control Board of Ontario; RBC, Royal Bank of Canada; Separate School, religious schools (students from a religious group); Scotiabank, Bank of Nova Scotia; TD, Toronto-Dominion Bank.

The ATM locations consist of stand-alone ATMS and ATMs located in their respective bank branches.

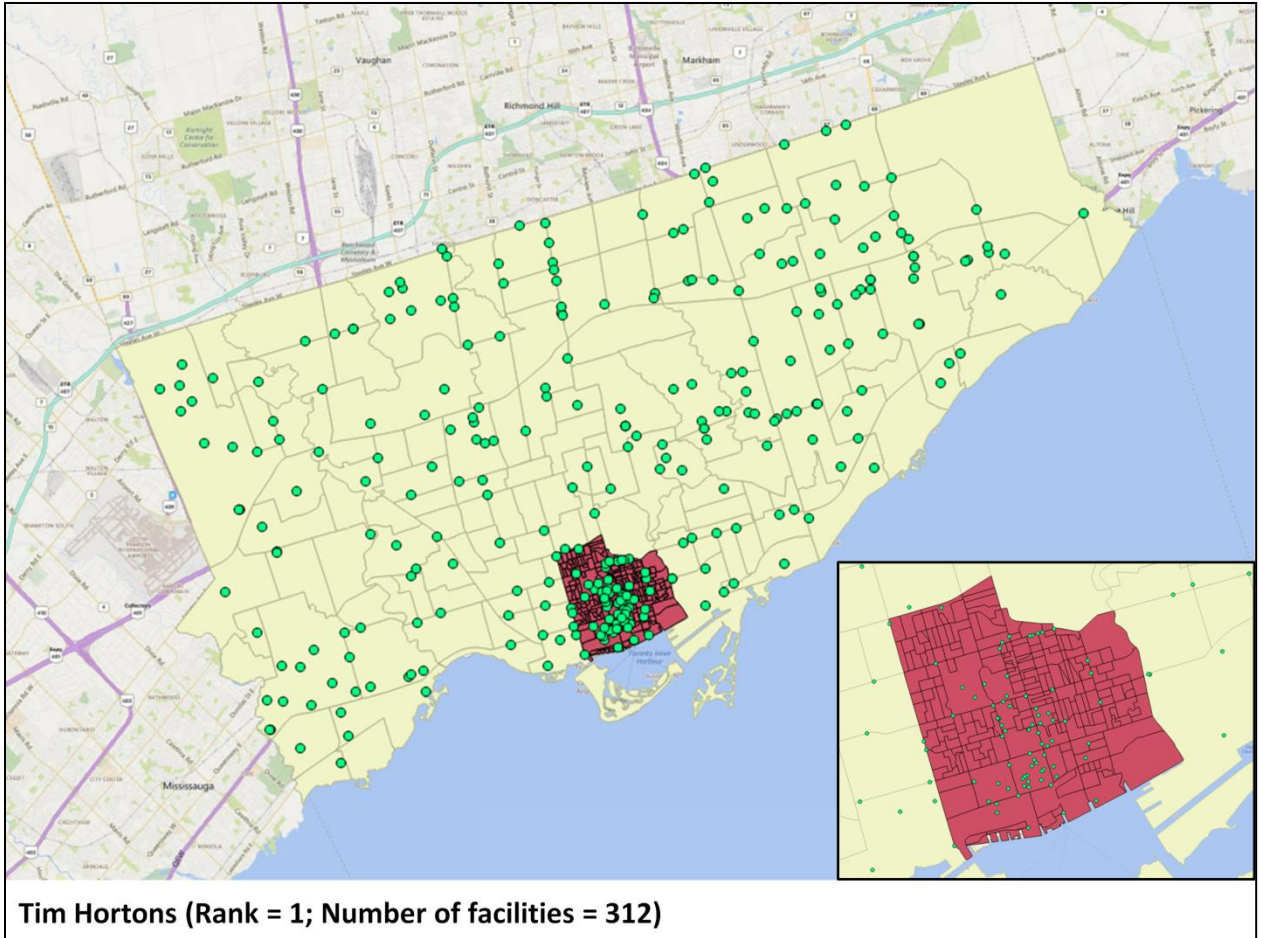
Section 3. Supplemental Figures and Figure Legends

Section 3.1. Map of facilities

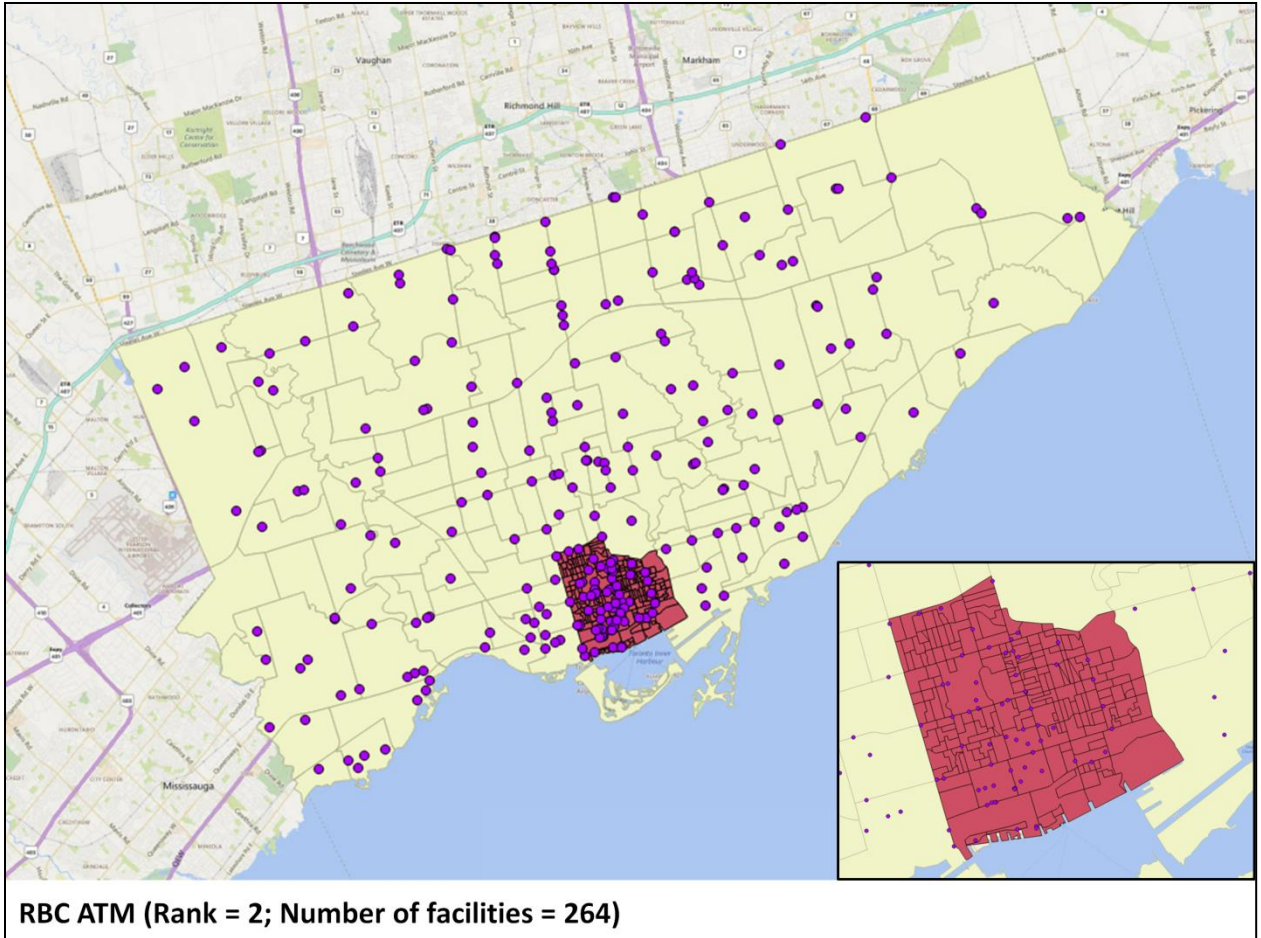
Supplemental Figures 1 – 6 showcase the distribution of facilities of the Top 5 ranked businesses and municipal locations (Tim Hortons, RBC ATM, Subway, Scotiabank ATM, CIBC ATM) in all of Toronto and downtown Toronto.



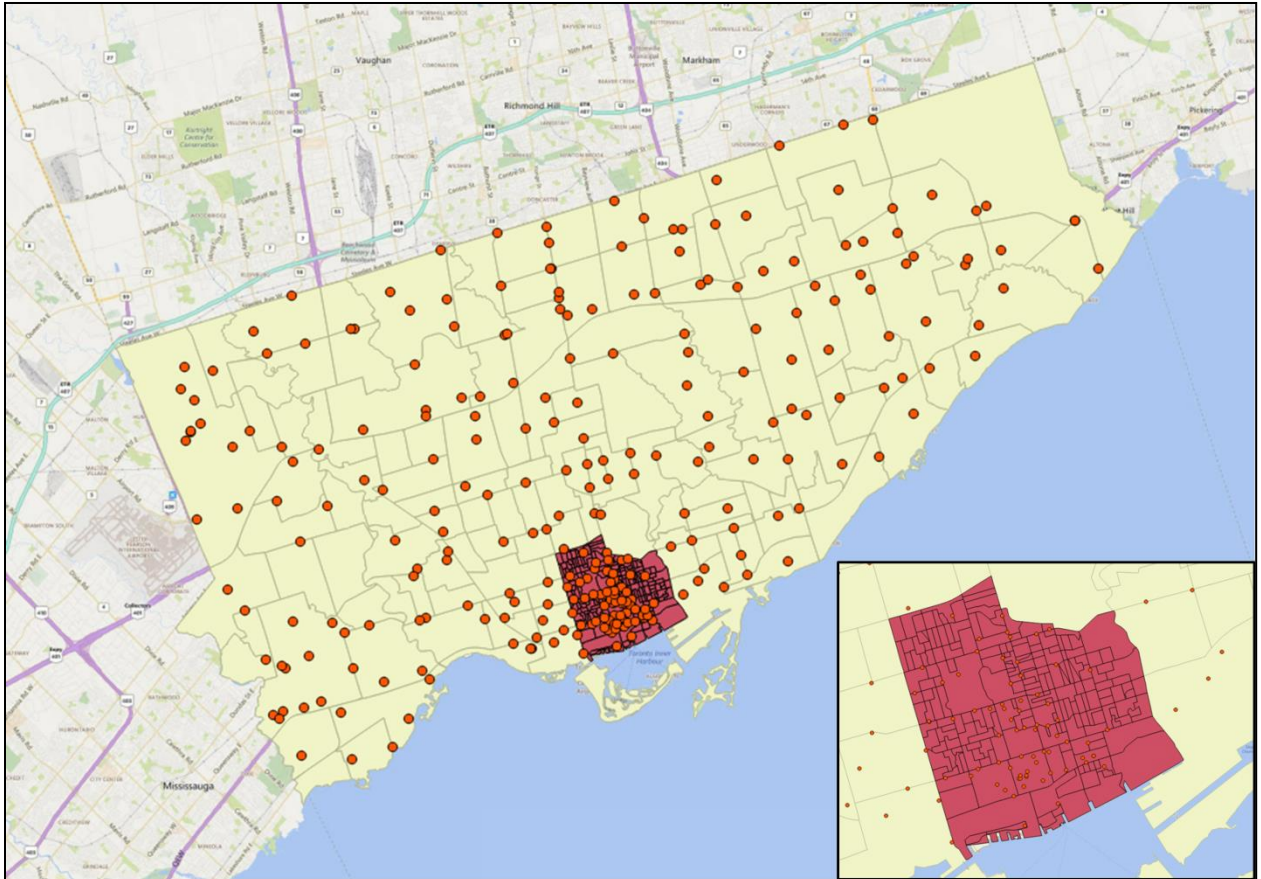
Supplemental Figure 1. Map of the facilities of the Top 5 ranked businesses in terms of actual coverage in all of Toronto.



Supplemental Figure 2. Map of the facilities of the Tim Hortons (Coffee Shop) in Toronto.

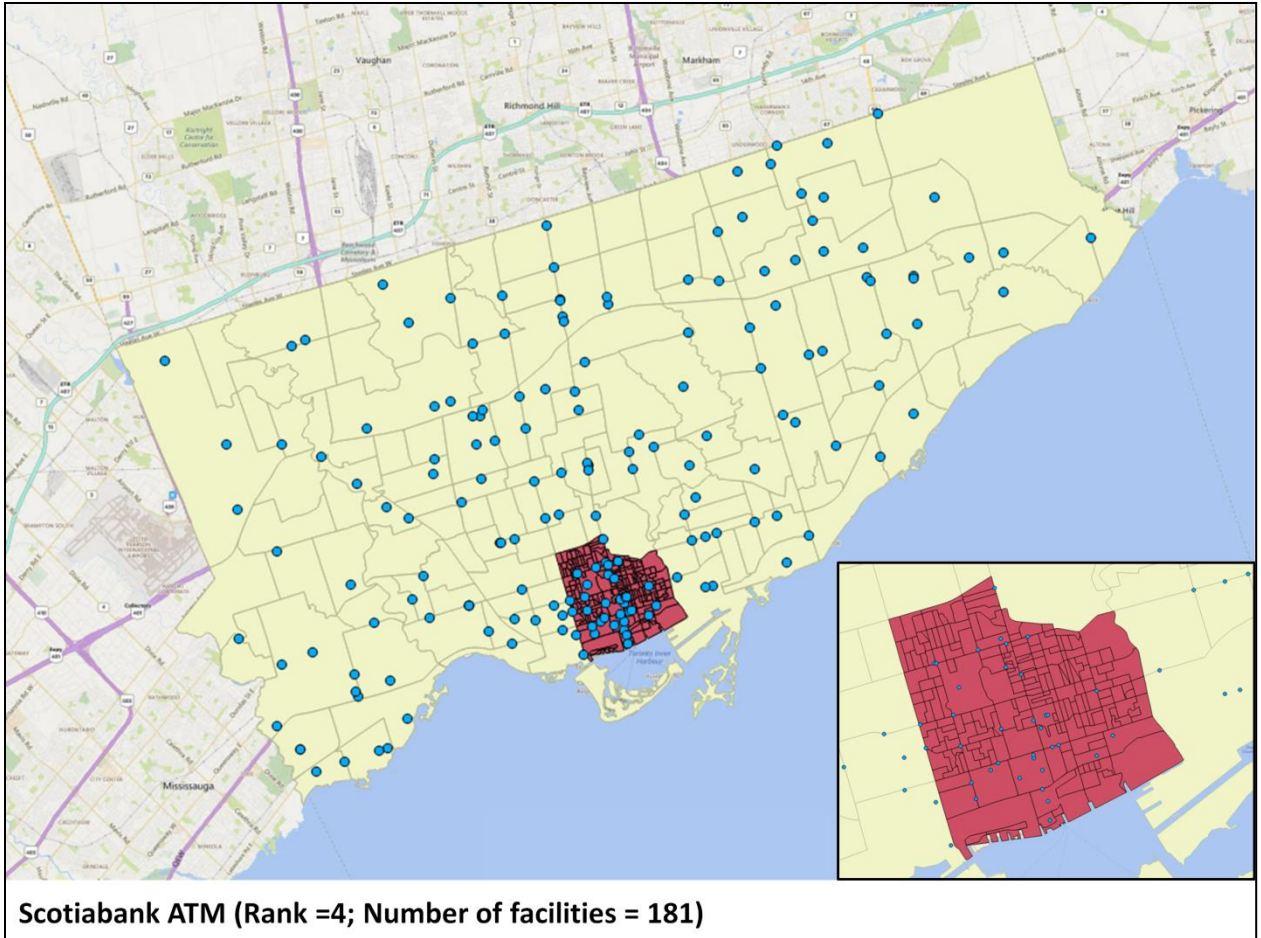


Supplemental Figure 3. Map of the facilities of Royal Bank of Canada (RBC) ATMs (Bank ATM) in Toronto.

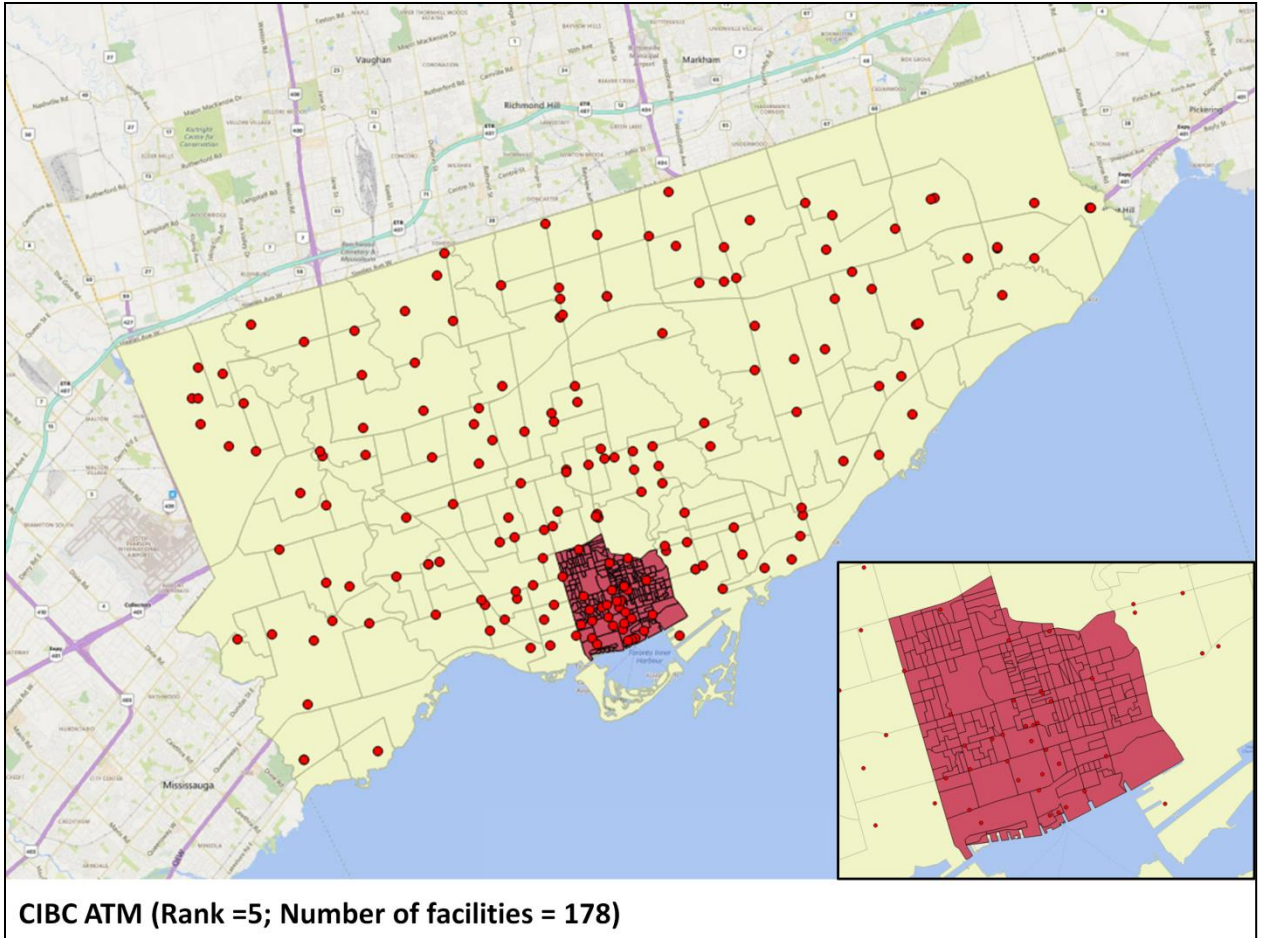


Subway (Rank = 3; Number of facilities = 281)

Supplemental Figure 4. Map of the facilities of Subway (Restaurant Chain) in Toronto.



Supplemental Figure 5. Map of the facilities of Scotiabank ATMs (Bank ATM) in Toronto.



Supplemental Figure 6. Map of the facilities of the Canadian Imperial Bank of Commerce (CIBC) ATMs (Bank ATM) in Toronto.