

Supplemental materials for

Kiran T, Moineddin R, Kopp A, Glazier RH. Impact of team-based care on emergency department use. *Ann Fam Med*. 2022;20(1):24-31.

Supplemental Tables and Figures

Supplemental Figure 1. Selection of patients whose physician transitioned to team-based capitation and patients whose physician transitioned to non-team capitation between 2007 and 2013, Ontario, Canada.

Supplemental Table 1. Select characteristics of patients whose physician transitioned to team-based capitation and matched patients whose physician transitioned to non-team capitation between 2007 and 2013, stratified by rurality, Ontario, Canada.

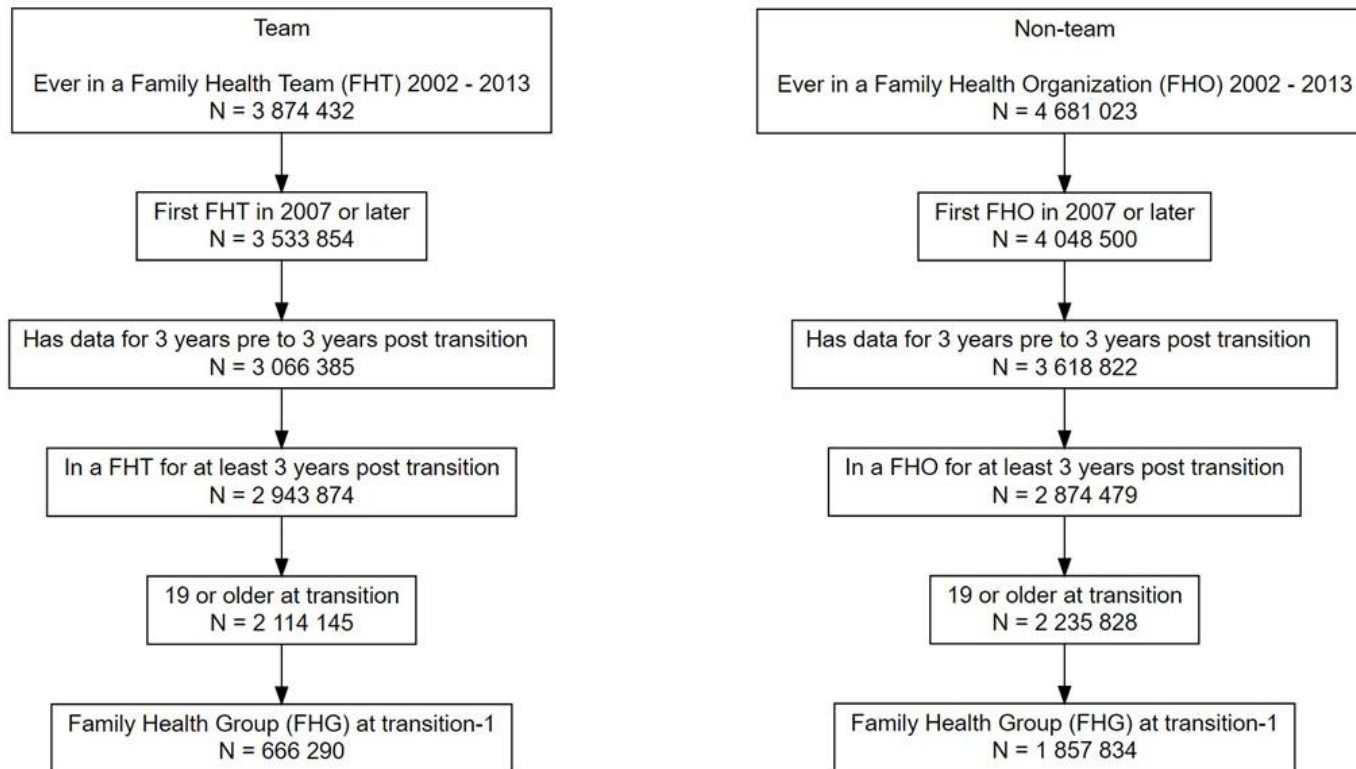
Supplemental Figure 2. Details on the negative binomial regression modeling

Supplemental Table 2. Number of Ontario residents included in denominator by year for the unmatched and matched analysis

Supplemental Table 3. Change in emergency department visit rate after transition to capitation, team-based versus non-team for matched data, 2007 – 2013, stratified by rurality, Ontario, Canada.

Supplemental Figure 3. Mean emergency department visit rate before and after transition to a capitation-based primary care model between 2007 - 2013, with a team or without a team for matched data, stratified by rurality, Ontario, Canada.

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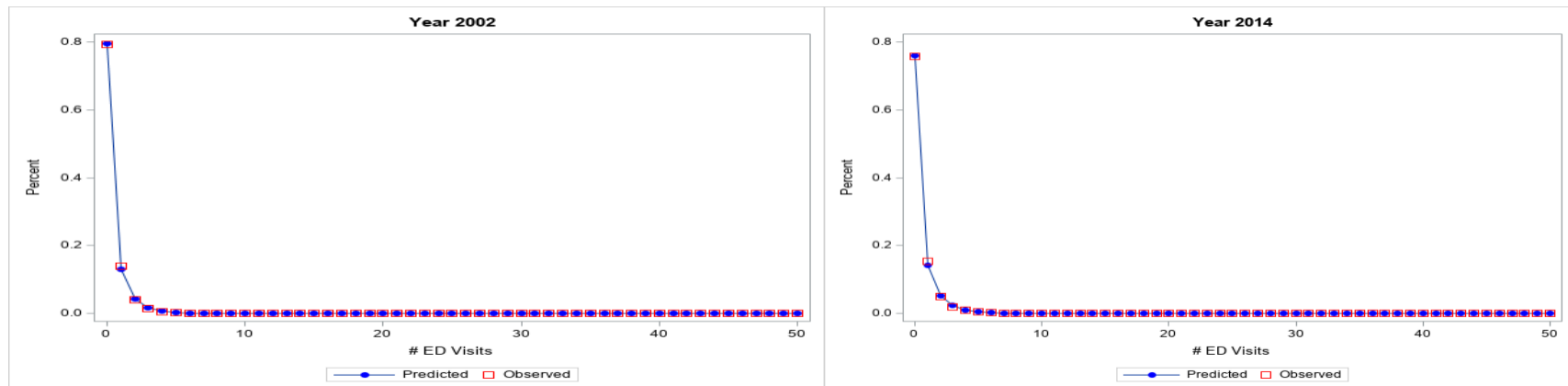
	Total	Big cities		Small Towns		Rural	
		Team	Non-team	Team	Non-team	Team	Non-team
No. of patients	486,528	182,437	182,437	51,645	51,645	9,182	9,182
Age, mean (SD)	47.53 (17.27)	46.97 (17.32)	46.97 (17.32)	48.96 (17.01)	48.96 (17.01)	50.64 (17.09)	50.63 (17.09)
Age group, no. (%)							
< 19	89 (0.0)	0 (0.0)	45 (0.0)	0 (0.0)	28 (0.1)	0 (0.0)	15 (0.2)
19 – 44	222,701 (45.8)	87,152 (47.8)	87,105 (47.7)	20,988 (40.6)	20,962 (40.6)	3,255 (35.4)	3,239 (35.3)
45 – 64	176,586 (36.3)	63,702 (34.9)	63,703 (34.9)	20,715 (40.1)	20,711 (40.1)	3,879 (42.2)	3,876 (42.2)
65+	87,152 (17.9)	31,583 (17.3)	31,583 (17.3)	9,942 (19.3)	9,944 (19.3)	2,048 (22.3)	2,052 (22.3)
Female (n, %)	278,366 (57.2)	105,390 (57.8)	105,390 (57.8)	28,622 (55.4)	28,622 (55.4)	5,171 (56.3)	5,171 (56.3)
Morbidity, no. (%), RUB							
0 (none)	14,673 (3.0)	4,408 (2.4)	6,252 (3.4)	1,732 (3.4)	1,722 (3.3)	234 (2.5)	325 (3.5)
1	21,757 (4.5)	7,558 (4.1)	8,621 (4.7)	2,344 (4.5)	2,445 (4.7)	346 (3.8)	443 (4.8)
2	75,523 (15.5)	27,554 (15.1)	29,054 (15.9)	7,999 (15.5)	8,114 (15.7)	1,353 (14.7)	1,449 (15.8)
3	270,636 (55.6)	101,315 (55.5)	102,061 (55.9)	28,098 (54.4)	28,889 (55.9)	5,106 (55.6)	5,167 (56.3)
4	80,261 (16.5)	31,917 (17.5)	28,747 (15.8)	8,598 (16.6)	8,055 (15.6)	1,599 (17.4)	1,345 (14.6)
5 (high)	23,678 (4.9)	9,685 (5.3)	7,702 (4.2)	2,874 (5.6)	2,420 (4.7)	544 (5.9)	453 (4.9)
Co-morbidity, no. (%), ADGs							
No utilization	14,674 (3.0)	4,409 (2.4)	6,252 (3.4)	1,732 (3.4)	1,722 (3.3)	234 (2.5)	325 (3.5)
1 – 4 (low co-morbidity)	195,709 (40.2)	71,222 (39.0)	72,956 (40.0)	22,195 (43.0)	21,363 (41.4)	3,902 (42.5)	4,071 (44.3)

5 - 9	222,390 (45.7)	84,867 (46.5)	83,576 (45.8)	22,563 (43.7)	23,237 (45.0)	4,113 (44.8)	4,034 (43.9)
10+ (high co-morbidity)	53,755 (11.0)	21,939 (12.0)	19,653 (10.8)	5,155 (10.0)	5,323 (10.3)	933 (10.2)	752 (8.2)
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Recent resident (last 10 years), no. (%)	33,661 (6.9)	16,153 (8.9)	14,913 (8.2)	1,215 (2.4)	995 (1.9)	198 (2.2)	187 (2.0)
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Income quintile (Q), no. (%)							
Q1 (lowest)	78,274 (16.1)	32,898 (18.0)	28,849 (15.8)	7,807 (15.1)	5,099 (9.9)	2,000 (21.8)	1,621 (17.7)
Q2	85,524 (17.6)	33,297 (18.3)	31,764 (17.4)	9,112 (17.6)	7,087 (13.7)	2,332 (25.4)	1,932 (21.0)
Q3	92,632 (19.0)	34,033 (18.7)	33,577 (18.4)	11,394 (22.1)	9,899 (19.2)	1,939 (21.1)	1,790 (19.5)
Q4	109,653 (22.5)	39,964 (21.9)	39,535 (21.7)	12,470 (24.1)	14,333 (27.8)	1,460 (15.9)	1,891 (20.6)
Q5 (highest)	118,987 (24.5)	41,754 (22.9)	48,276 (26.5)	10,735 (20.8)	15,165 (29.4)	1,211 (13.2)	1,846 (20.1)
Missing	1,458 (0.3)	491 (0.3)	436 (0.2)	127 (0.2)	62 (0.1)	240 (2.6)	102 (1.1)
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Year of transition, no. (%)							
2007	212 (0.0)	74 (0.0)	74 (0.0)	22 (0.0)	22 (0.0)	10 (0.1)	10 (0.1)
2008	59,040 (12.1)	19,356 (10.6)	19,356 (10.6)	8,311 (16.1)	8,311 (16.1)	1,853 (20.2)	1,853 (20.2)
2009	164,836 (33.9)	56,087 (30.7)	56,087 (30.7)	22,989 (44.5)	22,989 (44.5)	3,342 (36.4)	3,342 (36.4)
2010	99,364 (20.4)	37,504 (20.6)	37,504 (20.6)	9,785 (18.9)	9,785 (18.9)	2,393 (26.1)	2,393 (26.1)
2011	57,296 (11.8)	23,279 (12.8)	23,279 (12.8)	4,673 (9.0)	4,673 (9.0)	696 (7.6)	696 (7.6)
2012	73,996 (15.2)	32,245 (17.7)	32,245 (17.7)	4,159 (8.1)	4,159 (8.1)	594 (6.5)	594 (6.5)
2013	31,784 (6.5)	13,892 (7.6)	13,892 (7.6)	1,706 (3.3)	1,706 (3.3)	294 (3.2)	294 (3.2)
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Supplemental Figure 2. Details on the negative binomial regression modeling

We used a negative binomial regression model fitted to the number of ED visits adjusted for age and sex. Year (-6, -5, ..., 6) was included as a categorical variable and serial correlation among the repeated observations of individuals was modelled as an AR(1) model. The adjusted/expected rate of ED visits for each year was calculated using the fitted negative binomial regression.

The distribution of annual number of ED visits were similar over the study period. To make sure that the distribution of the ED visits followed a Negative Binomial, we fitted a negative binomial distribution to the number of ED visits and calculated the expected probability for the number of ED visits. We plotted the observed and predicted probabilities to assess the goodness of fit. The predicted and observed probability of zero were very close.



Supplemental Table 2. Number of Ontario residents included in denominator by year for the unmatched and matched analysis

Rurality	Status	Index year	Denominator	
			Unmatched Data	Matched Data
Big cities	Non-team	-6	1683290	182411
		-5	1683998	182485
		-4	1683998	182485
		-3	1683998	182485
		-2	1683998	182485
		-1	1683998	182485
		0	1683998	182485
		1	1683998	182485
		2	1683998	182485
		3	1593733	168616
		4	1335677	136402
		5	1004607	113130
	6	655455	75626	
	Team	-6	330030	182286
		-5	386509	182381
		-4	386509	182381
		-3	386509	182381
		-2	386509	182381
		-1	386509	182381
		0	386509	182381
		1	386509	182381
		2	386509	182381
		3	363928	168587
		4	309253	136360
5		276217	113081	
Small towns	Non-team	6	227643	75577
		-6	475728	51634
		-5	475980	51656

		-4	475980	51656
		-3	475980	51656
		-2	475980	51656
		-1	475980	51656
		0	475980	51656
		1	475980	51656
		2	475980	51656
		3	464866	49955
		4	430048	45802
		5	373292	41132
		6	273763	31347
	Team	-6	158244	51608
		-5	212858	51638
		-4	212858	51638
		-3	212858	51638
		-2	212858	51638
		-1	212858	51638
		0	212858	51638
		1	212858	51638
		2	212858	51638
		3	206180	49948
		4	184517	45793
		5	153665	41120
		6	131293	31335
Rural	Non-team	-6	92637	9033
		-5	92685	9043
		-4	92685	9043
		-3	92685	9043
		-2	92685	9043
		-1	92685	9043
		0	92685	9043
		1	92685	9043

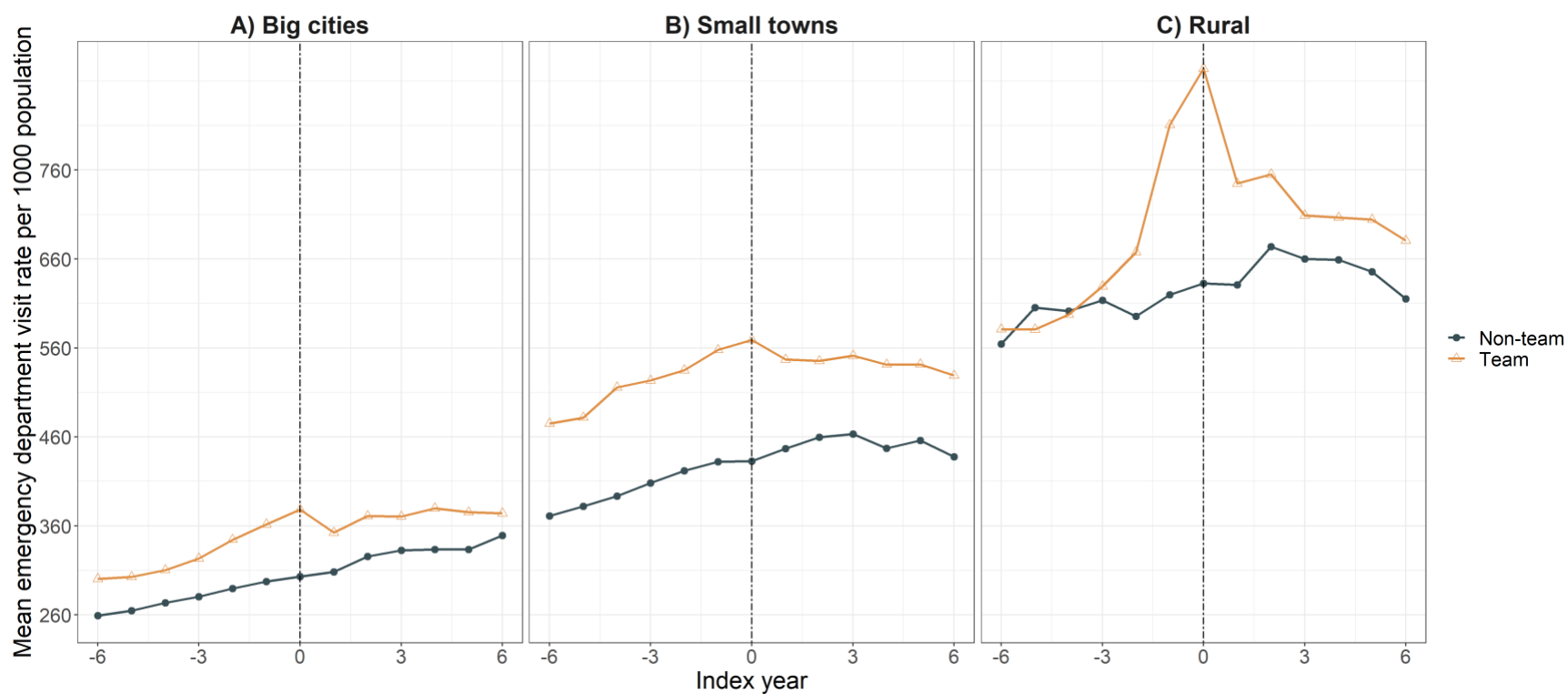
	2	92685	9043
	3	90409	8760
	4	87009	8189
	5	82744	7511
	6	62044	5142
Team	-6	41360	9030
	-5	63811	9043
	-4	63811	9043
	-3	63811	9043
	-2	63811	9043
	-1	63811	9043
	0	63811	9043
	1	63811	9043
	2	63811	9043
	3	61313	8761
	4	53003	8189
	5	45057	7511
	6	40820	5142

Supplemental Table 3. Change in emergency department visit rate after transition to capitation, team-based versus non-team for matched data, 2007 – 2013, stratified by rurality, Ontario, Canada.

Emergency department visit rate % (95% CI)						
	Big cities		Small town		Rural	
	Team	Non-team	Team	Non-team	Team	Non-team
Trend before	3.86 (3.51, 4.21)	2.95 (2.6, 3.29)	3.23 (2.77, 3.70)	3.32 (2.81, 3.83)	6.41 (5.16, 7.67)	1.73 (0.52, 2.96)
Level change	3.32 (1.85, 4.83)	-0.36 (-1.78, 1.15)	2.08 (0.02, 4.19)	0.6 (-1.59, 2.84)	11.39 (6.24, 16.81)	2.28 (-3.05, 7.9)
Trend after	0.63 (0.31, 0.95)	2.65 (2.32, 2.98)	-0.7 (-1.09, 0.29)	0.82 (0.36, 1.29)	-2.85 (-3.73, 1.94)	0.45 (-0.4, 1.34)
Difference in rate of increase after transition (Non-team minus team) %	2.02		1.53		3.30	
p-value	<0.0001		0.0003		0.0285	

Notes: ED, emergency department; Non-team patients were matched to team patients based on Local Health Integration Network, Rurality Index for Ontario, age, sex, year of transition; age matching was done using increasing increments (first match if exact, then 10 days, then 100 days, then 365 days).

Supplemental Figure 3. Mean emergency department visit rate before and after transition to a capitation-based primary care model, between 2007 and 2013, with a team or without a team for matched data, stratified by rurality, Ontario, Canada.



Notes: Patients whose physician transitioned to non-team capitation were matched to patients whose physician transitioned to team-based capitation by year of transition, age, sex, rurality, and local health region.