

Comparison of Family Health Teams to Other Ontario Primary Care Models, 2004/05 to 2011/12

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About ICES

The Institute for Clinical Evaluative Sciences (ICES) is an independent, nonprofit research organization that produces knowledge to enhance the effectiveness of health care. Internationally recognized for its innovative use of population-based health information, ICES research provides measures of health system performance, a clearer understanding of the shifting health care needs of Ontarians, and a stimulus for discussion of practical solutions to optimize scarce resources.

Key to our work is the ability to link population based health information, at the patient level, in a way that ensures privacy and confidentiality. Linked databases reflecting 13 million of 34 million Canadians allow ICES to follow patient populations through diagnosis and treatment and to evaluate outcomes.

ICES brings together the best and the brightest talent. Many of our scientists are not only internationally recognized leaders in their fields but are also practicing clinicians who understand the grassroots of health care delivery, making the knowledge produced at ICES clinically focused and useful in changing practice. Other team members have statistical or epidemiological training, project management skills or communications expertise. The variety of skill sets and educational backgrounds ensures a multidisciplinary approach to issues and creates a real-world mosaic of perspectives that is vital to shaping Ontario's future health care system.

ICES receives core funding from the Ontario Ministry of Health and Long-Term Care. In addition, ICES scientists compete for peer-reviewed grants from federal funding agencies, such as the Canadian Institutes of Health Research, and receive project specific funds from provincial and national organizations. The knowledge that arises from this research is always produced independent of the funding bodies, which is critical to ICES' reputation as a trusted, impartial source of high-quality health and health services research.

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Executive Summary

Background

Family Health Teams (FHTs) are primary health care organizations that include a team of family physicians, nurse practitioners, registered nurses, dietitians, social workers and other professionals whose programs and services are geared to local health and community needs. Since 2005, over 180 FHTs have been operationalized, and there are

currently over three million Ontarians from over 200 communities enrolled in FHTs. The extent to which the patient outcomes of FHTs compare to other major models of primary care in Ontario over time is currently unknown. This report is meant to complement, inform and expand upon previous work done by the Conference Board of Canada in its evaluation of FHTs, by looking at population-based outcomes longitudinally and across multiple models of care.

Objective

The main objective of this report is to compare outcomes of FHT patients in relation to other major models of primary care in Ontario, over time.

Methods

The primary care models included in this study are Family Health Teams (FHTs); Community Health Centres (CHCs); Enhanced Fee-For-Service (EFFS) models (including Family Health Groups and Comprehensive Care Model); Family Health Organizations (FHOs) that were not FHTs; Family Health Networks (FHNs) that were not FHTs; and straight fee-for-service (FFS) practices. Physicians in CHCs are paid through salary. In the other models, there is either a blend of payments including predominantly capitation (FHOs and FHNs), predominantly fee-for-service payments (EFFS), or straight fee-for-service payments (FFS). The timeframe of the study was from April 1, 2004 to March 31, 2012. The study used administrative datasets that were linked using unique, encoded identifiers and analyzed at the Institute for Clinical Evaluative Sciences (ICES). Models of care were compared according to demographics and case mix, health care utilization, cancer screening and diabetes care. The primary analysis consisted of annual cross-sectional measures of health care utilization and performance for physician practice based on the model of care in March 2012. Trends over time were adjusted for age, sex, income quintile, morbidity, comorbidity, rurality and the rate of the outcome at baseline (2004).

Results

The approximate number of Ontarians in March 2012 in each primary care model studied was:

- 2.3 million in EFFS
- 1.2 million in FHTs
- 1.0 million in FHOs that were not FHTs
- 224,000 in FFS
- 60,000 in CHCs
- 39,000 in FHNs that were not FHTs

DEMOGRAPHICS FOR FHTs IN 2012

- *Higher income.* FHTs had higher income distributions than the other models, along with FHOs and FHNs, while CHCs had an especially low-income population.
- *Outside major urban centres.* FHTs were over-represented in non-major urban and rural areas and under-represented in major urban centres. EFFS and FFS models were predominantly major urban while FHNs were largely rural.
- *Few recent immigrants.* There was a low proportion of recent immigrants in FHTs, along with FHOs and FHNs, while high proportions of recent immigrants were found in CHCs, EFFS and FFS models.

- *Lower morbidity and co-morbidity.* FHTs had fewer patients with high levels of co-morbidity and expected resource use, as did FHOs and FHNs. The highest levels were found in CHCs, followed by EFFS and FFS.

ADJUSTED TRENDS OVER TIME FOR FHTs, 2004/05 TO 2011/12

Health care utilization

- *Similar trends in emergency department (ED) use.* FHTs had higher rates of overall ED use than some models (including FFS and FHOs) and lower rates than other models (CHCs). There were no statistically significant differences in less urgent ED visits between models.
- *Few differences in hospital admissions or readmissions.* FHTs had hospital admission rates for chronic conditions and hospital readmission rates within 30 days and within one year that were similar to other models, except CHCs which had higher rates and FFS which had lower rates of readmission within one year.
- *Few differences in specialist visits.* FHTs had rates of specialist visits over time that were higher than FFS, lower than CHCs, and similar to other models.

Cancer screening

- *Higher than FFS and EFFS.* Colorectal and cervical cancer screening rates were higher in FHTs than in FFS and EFFS. FHTs had higher colorectal cancer screening than FHTs and CHCs had higher cervical cancer screening than FHTs.

Diabetes care (excluding CHCs due to data limitations)

- *Higher than some models.* FHTs had higher rates of retinal exams than EFFS, FHTs and FHOs, and higher rates of hemoglobin A1c testing than FFS and EFFS. There were no statistically significant differences in cholesterol testing between models. Prescribing of statins and ACE inhibitors or ARBs were higher in FHTs than in EFFS, FFS and FHOs.

Interpretation

Similar to previous analyses, this study found that FHTs and other capitation-based models have somewhat wealthier and healthier populations than other models of care. FHTs also tended to be located outside of major urban centres and served relatively few recent immigrants. Given that physicians had a free choice of models, these patterns likely reflect the way that payment incentives such as capitation and bonuses favour certain types of practices. CHCs serve low-income, high immigrant populations in keeping with their mandate to improve access for patients most likely to experience barriers to care. Health care utilization increased in all models of care over time, with few differences in trends between models. FHTs generally performed well in cancer screening and diabetes care, with improvements over time that were larger than those of fee-for-service models but not consistently better than other capitation models. Improvements over time in cancer screening in FHTs were not consistently better than in CHCs.

Introduction

Family Health Teams (FHTs) are primary health care organizations that include a team of family physicians, nurse practitioners, registered nurses, dietitians, social workers and other professionals whose programs and services are geared to local health and community needs. Since 2005, over 180 FHTs have been operationalized, and there are currently over three million Ontarians from over 200 communities enrolled in FHTs.

There are many FHTs in rural and northern communities. In addition, FHTs often provide primary

care services to unique populations of patients with specialized needs such as people who are recent immigrants, homeless, or who have severe mental illness or addiction. The extent to which the patient outcomes of FHTs compare to other major models of primary care in Ontario over time is currently unknown.

This report is meant to complement, inform and expand upon previous work done by the Conference Board of Canada in its evaluation of FHTs, by looking at population-based outcomes longitudinally and across multiple models of care.¹

Objective

The main objective of this report is to compare outcomes of Family Health Team (FHT) patients in relation to other major models of primary care in Ontario, over time.

Methods

Primary Care Models

The Ontario primary care models included in this study are:

- Family Health Teams (FHTs)
- Community Health Centres (CHCs)
- Enhanced Fee-For-Service (EFFS) models (including Family Health Groups and the Comprehensive Care Model)

- Family Health Organizations (FHOs) that were not FHTs
- Family Health Networks (FHNs) that were not FHTs
- straight Fee-For-Service (FFS) practices

A description of these primary care models, including information about when each was introduced in Ontario, is available in the [Appendix](#).

Time Frame

The study time frame was from April 1, 2004 to March 31, 2012. This time period was chosen in order to allow for comparisons over the time period during which new physician payment and organizational models were formed and developed.

Population

The study population was limited to Ontarians aged 21 years and older in March 2012 (i.e., aged 18 years in March 2009). Each person was attributed to a model of care as of March 31, 2012. For patient enrolment models, we used continuous rostering or virtual rostering to the same organization in the same model of care in the period from April 1, 2009 to March 31, 2012. We used virtual rostering in the same period for non-rostered patients, and the record of at least one primary care visit in 2008-2010 and 2010-2012 for CHC patients.

Analysis

The primary analysis consisted of annual cross-sectional measures of health care utilization and performance for physician practice based on the model of care in March 2012. Proportions and rates for these measures were calculated.

Generalized estimating equations were used to control for patient characteristics including age, sex, neighbourhood income quintile, morbidity, comorbidity, rurality and the rate of the outcome at baseline (2004). They were also used to account for clustering of physicians within primary care models. We were unable to adjust for physician characteristics, as these were not available for CHCs.

Measures

We used Ontario's administrative health databases which are held securely in linkable files without any direct personal identifiers and are housed at the Institute for Clinical Evaluative Sciences (ICES) for analysis. Ontario permanent residents have universal public health insurance under the Ontario Health Insurance Plan (OHIP), the single payer for all medically necessary services provided by physicians and hospitals. Using an encrypted version of a patient's OHIP health card number as a unique identifier, it is possible to link individuals across databases to capture a complete health services profile for each resident. The various measures of health care utilization used and the relevant databases from which they were derived are described below.

Demographics

Age, sex and area of residence were derived from the Registered Persons Database, Ontario's health care registry.

Household income, adjusted for household size and specific to each community, was used to order postal codes based on the individual's residential dissemination area into quintiles, ranging from lowest (Q1) to highest (Q5) relative income. Income quintile was derived using Statistics Canada's Postal Code Conversion file² to assign postal codes of residents to the Census dissemination areas in the 2006 Census.

Recent registrant (a proxy for recent immigrants), was assigned to individuals (>10 years of age) with a first registration in OHIP within the prior 10 years.

Location

Urban-rural location was assigned using the Rurality Index of Ontario³ with 0-9 indicating major urban centres, 10-39 indicating non-major urban centres and ≥40 indicating rural areas.

Case Mix

One year of diagnostic data from physician claims using the Ontario Health Insurance Plan (OHIP) database and hospital discharges from the Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD) were used to assign Ontario residents to a Resource Utilization Band (RUB) within the Johns Hopkins Adjusted Clinical Group (ACG) System.⁴ RUBs are quintiles of expected resource use and therefore are measures of overall morbidity and expected costs. RUB 0 is comprised of non-users of the health system, RUB 1 is the quintile with the least expected use and RUB 5 is the quintile with the highest expected use. Adjusted Diagnosis Groups (ADGs) are aggregations of similar types of health conditions that can be used to count the number of comorbid condition types that a patient has.⁴ ADGs are therefore used descriptively as a measure of comorbidity.

Chronic Conditions

Hypertension, congestive heart failure (CHF), acute myocardial infarction, chronic obstructive pulmonary disease (COPD), asthma, mental health conditions and diabetes were measured using validated cohorts at ICES.⁵⁻⁸ The algorithm used to define cohorts varies slightly for each chronic condition, based on the original ICES algorithm for diabetes (i.e., two physician claims or one hospital admission with diabetes within two years).⁵ Mental health diagnoses are measured over a two-year period, while the other cohorts are cumulative over time. The diabetes definition has been reported to have a sensitivity of 86% and a specificity of 98%.⁵ The other cohorts have similar performance characteristics, as indicated in published validation studies.⁶⁻⁸

Health Care Utilization

Emergency department (ED) visits, potentially avoidable hospital admissions and specialist office visits are known to vary according to practice demographics and case mix. For that reason, analyses were performed using generalized estimating equations to adjust for age, sex, rurality and morbidity (using RUB) and to account for clustering of physicians within models of care. These analyses were conducted at the level of physician practice.

- ED visits were measured using the National Ambulatory Care Reporting System (NACRS) database. Triage level was measured using the

Canadian Triage and Acuity Scale (CTAS), where CTAS level 1 was considered resuscitation, CTAS 2 emergent, CTAS 3 urgent, CTAS 4 less urgent and CTAS 5 non-urgent.⁹ For this report, CTAS 1-3 was considered high urgency and CTAS 4-5 was considered low urgency.

- Hospital readmissions were measured as readmission for any cause within 30 days and within one year to any acute care hospital in Ontario using the CIHI-DAD. Potentially avoidable hospitalizations included those with a most responsible diagnosis of asthma, CHF, COPD or diabetes.
- Physician office visits with a specialist included those physicians listed as respirologists, cardiologists, endocrinologists, general internists, psychiatrists or other specialists in the ICES Physician Database.

Cancer Screening

Measures of preventive cancer screening were captured using a combination of the CIHI-DAD, the CIHI Same Day Surgery Database, the Ontario Cancer Registry and OHIP as follows:

[Note that only OHIP physician claims and OHIP lab claims were used for inclusion.]

- Pap smear for women aged 23-69 in the previous three years was measured through a validated algorithm that included laboratory and physician claims.¹⁰

- Fecal occult blood testing (FOBT) in the previous two years was measured through laboratory claims for individuals aged 52-74.
- Other investigations (barium enema, sigmoidoscopy) in the previous five years were measured using radiology and physician claims.
- Colonoscopy within the previous ten years among individuals aged 52-74 years was measured using physician claims.

Diabetes Care

Diabetes care measures were captured using the Ontario Diabetes Database, OHIP and CIHI-DAD.

- Performance measures for patients with diabetes included the percentage with at least two HbA1c tests within the previous 12 months, an eye exam with an ophthalmologist or optometrist within the previous 24 months, and at least one cholesterol test within the previous 12 months.
- Additional diabetes measures for those aged 66 and older included filling a prescription drug claim through the Ontario Drug Benefit Program for an angiotensin converting enzyme (ACE) inhibitor, angiotensin renin blocker (ARB) or statin within the previous 12 months.
- Use of financial incentive codes for diabetes care was measured through at least one billing claim of K030 or Q040 within the previous 12 months.

Results

After applying exclusion criteria, the approximate number of Ontarians in each primary care model studied was:

- 2.3 million in EFFS
- 1.2 million in FHTs
- 1.0 million in FHOs that were not FHTs
- 224,000 in FFS
- 60,000 in CHCs
- 39,000 in FHNs that were not FHTs

Demographics and Case Mix

- The mean age of all patients was 51 years. Both mean age and proportion of seniors (age 65 and older) were higher in FHN and FFS models. More than half of the patients in each group were female, with the largest proportion of females in CHCs (60.9%).
- The lowest income was found in CHCs where almost one-third of clients (32.5%) were in the lowest income quintile. FFS and EDFS models had income distributions similar to the overall distribution, while FHTs, FHNs and FHOs had higher income distributions (14.6–17.4% in the lowest income quintile and 21.0–26.0% in the highest income quintile).
- Overall, 72.8% of individuals lived in major urban centres, varying from 79.5% and 84.5% in FFS and EDFS, respectively, to 63.6% in CHC models, 66.5% in FHO models, 56.3% in FHTs and 3.7% in FHNs. Similarly, the variation in rural location was marked, varying from 3.1% in EDFS to 64.5% in FHNs.
- There was a large variation in the proportion of recent registrants (a proxy for recent immigrants), comprising 12.4% of CHC clients, 9.4% of EDFS patients and 8.1% of FFS patients, but only 0.9% in FHNs and 2.9% and 2.7% in FHOs and FHTs, respectively. This gradient largely followed rurality; the highest proportion of recent registrants was found in groups whose patients were mostly major urban.
- The highest level of comorbidity was found in CHCs, where 17.8% of patients had 10+ ADGs. EDFS and FFS had the next highest level of comorbidity (12.6% and 11.0% with 10+ ADGs, respectively) followed by FHTs, FHNs and FHOs (who had 7.6%, 8.2% and 8.4% of patients with 10+ ADGs, respectively). Similarly, the highest expected resource use was found in CHCs, with 27.8% of patients in RUB 4 and RUB 5 categories. This proportion ranged from 18.4–20.7% in the other models of care. In terms of physician payment, the highest levels of morbidity and comorbidity were found in the salary model (CHCs). Lower levels were found in the fee-for-service models (FFS and EDFS), and the lowest levels were found in the blended capitation models (FHOs, FHNs, FHTs).
- The prevalence of chronic conditions could not be applied to CHCs due to lack of cumulative diagnostic information. Among the other groups, variation was relatively small, with a higher prevalence of many chronic conditions in FFS and FHNs, which were also the groups with the oldest populations.

EXHIBIT 1 Demographic and case mix of major primary care models, in Ontario, 2011/12

Patient Characteristics	Primary Care Model						Total	P-value
	Family Health Team	Community Health Centre	Enhanced Fee-For-Service [*]	Fee-For-Service	Family Health Network	Family Health Organization [†]		
No. of Patients	1,162,807	60,428	2,336,528	224,066	39,159	1,027,240	4,850,228	
Age, years								
Mean (SD)	51.2 (17.4)	51.3 (17.1)	49.8 (16.9)	53.7 (16.7)	54.7 (18.0)	51.4 (17.4)	50.7 (17.2)	<0.001
Median (IQR)	51 (38-64)	51 (39-63)	49 (37-62)	53 (42-65)	55 (42-68)	51 (38-64)	50 (38-63)	<0.001
Age Group, n (%)								
21-34 (years)	235,107 (20.2)	11,414 (18.9)	495,100 (21.2)	33,084 (14.8)	6,625 (16.9)	201,487 (19.6)	982,817 (20.3)	<0.001
35-49	310,173 (26.7)	16,838 (27.9)	696,588 (29.8)	58,341 (26.0)	8,164 (20.8)	278,372 (27.1)	1,368,476 (28.2)	
50-64	345,514 (29.7)	18,367 (30.4)	672,729 (28.8)	72,803 (32.5)	12,176 (31.1)	303,930 (29.6)	1,425,519 (29.4)	
65-74	146,127 (12.6)	7,568 (12.5)	257,324 (11.0)	32,152 (14.3)	6,342 (16.2)	129,496 (12.6)	579,009 (11.9)	
75-84	90,611 (7.8)	4,481 (7.4)	156,391 (6.7)	20,624 (9.2)	4,131 (10.5)	80,783 (7.9)	357,021 (7.4)	
85+	35,275 (3.0)	1,760 (2.9)	58,396 (2.5)	7,062 (3.2)	1,721 (4.4)	33,172 (3.2)	137,386 (2.8)	
Female, n (%)	630,889 (54.3)	36,804 (60.9)	1,259,799 (53.9)	113,943 (50.9)	20,543 (52.5)	546,899 (53.2)	2,608,877 (53.8)	<0.001
Income Quintile, n (%)								
1 (lowest income)	202,727 (17.4)	19,627 (32.5)	416,826 (17.8)	48,048 (21.4)	6,633 (16.9)	150,433 (14.6)	844,294 (17.4)	<0.001
2	226,636 (19.5)	12,148 (20.1)	471,927 (20.2)	50,618 (22.6)	7,479 (19.1)	178,897 (17.4)	947,705 (19.5)	
3	230,136 (19.8)	10,752 (17.8)	493,537 (21.1)	45,823 (20.5)	6,955 (17.8)	196,546 (19.1)	983,749 (20.3)	
4	254,632 (21.9)	9,336 (15.4)	509,584 (21.8)	42,542 (19.0)	7,268 (18.6)	231,647 (22.6)	1,055,009 (21.8)	
5 (highest income)	244,258 (21.0)	8,145 (13.5)	437,989 (18.7)	36,153 (16.1)	10,197 (26.0)	265,927 (25.9)	1,002,669 (20.7)	
Rurality Index, n (%)								
Major urban (0-9)	654,845 (56.3)	38,434 (63.6)	1,974,443 (84.5)	178,180 (79.5)	1,432 (3.7)	682,736 (66.5)	3,530,070 (72.8)	<0.001
Non-major urban (10-39)	339,601 (29.2)	13,168 (21.8)	280,477 (12.0)	27,278 (12.2)	11,673 (29.8)	275,779 (26.8)	947,976 (19.5)	
Rural (40+)	155,009 (13.3)	7,976 (13.2)	73,379 (3.1)	17,390 (7.8)	25,271 (64.5)	65,319 (6.4)	344,344 (7.1)	
Recent Registrants,[‡] n (%)	30,908 (2.7)	7,514 (12.4)	220,111 (9.4)	18,255 (8.1)	351 (0.9)	30,213 (2.9)	307,352 (6.3)	<0.001
Adjusted Diagnosis Group,[§] n (%)								
1-4 (lower comorbidity)	564,115 (48.5)	20,673 (34.2)	860,757 (36.8)	95,754 (42.7)	18,228 (46.5)	475,026 (46.2)	2,034,553 (41.9)	<0.001
5-9	431,459 (37.1)	28,970 (47.9)	1,063,803 (45.5)	103,607 (46.2)	15,356 (39.2)	403,299 (39.3)	2,046,494 (42.2)	
10+ (higher comorbidity)	88,235 (7.6)	10,772 (17.8)	294,064 (12.6)	24,570 (11.0)	3,201 (8.2)	86,035 (8.4)	506,877 (10.5)	
Resource Utilization Band,[¶] n (%)								
1 (lowest expected use)	72,725 (6.3)	2,728 (4.5)	99,124 (4.2)	9,753 (4.4)	1,955 (5.0)	61,495 (6.0)	247,780 (5.1)	<0.001
2	211,819 (18.2)	7,659 (12.7)	334,640 (14.3)	34,739 (15.5)	6,289 (16.1)	181,553 (17.7)	776,699 (16.0)	
3	583,052 (50.1)	33,235 (55.0)	1,300,984 (55.7)	133,523 (59.6)	20,453 (52.2)	532,862 (51.9)	2,604,109 (53.7)	
4	155,022 (13.3)	11,729 (19.4)	363,300 (15.5)	33,535 (15.0)	5,484 (14.0)	136,364 (13.3)	705,434 (14.5)	
5 (highest expected use)	61,333 (5.3)	5,070 (8.4)	120,642 (5.2)	12,382 (5.5)	2,606 (6.7)	52,150 (5.1)	254,183 (5.2)	

EXHIBIT 1 Demographic and case mix of major primary care models, in Ontario, 2011/12 (continued)

Patient Characteristics	Primary Care Model						Total	P-value
	Family Health Team	Community Health Centre	Enhanced Fee-For-Service [*]	Fee-For-Service	Family Health Network	Family Health Organization [†]		
Disease Prevalence, n (%)								
Mental illness	229,092 (19.7)	n/a	605,961 (25.9)	60,005 (26.8)	8,655 (22.1)	222,219 (21.6)	1,134,609 (23.4)	<0.001
Acute myocardial infarction	22,699 (2.0)	n/a	35,001 (1.5)	4,483 (2.0)	948 (2.4)	19,506 (1.9)	82,637 (1.7)	<0.001
Asthma	146,246 (12.6)	n/a	333,715 (14.3)	29,278 (13.1)	5,120 (13.1)	131,315 (12.8)	645,674 (13.5)	<0.001
Congestive heart failure	30,956 (2.7)	n/a	53,920 (2.3)	6,454 (2.9)	1,433 (3.7)	28,799 (2.8)	121,562 (2.5)	<0.001
Chronic obstructive pulmonary disease	106,949 (9.2)	n/a	186,732 (8.0)	20,923 (9.3)	5,186 (13.2)	91,632 (8.9)	411,422 (8.6)	<0.001
Diabetes	140,569 (12.1)	n/a	333,311 (14.3)	36,408 (16.2)	5,451 (13.9)	126,785 (12.3)	642,524 (13.4)	<0.001
Hypertension	345,773 (29.7)	n/a	738,388 (31.6)	84,196 (37.6)	14,476 (37.0)	317,327 (30.9)	1,500,160 (31.3)	<0.001

* Includes Family Health Groups and the Comprehensive Care Model.

† Not part of a Family Health Team.

‡ Recent registrants are first-time OHIP registrants older than 10 years of age; a proxy for recent immigrants.

§ Derived from Johns Hopkins Adjusted Clinical Groups (ACGs), ADGs measure the number of different types of comorbid conditions.

¶ Derived from Johns Hopkins Adjusted Clinical Groups (ACGs), RUBs are quintiles of expected resource use.

n/a = data not available

Health Care Utilization

These findings for 2011/12 are unadjusted and should be interpreted in light of each group's demographic and case-mix profile. For example, emergency department (ED) use and inpatient admissions are known to be higher in rural areas and among sicker populations, while specialist visits are known to be lower in rural areas.

- CHCs had the highest rates of ED visits (67.0 per 100 population), more urgent ED visits (42.0 per 100 population), and a relatively low proportion (37%) of less urgent visits relative to the total. FHNs also had a high rate of ED visits overall (65.5 per 100 population), but had the highest proportion of less urgent visits (36.0 per 100 population). FHTs had the next highest rate of ED visits overall (45.8 per 100 population), with the next highest proportion of low urgency visits (20.9 per 100 population). EFFT and FFS models had the lowest ED visit rates overall (33.7 and 35.8 per 100 population, respectively) and the lowest proportion of less urgent visits (11.5 and 14.0 per 100 population, respectively).
- CHCs had the highest rates of inpatient hospital admissions (92.0 per 10,000 population) with especially high admission rates for COPD and diabetes (53.0 and 16.2 per 10,000 population, respectively). The next highest admission rate was found in FHNs, which also had high rates of admission for COPD (34.0 per 10,000 population). FHTs, FFS, FHOs and EFFT had the next highest admission rates overall in that order.
- Hospital readmissions within 30 days and within one year after discharge were similar across all primary care models, with the highest proportions in CHCs and FHNs (7.0% and 6.7%, respectively, within 30 days).
- Specialist visit rates were similar across models with the highest rates in CHCs (2.6 visits per patient) and the lowest in FHNs (1.7 visits per patient).

EXHIBIT 2 Emergency department visits, inpatient hospital admissions, hospital readmissions and specialist visits, by major primary care model, in Ontario, 2011/12

	Primary Care Model						Total	P-value
	Family Health Team	Community Health Centre	Enhanced Fee-For-Service [*]	Fee-For-Service	Family Health Network	Family Health Organization [†]		
No. of patients	1,162,807	60,428	2,336,528	224,066	39,159	1,027,240	4,850,228	
Mean no. of emergency department visits per 100 population^{**}								
More urgent	24.7	42.0	22.2	21.7	29.1	23.7	23.4	<0.001
Less urgent	20.9	24.8	11.5	14.0	36.0	15.3	15.0	<0.001
Total	45.8	67.0	33.7	35.8	65.5	39.1	38.5	<0.001
Less urgent as a proportion of total, %	45.6	37.0	34.0	39.2	54.9	39.1	39.0	
Mean no. of inpatient hospital admissions per 10,000 population								
Congestive heart failure	16.4	18.4	13.8	19.7	21.7	15.7	15.2	<0.001
Chronic obstructive pulmonary disease	24.0	53.0	15.5	21.6	34.0	21.1	19.6	<0.001
Asthma	2.0	4.5	2.1	1.4	3.1	1.4	1.9	<0.001
Diabetes	7.6	16.2	6.1	6.3	6.9	6.6	6.7	<0.001
Conditions combined	50.0	92.0	37.5	49.0	65.6	44.9	43.5	<0.001
Mean no. of hospital readmissions (%)								
Within 30 days	4,017 (5.6)	354 (7.0)	6,246 (5.1)	679 (5.7)	199 (6.7)	3,092 (5.3)	14,587 (5.4)	<0.001
Within one year	12,777 (17.8)	1,085 (21.5)	19,703 (16.2)	2,107 (17.8)	619 (20.9)	9,735 (16.6)	46,026 (16.9)	<0.001
Mean no. of specialist visits per patient								
Cardiology	0.10	0.11	0.11	0.13	0.06	0.09	0.11	<0.001
Endocrinology	0.03	0.07	0.06	0.06	0.01	0.04	0.05	<0.001
General internal medicine	0.08	0.11	0.10	0.10	0.15	0.08	0.09	<0.001
Psychiatry	0.16	0.43	0.20	0.19	0.06	0.19	0.19	<0.001
Respirology	0.04	0.05	0.04	0.05	0.02	0.04	0.04	<0.001
Other specialists	1.52	1.83	1.58	1.66	1.43	1.57	1.57	<0.001
Total specialists	1.92	2.60	2.08	2.19	1.73	2.02	2.04	<0.001

* Includes Family Health Groups and the Comprehensive Care Model.

† Not part of a Family Health Team.

** Emergency department triage according to the Canadian Triage and Acuity Scale (CTAS)

More urgent—CTAS 1–3

Less urgent—CTAS 4, 5

Cancer Screening and Diabetes Care

These findings for 2011/12 are also unadjusted and should be interpreted in light of each model's demographic and case-mix profile. For example, access to retinal screening may be lower in rural areas, and laboratory testing in hospital labs, which is prevalent in rural areas and hospital-based academic FHTs, is not captured in these data.

- The proportion with colorectal cancer screening was 63.9% overall and was similar among all primary care models, apart from FFS where only 50.9% of individuals were screened. Pap smear rates were 71.5% overall with CHCs having the highest proportion (79.4%) and FFS the lowest (62.7%).
- Diabetes care could not be assessed for CHCs due to lack of cumulative diagnostic information for identifying clients with diabetes. Among the other models overall, 69.6% had retinal screening, 46.7% had at least four hemoglobin A1c tests, 70.3% had at least two cholesterol tests, 71.7% of seniors were prescribed a statin and 73.7% of seniors were prescribed an angiotensin converting enzyme (ACE) inhibitor or angiotensin II receptor blocker (ARB).
- Variation across groups was relatively small for diabetes testing (retinal exam, hemoglobin A1c and cholesterol), with FHTs having slightly higher proportions and FFS slightly lower. There was also very little variation in prescribing.
- Diabetes management incentive codes were used most often by FHNs, FHOs and FHTs, less often by EFS and rarely by FFS.

EXHIBIT 3 Cancer screening and diabetes care, by major primary care model, in Ontario, 2011/12

	Primary Care Model						Total	P-value
	Family Health Team	Community Health Centre	Enhanced Fee-For-Service*	Fee-For-Service	Family Health Network	Family Health Organization†		
No. of patients	1,162,807	60,428	2,336,528	224,066	39,159	1,027,240	4,850,228	
Cancer screening, n (%)								
Colorectal cancer‡	276,196 (64.2)	14,434 (63.5)	522,225 (64.5)	47,352 (50.9)	11,342 (68.7)	247,949 (65.3)	1,119,498 (63.9)	<0.001
Cervical cancer§	334,272 (73.4)	21,550 (79.4)	679,078 (70.6)	50,832 (62.7)	9,045 (67.5)	285,276 (72.7)	1,380,053 (71.5)	<0.001
Diabetes care, n (%)								
Retinal exam within two years	92,235 (74.5)	n/a	197,579 (66.5)	21,907 (66.9)	3,566 (76.4)	81,302 (72.6)	396,589 (69.6)	<0.001
Hemoglobin A1c test, at least 4 in 2 years	62,277 (50.3)	n/a	133,008 (44.8)	13,320 (40.7)	2,284 (48.9)	55,388 (49.4)	266,277 (46.7)	<0.001
Cholesterol test, at least 2 in 2 years	82,879 (67.0)	n/a	214,807 (72.3)	22,819 (69.7)	2,870 (61.5)	77,320 (69.0)	400,695 (70.3)	<0.001
Prescribed statin	44,648 (72.7)	n/a	94,018 (71.7)	10,950 (68.0)	1,861 (71.6)	40,019 (71.5)	191,496 (71.7)	<0.001
Prescribed ACE inhibitor or ARB	46,462 (75.7)	n/a	95,639 (72.9)	11,397 (70.8)	1,993 (76.7)	41,329 (73.8)	196,820 (73.7)	<0.001
Billed diabetes management incentive codes, at least 1 in 2 years								
K030	50,720 (41.0)	n/a	63,796 (21.5)	2,940 (9.0)	2,456 (52.6)	51,505 (46.0)	171,417 (30.1)	<0.001
Q040	44,434 (35.9)	n/a	74,816 (25.2)	1,980 (6.0)	1,696 (36.3)	43,723 (39.0)	166,649 (29.2)	<0.001

*Includes Family Health Groups and the Comprehensive Care Model.

†Not part of a Family Health Team.

‡Includes a fecal occult blood test in the previous two years or barium enema or sigmoidoscopy in the previous five years or a colonoscopy in the previous 10 years.

§Includes a Pap smear in the previous three years.

ACE = angiotensin converting enzyme; ARB = angiotensin receptor blocker.

n/a = data not available

Time Trends and Adjusted Models

The graphs in Exhibits 4.1 to 4.13 represent unadjusted annual rates that should be interpreted in light of adjusted findings. Adjusted models used FHTs as the reference group. The sections titled "Findings" present the results of adjusted analyses.

EXHIBIT 4.1 Rate of emergency department visits per 100 patients, by major primary care model, in Ontario, 2004/05 to 2011/12

Findings

After adjustment, ED rates were 6.5 visits per 100 patients higher in CHCs than in FHTs ($p < 0.05$), while rates in FFS were 6.5 per 100 patients lower than FHTs ($p < 0.05$) and FHOs were 2.9 visits per 100 patients lower ($p < 0.05$). EFFS and FHNs were not statistically significantly different from FHTs.

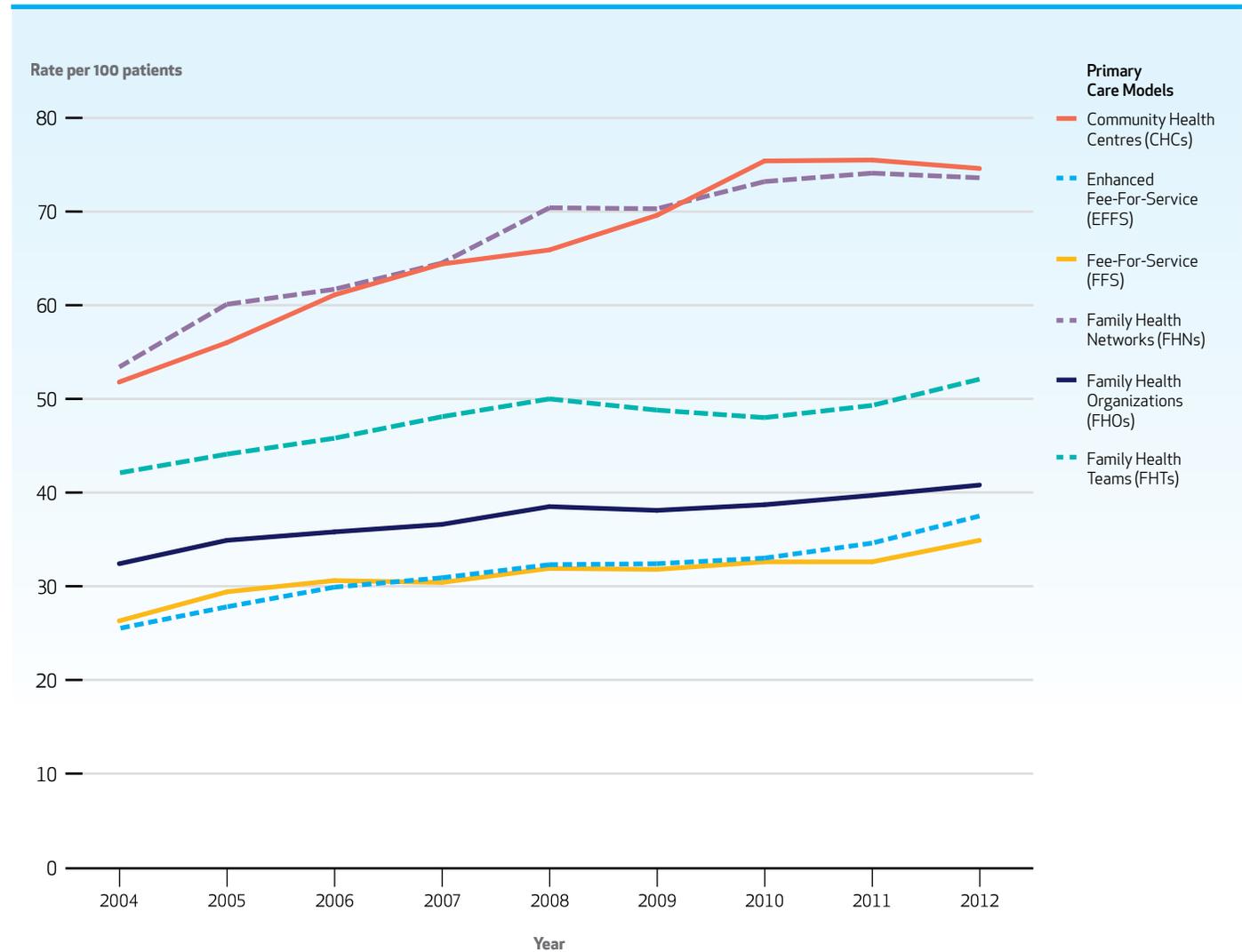


EXHIBIT 4.2 Rate of less urgent emergency department visits per 100 patients, by major primary care model, in Ontario, 2004/05 to 2011/12: Canadian Triage and Acuity Scale Levels 4–5

Finding

There were no statistically significant differences between groups in the adjusted models.

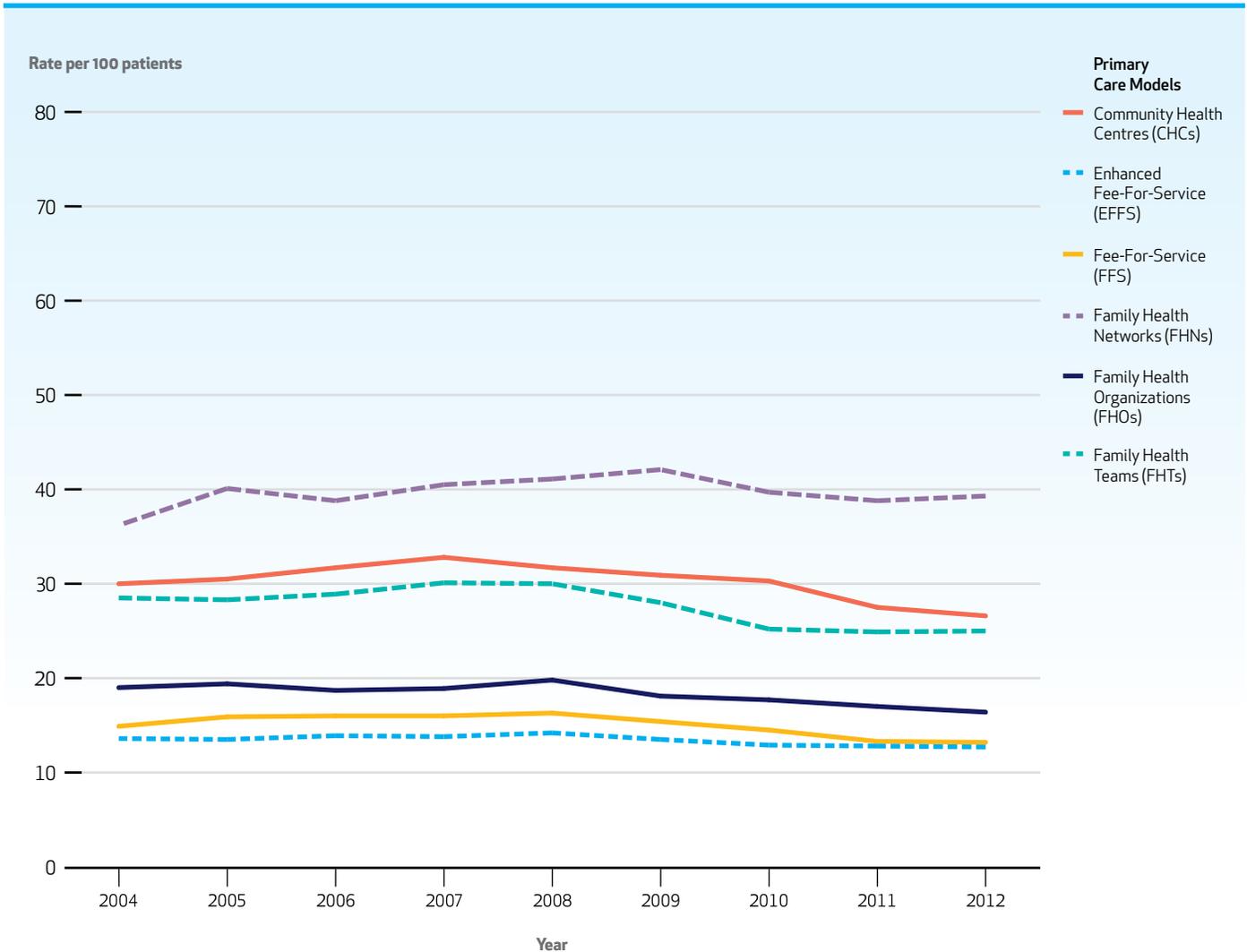


EXHIBIT 4.3 Rate of hospital admissions for chronic conditions per 10,000 patients, by major primary care model, in Ontario, 2004/05 to 2011/12

Findings

Inpatient admissions for asthma, CHF, COPD or diabetes mellitus were 45 admissions per 10,000 patients higher for CHCs than for FHTs ($p < 0.005$) in adjusted models. None of the other groups were statistically significantly different from FHTs.

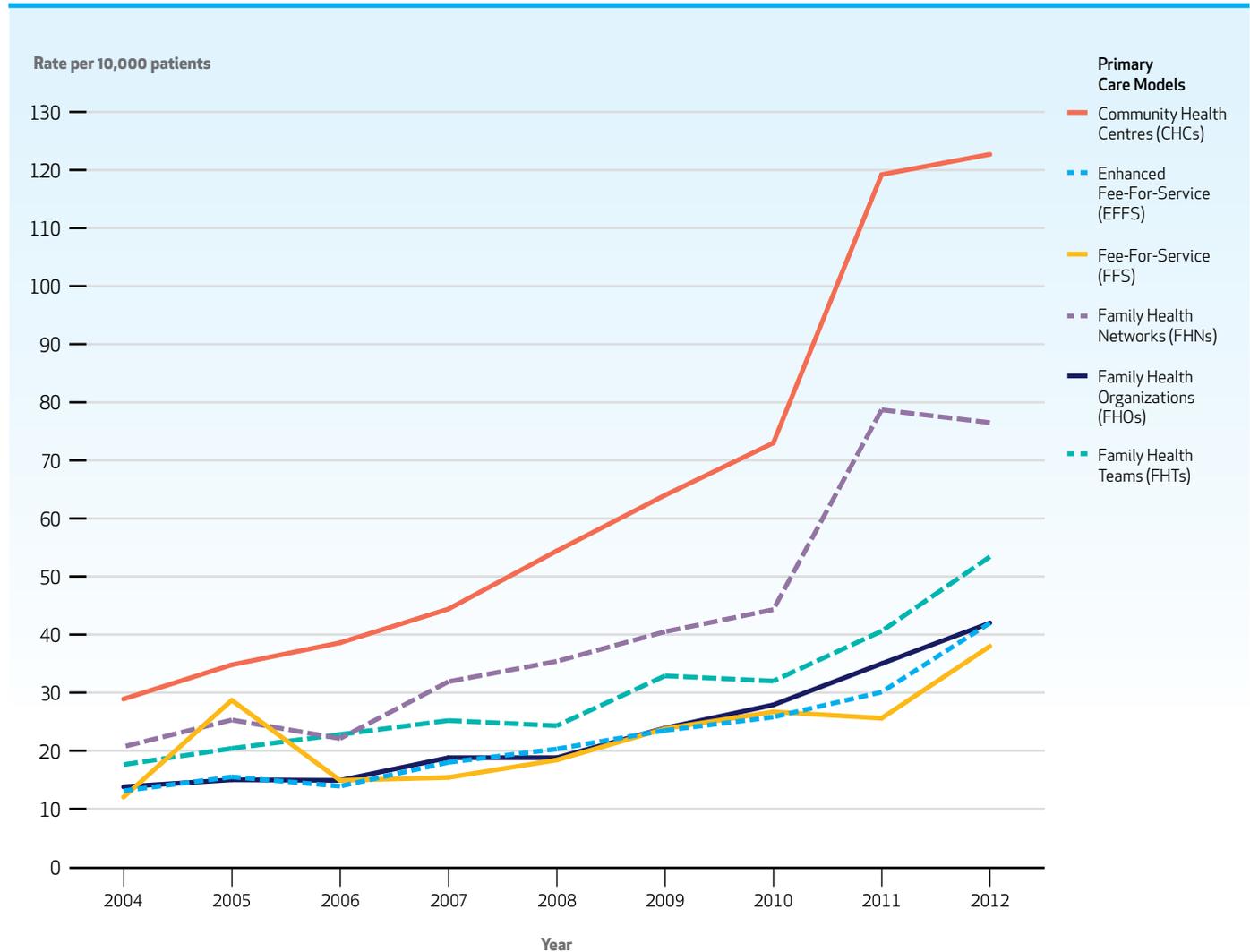


EXHIBIT 4.4 Percentage of hospital readmissions within 30 days, by major primary care model, in Ontario, 2004/05 to 2011/12

Findings

Hospital readmissions within 30 days were 3.1% higher in CHCs than in FHTs ($p < 0.005$) in adjusted models. None of the other groups were statistically different from FHTs.

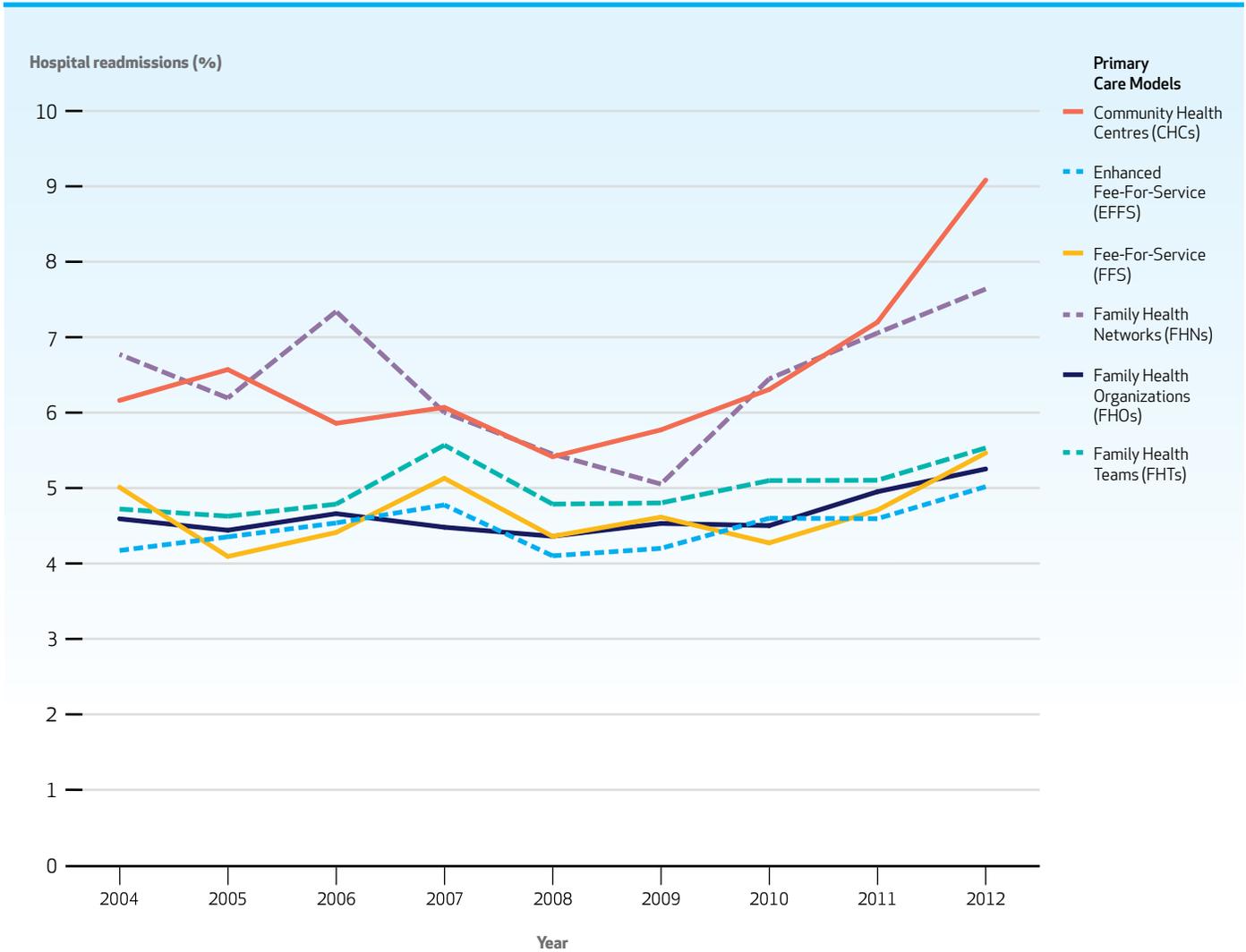


EXHIBIT 4.5 Percentage of hospital readmissions within one year, by major primary care model, in Ontario, 2004/05 to 2011/12

Findings

Hospital readmissions within one year were 4.9% higher in CHCs than FHTs ($p < 0.005$) and 2.5% higher in FFS than FHTs ($p < 0.005$) in adjusted models. None of the other groups were statistically significantly different from FHTs.

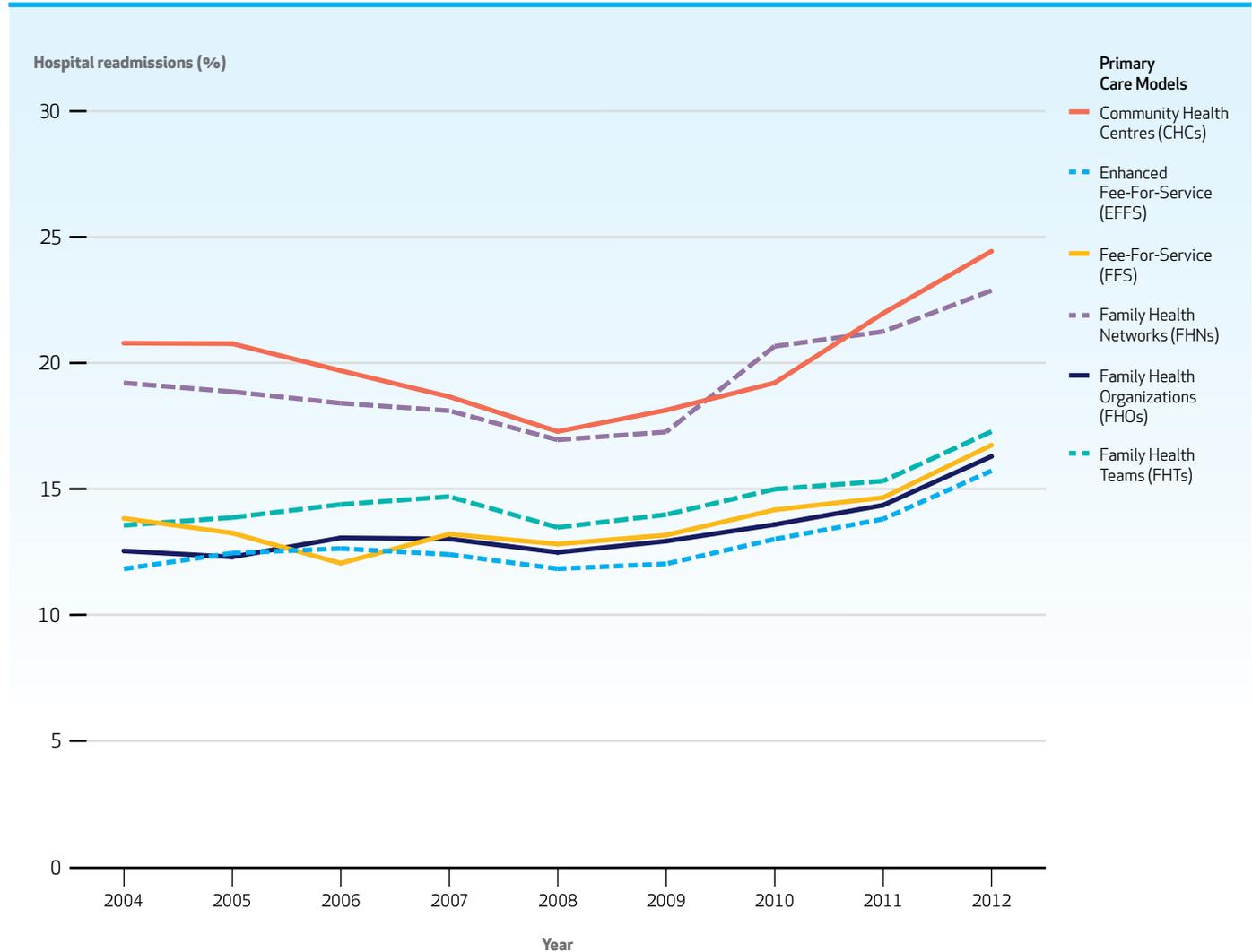


EXHIBIT 4.6 Mean number of specialist visits per patient, by major primary care model, in Ontario, 2004/05 to 2011/12

Findings

Total specialist visits were 0.3 visits per patient higher in CHCs than in FHTs ($p < 0.005$) and 0.1 visits higher in FFS than in FHTs ($p < 0.005$) in adjusted models. None of the other groups were statistically significantly different from FHTs.

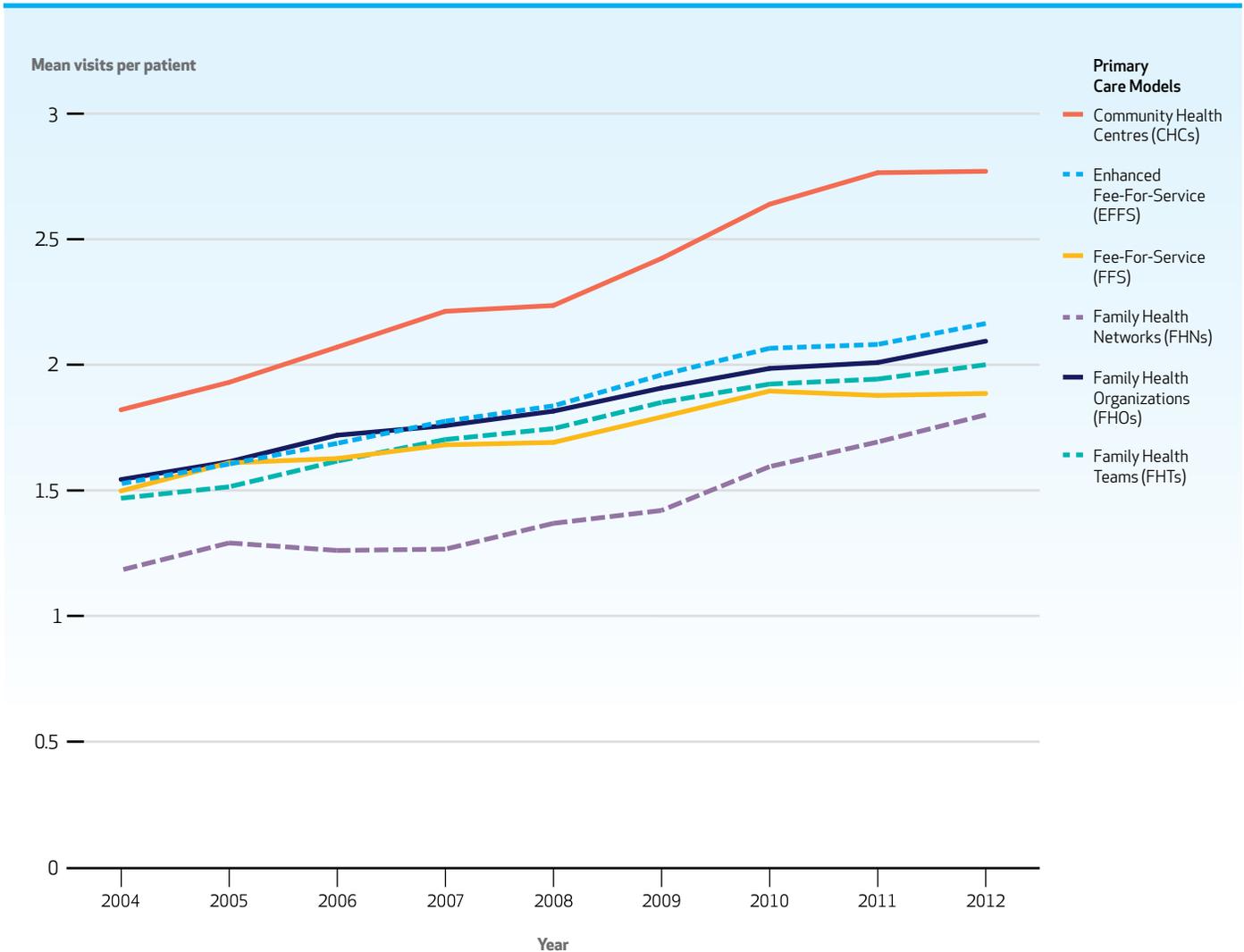


EXHIBIT 4.7 Percentage of patients aged 52 to 74 who had a fecal occult blood test in the previous two years, other investigations in the previous five years, or a colonoscopy in the previous 10 years, by major primary care model, in Ontario, 2004/05 to 2011/12

Findings

Colorectal cancer screening was 6.1% higher in FHNs than in FHTs, ($p < 0.01$) 15.7% lower in FFS ($p < 0.005$) and 2.6% lower in EFFFs ($p < 0.005$) in adjusted models. CHCs and FHOs were not statistically significantly different from FHTs.

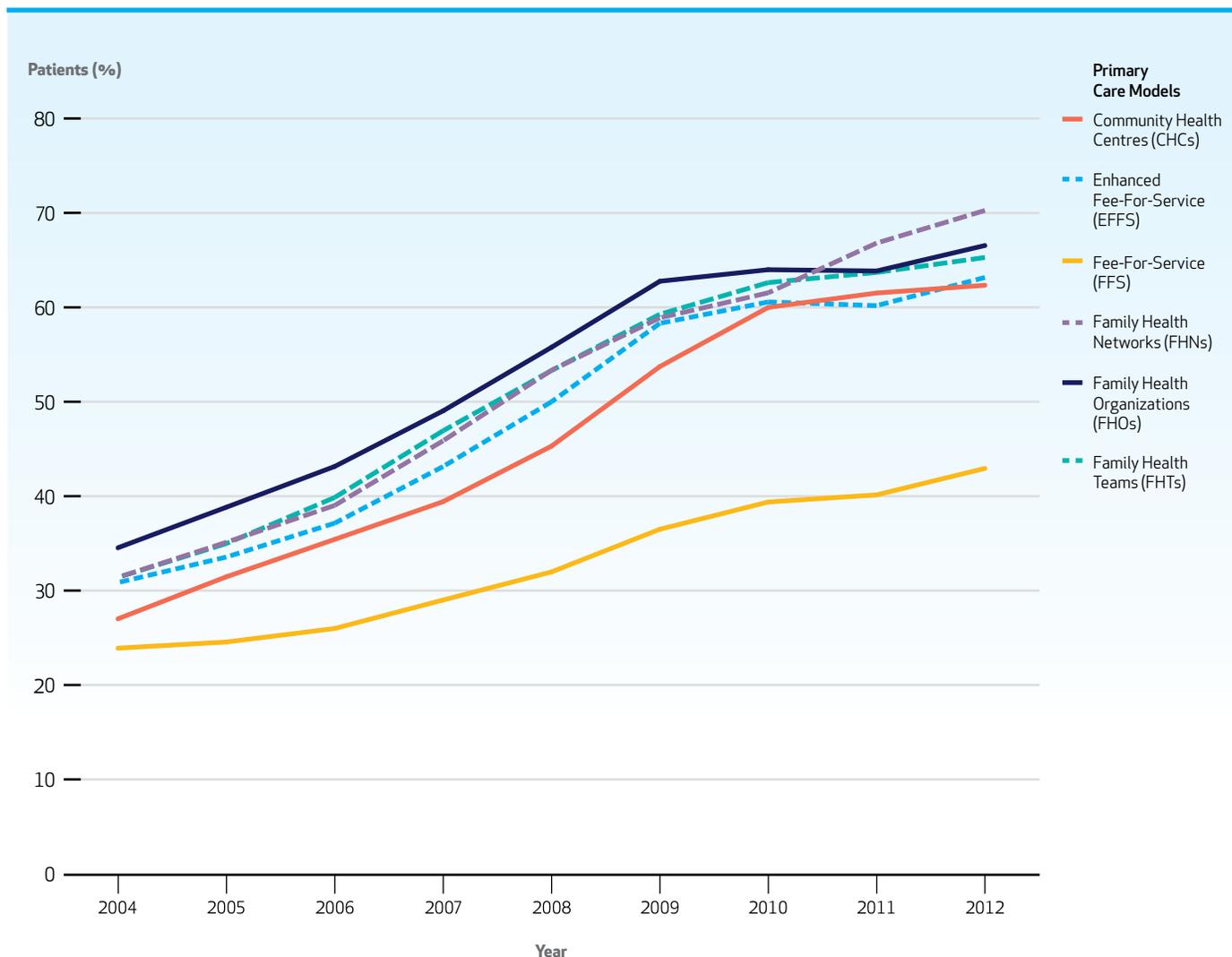


EXHIBIT 4.8 Percentage of female patients aged 23 to 69 who had a Pap smear in the previous three years, by major primary care model, in Ontario, 2004/05 to 2011/12

Findings

The proportion of female patients with a Pap smear in the previous three years was 7.0% higher in CHCs than in FHTs ($p < 0.005$), 10.5% lower in FFS ($p < 0.005$) and 4.0% lower in EDFS ($p < 0.005$) in adjusted models. FHNs and FHOs were not statistically different from FHTs.

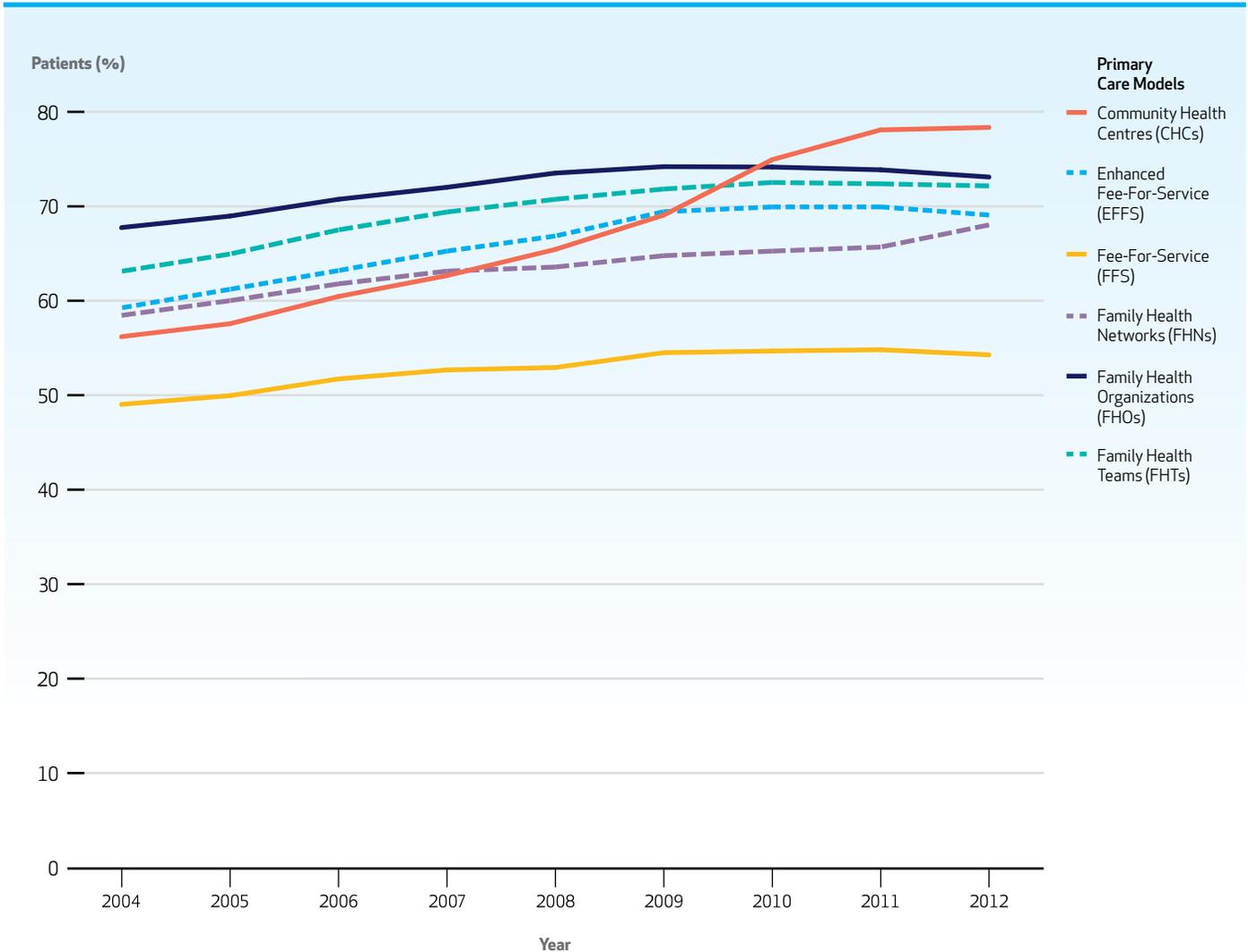


EXHIBIT 4.9 Percentage of patients with diabetes with at least one retinal examination in the previous two years, by major primary care model excluding CHCs, in Ontario, 2004/05 to 2011/12

Findings

Retinal exams among people with diabetes were 8.3% lower in FFS ($p < 0.005$), 5.7% lower in EFFF ($p < 0.005$) and 1.4% lower in FHOs ($p < 0.05$) than in FHTs in adjusted models. There were no statistically significant differences between FHNs and FHTs.

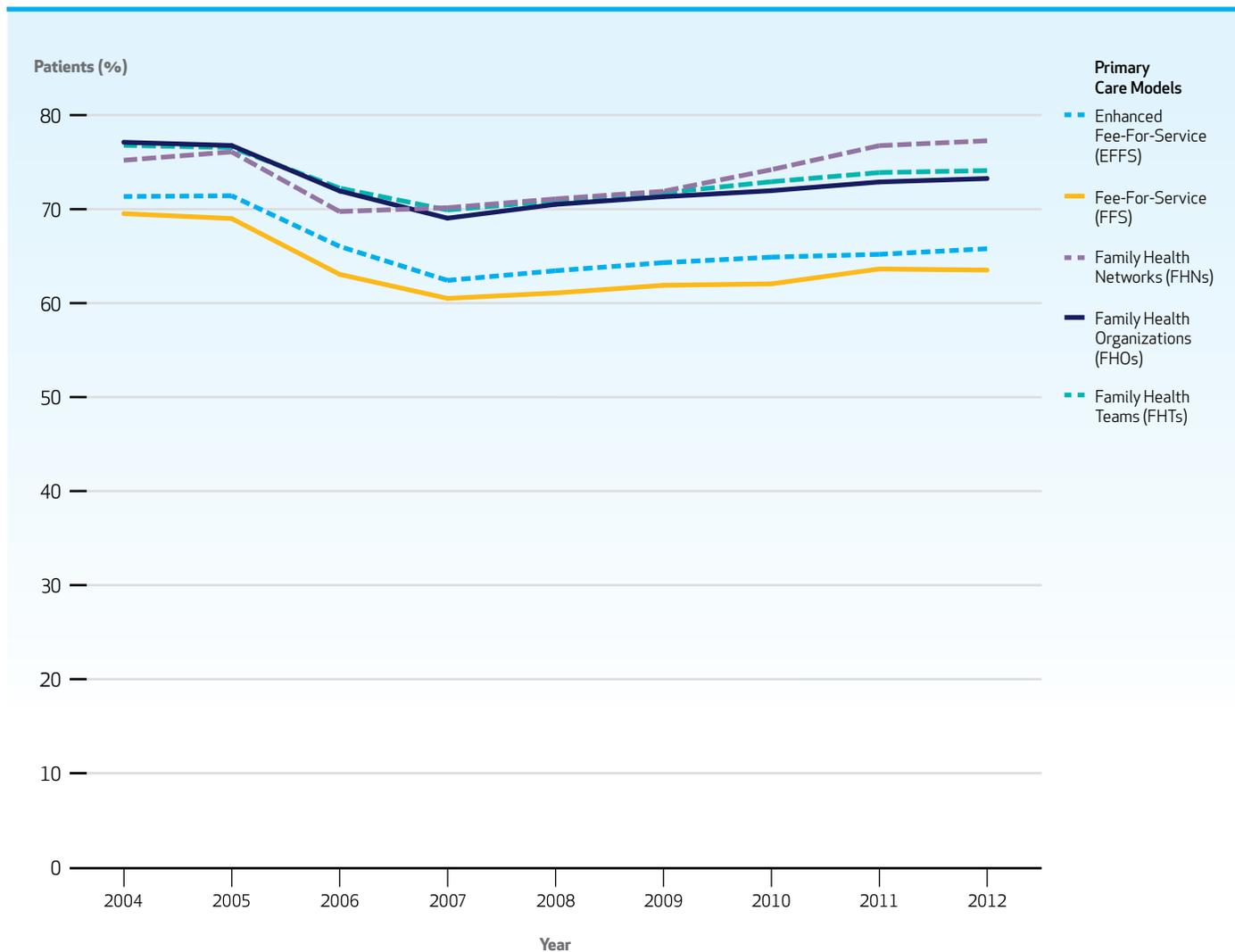


EXHIBIT 4.10 Percentage of patients with diabetes with two or more glycosylated hemoglobin tests in the previous 12 months, by major primary care model excluding CHCs, in Ontario, 2004/05 to 2011/12

Findings

Hemoglobin A1c testing was 6.6% lower in EFFFs ($p < 0.005$) and 10.6% lower in FFS ($p < 0.005$) than in FHTs in adjusted models. FHNs and FHOs were not statistically significantly different from FHTs.

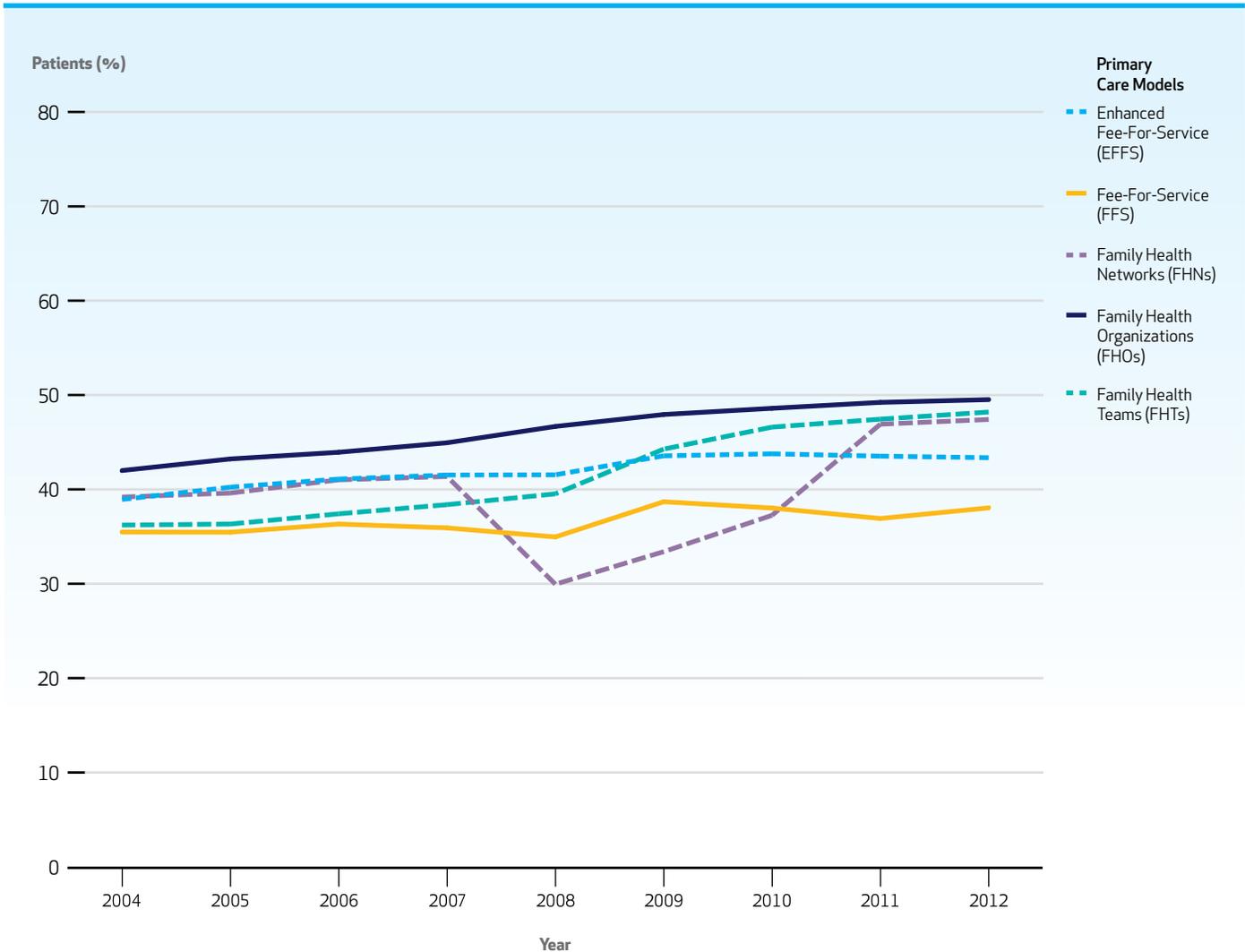


EXHIBIT 4.11 Percentage of patients with diabetes with at least one low-density lipoprotein cholesterol test in the previous 12 months, by major primary care model excluding CHCs, in Ontario, 2004/05 to 2011/12

Finding

There were no statistically significant differences between groups in cholesterol testing.

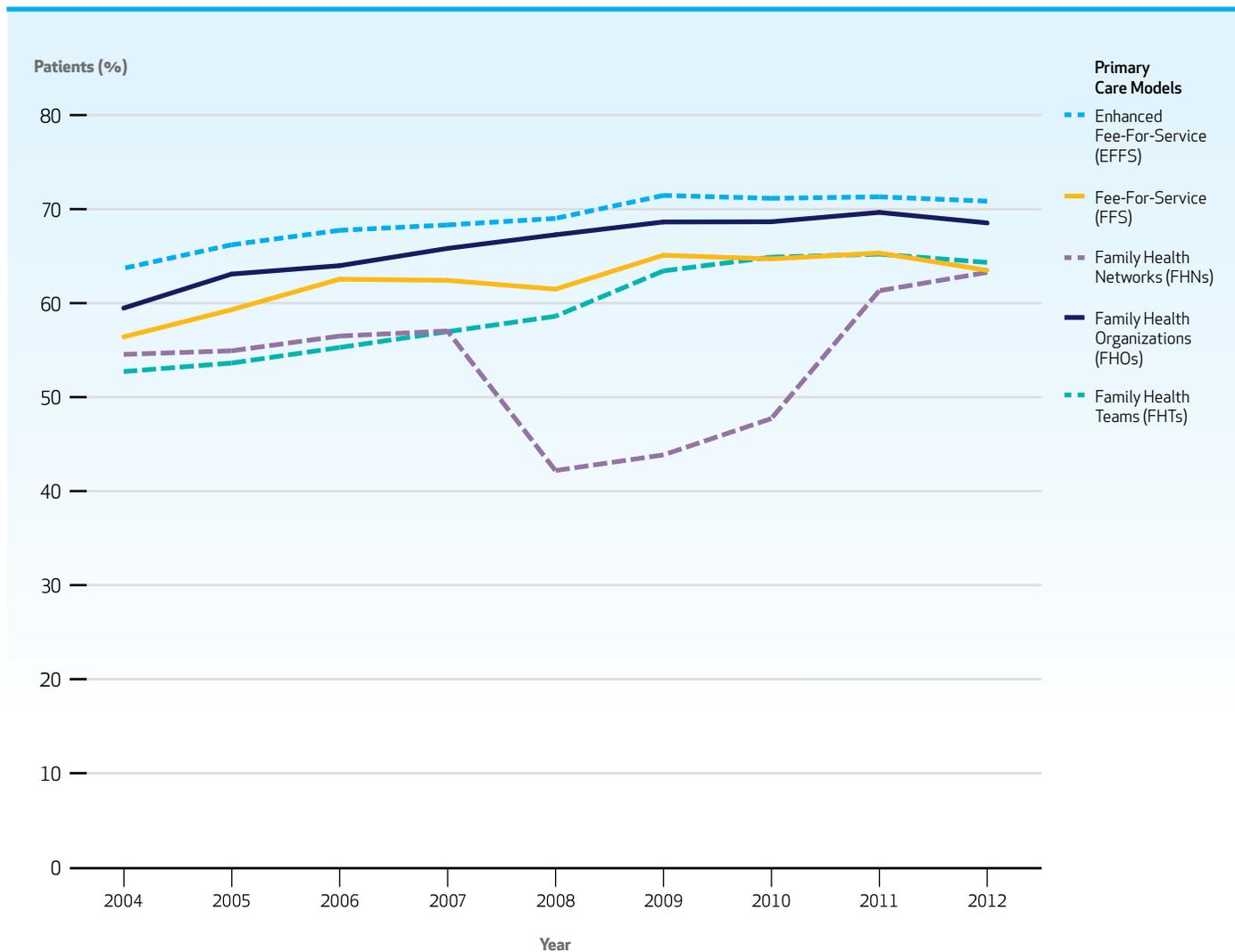


EXHIBIT 4.12 Percentage of patients with diabetes aged 66 and older prescribed a statin in the previous 12 months, by major primary care model excluding CHCs, in Ontario, 2004/05 to 2011/12

Findings

Prescribing of statins was 4.0% lower in FFS ($p < 0.005$), 1.7% lower in EFFE ($p < 0.005$) and 1.6% lower in FHOs ($p < 0.05$) than in FHTs in adjusted models. There was no statistically significant difference between FHNs and FHTs.

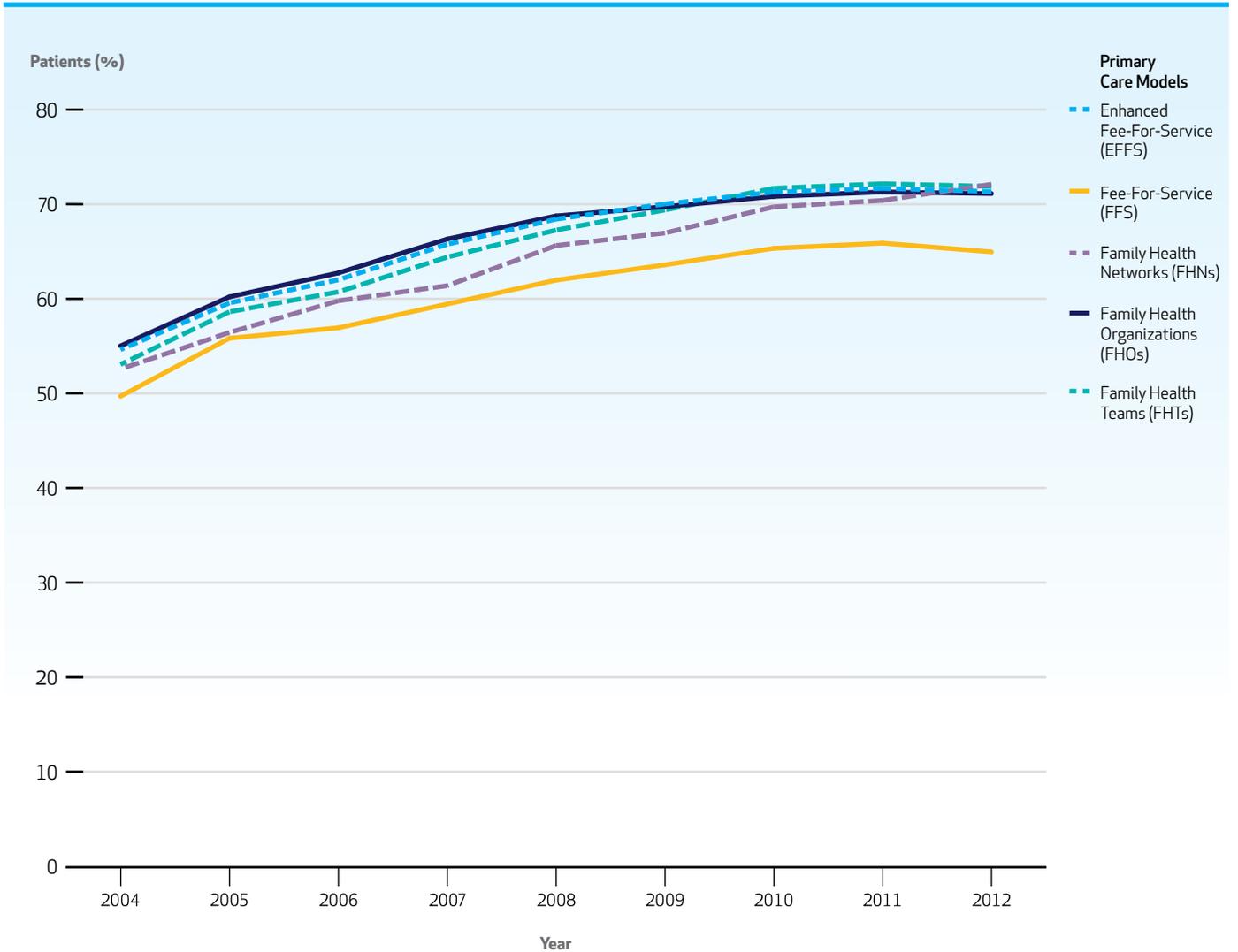
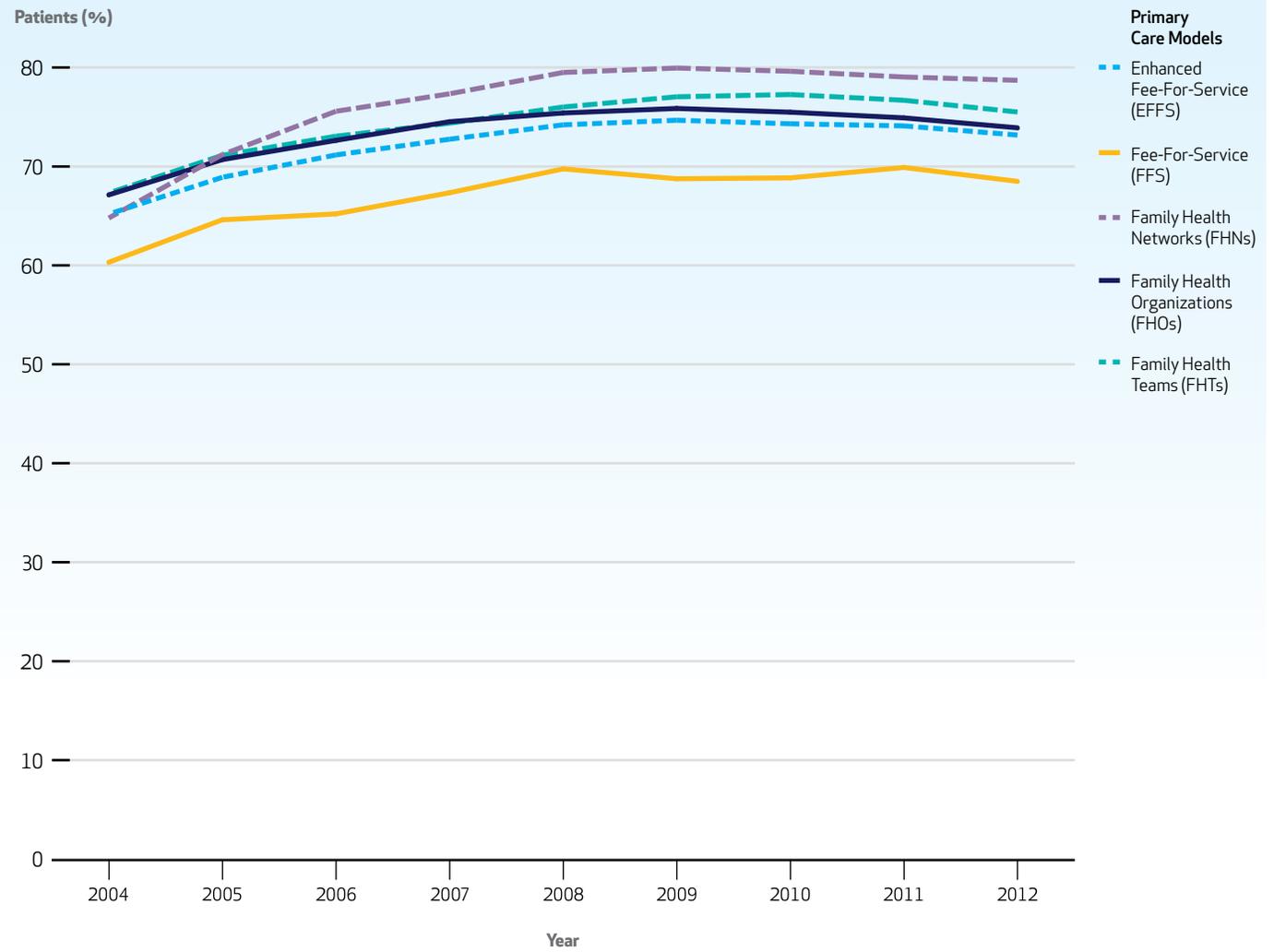


EXHIBIT 4.13 Percentage of patients with diabetes aged 66 and older prescribed angiotensin converting enzyme or angiotensin II receptor blockers in the previous 12 months, by major primary care model excluding CHCs, in Ontario, 2004/05 to 2011/12

Findings

Prescribing of ACE inhibitors or ARBs was 4.4% lower in FFS ($p < 0.005$), 2.2% lower in EFFS ($p < 0.005$) and 1.4% lower in FHOs ($p < 0.05$) than in FHTs in adjusted models. There was no statistically significant difference between FHNs and FHTs.



Discussion

Demographics and case mix were found to vary substantially between models of care. Similar to the current report, previous work found that FHTs had slightly higher area-level income, fewer recent immigrants, were more likely to be located in rural areas and less likely to be in major urban centres, than other primary care models combined.¹¹ Other recent studies relevant to Ontario's primary care models are also available.^{1,12} The current report found that CHCs had a similar distribution of rurality as FHTs, but that they were otherwise distinct from FHTs and other models in demographics and case mix. Compared with other models, CHCs had a higher proportion of clients with low income, a higher proportion of recent registrants (a proxy for recent

immigrants) and higher levels of morbidity and comorbidity. These contexts are important when examining use of health care services and performance.

Overall emergency department (ED) use and low urgency ED visits were slightly higher in FHTs than in all models combined; however inpatient admissions, readmissions and specialist visits were similar in FHTs to those in all models combined. CHCs had high ED rates overall, but with high rates of high urgency visits and a lower proportion of low urgency visits. CHCs also had higher rates of inpatient admission, readmission and specialist visits than other models.

Very few longitudinal analyses are available that compare Ontario's primary care models with each other, so these findings from 2004/05 to 2011/12

may serve to fill a knowledge gap. Trends over time indicate that most health care utilization was increasing over this time period. The only exception was low urgency ED visits which decreased as a proportion of all visits across all models, most likely as a result of coding changes in assigning triage level that were implemented in 2008.^{9,13}

In adjusted longitudinal analyses, FHTs were found to have overall ED visit rates lower than some models (CHCs), higher than other models (FFS and FHOs) and similar to the remaining models (FFS and FHNs). Adjusted analyses found no significant differences between models with respect to low urgency ED visits. Adjusted rates of inpatient admissions and readmissions also found FHTs

to be similar to other models, except CHCs, which had higher rates, and FFS, which had lower rates of readmission within one year. FHTs had lower rates of specialist visits than CHCs in adjusted analyses, but higher rates than FFS and similar rates to the other models. Overall, changes over time in health care utilization in FHTs appear to be similar to those in the other models, with smaller increases than in CHCs.

Measures of performance in primary care models are limited in administrative data and this report was able to examine only cancer screening and diabetes care over time. Previous reports have included breast cancer screening, but unfortunately, recent data on mammography were not available at the time of these analyses. Between 2004/05 to 2011/12, the proportion of people with colorectal cancer screening doubled from 30.9% to 63.9% and those with a Pap smear increased from 60.5% to 71.5%. Increases in both colorectal and cervical cancer screening were greater in FHTs than in FFS and EDFS. FHTs had the largest increases in colorectal screening and CHCs the largest increases in Pap smears.

There were improvements over time in diabetes care, with 46.7% of patients receiving at least four hemoglobin A1c tests in two years, 70.3% taking at least two cholesterol tests, 71.7% prescribed a statin and 73.7% prescribed an ACE inhibitor or ARB. The only exception was retinal exams, which declined from 73.6% to 69.6%. This downward trend has been previously described and is likely an inadvertent consequence of delisting eye exams, even though exams were not delisted for people with diabetes.¹¹ The trends over time were

similar among models, with FHTs and FHTs generally showing the largest improvements, while FFS and EDFS showed the smallest improvements.

These analyses should be interpreted in light of several limitations. Administrative data are collected for reasons other than research and therefore may be inaccurate or incomplete for some measures. For example, not all health cards expire, therefore not all addresses are routinely updated, giving rise to inaccuracies from outdated addresses and the inadvertent inclusion of people who no longer reside in Ontario. The inclusion criteria used in this report were meant to align analyses with the primary data collection conducted by the Conference Board of Canada, but these criteria resulted in a limited selection of providers in each group and smaller populations for most models than at the present time.

Most relevant to the current analyses, providers in CHCs do not bill OHIP so their data may not be comparable to the other models. The encounter data for physicians in CHCs used in this report are expected to be accurate, but diagnostic coding may not be comparable as CHCs can record up to three diagnoses for each visit. As physicians in other models are limited to one diagnosis, we selected a single random diagnosis for each CHC visit, giving rise to possible differences in case mix between models on the basis of coding. Most validated ICES chronic disease cohorts are cumulative and rely on physician billings and hospital admissions starting in 1992. These data were not available for CHCs so the prevalence of chronic conditions and diabetes care could not be reported. Some hospital-based Pap smears and laboratory tests (including hemoglobin

A1c and lipids) are not reported. This would have the largest impact on small rural communities and academic FHTs based at hospitals.

There is a substantial amount of care provided by interprofessional team members in primary care in Ontario, especially at CHCs and FHTs. Encounter level data were available for nurse practitioners in CHCs but not in FHTs at the time of these analyses, so nurse practitioners were not included in these analyses. Encounter level data were not available for other health professionals. Most importantly, there were large demographic and case-mix differences between models. The regression analyses used may not have fully controlled for these factors and residual confounding is an important potential explanation for some of the differences found between models, especially CHCs. There is great heterogeneity between CHCs and recent work has established stratifications based on the priority populations served.¹⁴ These stratified analyses demonstrate that certain priority populations such as “at risk urban” appear to have especially high rates of health care use and will have influenced the overall CHC rates in this report. It may be useful to report all models of care according to similar stratifications in future comparative analyses.

These analyses were performed at the provider level, controlling for clustering of providers within models. Future work may benefit from analyses at the individual patient level, controlling for clustering within practices and trends over time. However, such analyses are time consuming and challenging to perform, given the large samples used in these analyses.

In summary, this report compares FHTs with other primary care models from 2004/05 to 2011/12. It finds substantial demographic and case-mix differences between models. Most forms of health care utilization increased over this time period. There was little consistency between models in these changes over time, with no single model appearing to be superior to another model. FFS tended to lag behind other models in cancer screening and diabetes care, but not in health care utilization. CHCs performed well in cancer screening but had high use of several health care services. This higher use may be due to heterogeneity between CHCs in their priority populations and an inability to fully control for demographic and case-mix differences in CHCs. FHTs and FHNs had the largest improvements in diabetes care. The findings about FHT trends over time should be placed in the context of the work performed by the Conference Board of Canada in its FHT evaluation.

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Appendix

Primary Care Model Descriptions

Community Health Centres (CHC)

CHCs are usually characterized by: community governance; a focus on particular population needs and social determinants of health; an expanded scope of health promotion, outreach and community development services; and salaried interprofessional teams.

Enhanced Fee-For-Service (EFFS) (includes Family Health Groups and Comprehensive Care Model)

Family Health Groups (FHGs), introduced in 2003, involve three or more physicians practicing together—not necessarily in the same office space but in close proximity; patient enrolment is strongly encouraged; care provided through regular office hours and extended hours (weekday evenings and/or weekends) based on number of physicians; utilize fee-for-service plus some incentives and bonuses for services to enrolled patients.

Comprehensive Care Models are designed for solo primary care physicians; patient enrolment is strongly encouraged; care provided through regular office hours plus at least one session of extended hours weekly; utilize fee-for-service plus some incentives and bonuses for services to enrolled patients.

Family Health Networks (FHNs) and Family Health Organizations (FHOs)

Introduced in 2001, Family Health Networks (FHNs) involve three or more physicians working together as a group – not necessarily in the same office space

but in close proximity; physicians commit to enrol patients; care provided through regular office hours and extended hours based on the number of physicians; services are paid through a blended capitation model plus some incentives and bonuses for services to enrolled patients.

Family Health Organizations (FHOs), introduced in 2005, share the same features as FHNs but with a larger basket of services included in capitation.

Family Health Teams (FHTs)

Introduced in 2006, FHTs are interprofessional teams, typically including primary care physicians, nurses, nurse practitioners, social workers, pharmacists, dietitians and sometimes other health professionals. Within the FHT model, primary care physicians are paid through a blended capitation model (FHN or FHO) or blended salary model. Other health professionals are paid through salary.

Fee-For-Service (FFS)

Fee-for-service is a traditional reimbursement method through which physicians bill the provincial government for each service they provide according to a set schedule of fees.



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