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Incident Atrial Fibrillation in the Emergency Department: A Population-based Assessment of Follow-up Care

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Running Head: Follow-up Care for Incident Atrial Fibrillation

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ABSTRACT

Background: For patients discharged from hospital, continuity of care is often poor. The emergency department (ED) has substantially less resources to facilitate follow-up care arrangements following discharge from an ED. In patients discharged from an Ontario ED with a new diagnosis of atrial fibrillation, we assessed the timeliness of follow-up care and the physician-level factors associated with care delays.

Methods: We conducted a retrospective cohort study of all patients discharged from the 157 non-pediatric EDs in Ontario, Canada, who received a new diagnosis of atrial fibrillation between April 2006 and March 2011. We determined the frequency of follow-up care with either a family physician, cardiologist, or internist within 7 (“timely”) and 30 days of the ED visit. Using logistic regression modeling, we assessed the association of emergency and family physician characteristics, including primary care model type, with obtaining “timely” follow-up care.

Results: Among 14,907 ED visits, half (50.1%) had “timely” follow-up care. By 30 days 18% still had not obtained follow-up care. Among emergency and family physician factors, lack of a family physician had the largest independent association with acquiring “timely” follow-up care (OR 0.59; 95% CI, 0.48-0.72), while emergency physician factors were not associated. Compared to patients whose family physician belonged to a primarily fee-for-service model, patients whose family doctor worked in a capitation-based Family Health Network, as part of a Family Health Team, were less likely to receive “timely” follow-up care (OR 0.73; 95% CI, 0.62-0.86), as were those whose family doctor belonged to the same model type without a Family Health Team (OR 0.77; 95% CI, 0.60-0.97). Results were similar for patients whose family doctor belonged to a capitation-based Family Health Organization, with a Family Health

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3 Team (OR 0.84; 95% CI, 0.76-0.93) or without (OR 0.86; 95% CI, 0.79-0.94). There was no
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5 difference between patients whose family doctor was remunerated through traditional fee-for-
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7 service payments and those in primarily fee-for-service primary care models.
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10 **Interpretation:** Only half of patients who were discharged from an emergency room in
11
12 Ontario with a new diagnosis of atrial fibrillation were seen within seven days of discharge. The
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14 most influential factor was having a family physician; patients whose family physician was
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16 remunerated via primarily fee-for-service methods were more likely to be seen within 7 days
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18 than those who were reimbursed via capitation.
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Introduction

Atrial fibrillation is a common cardiovascular disease, and its prevalence is projected to increase by 250% by the year 2050.^{1,2} While common, it is not always benign: it is estimated more than 15% of strokes are due to atrial fibrillation,^{3,4} and strokes caused by atrial fibrillation have a one-year mortality rate of 50%.⁵ The prognosis of some diseases markedly worsens in the setting of atrial fibrillation,⁶⁻⁸ and atrial fibrillation itself is associated with an independent increase in mortality among both sexes.⁹

Atrial fibrillation is seen frequently in the emergency department (ED).¹⁰ Canadian guidelines recommend that most of these patients be discharged from the ED to their place of residence, with follow-up care arranged.¹¹ Timely follow-up care is required to either initiate or continue (if the emergency physician offered a prescription) an oral anticoagulant medication such as warfarin, in order to prevent strokes,¹¹⁻¹³ and rate-control medication may be initiated or increased, in order to prevent tachycardiomyopathy,¹¹⁻¹³ as well as to improve patient quality of life.¹⁴ Therefore timely follow-up care is important, and in the setting of a new diagnosis this includes cardiologist consultation.^{11,15}

Beginning in the early 2000s, several new primary care models were introduced in Ontario, Canada; prior to the introduction of these models the large majority of family physicians were reimbursed for their services, either as an individual or in a group practice, via fee-for-service billing claims. The newer models range from mostly capitation-based reimbursement (Family Health Network [FHN] or Organization [FHO], the latter offering a slightly larger basket of services to patients) to mostly fee-for-service (Family Health Group [FHG] if three or more

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3 physicians, or Comprehensive Care Model [CCM] if less). All of the new models require the
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5 physicians to formally enroll patients, and availability of after-hours care (Box 1). The Family
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7 Health *Team* [FHT] is not a reimbursement model, but rather a model that is meant to facilitate
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9 the development of a patient-centered medical home, with funding for an interdisciplinary team,
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11 an executive director, and electronic medical records; it is not available to physicians in the
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13 primarily fee-for-service reimbursement models (FHG or CCM) (Figure 1).¹⁶ While these
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15 models were introduced to improve access to care, among other reasons, very few studies have
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17 rigorously evaluated outcomes like access to care for specific patient groups.^{17,18} In this study we
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19 examined whether follow-up care following an emergency visit for a new diagnosis of atrial
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21 fibrillation was associated with emergency physician and/or family physician characteristics,
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23 including the family physician's type of primary care model.
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32 Methods

33 Study Design

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35 This retrospective cohort study received ethics approval from Sunnybrook Health Sciences
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37 Centre.
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43 Data Sources

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45 Data sources included multiple administrative databases that contain information on all
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47 medically-necessary visits and billings in the province of Ontario. Ontario is Canada's largest
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49 province, with an ethnically diverse population of 13 million.¹⁹ It provides universal health-care
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51 coverage, thus the databases include the vast majority of health transactions in the province.
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3 The study cohort was identified using the Canadian Institutes of Health Information National
4 Ambulatory Care Reporting System (CIHI-NACRS), which contains anonymised, abstracted
5 data on all ED patient visits in Ontario. Up to 10 ED diagnoses are collected per patient, using
6 the *International Classification of Diseases, Version 10* (ICD 10) codes. We have previously
7 validated the code for atrial fibrillation (I480) in CIHI-NACRS, which has high positive
8 predictive value (93.0%) and sensitivity (96.6%).¹⁰ ED visit data were linked via the scrambled,
9 unique Ontario Health Card number to multiple anonymised administrative datasets: the
10 Discharge Abstract Database, which contains all hospitalizations, the Registered Persons
11 Database, which contains accurate mortality data (including out of hospital deaths),²⁰ the Ontario
12 Health Insurance Plan, which contains all billings in Ontario paid for by universal health care (by
13 all physician types, in any setting, including Long-Term Care facilities). Physician specialty was
14 determined using a derived physician database: the ICES Physician Database comprises
15 information from the Ontario Health Insurance Plan Corporate Provider Database and database
16 of physician billings, as well as the Ontario Physician Human Resource Data Centre database.
17 Where ED visits in CIHI-NACRS could not be linked to an emergency physician billing code,
18 missing data on managing physician characteristics was imputed using multiple imputation.
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We determined the family physician with whom the patient was enrolled using the client agency program enrolment tables, and the physician's primary care model type using the corporate provider database. If the patient was not enrolled with a family physician during the year of the ED visit (the minority of patients), we used a virtual rostering method, whereby the patient was attributed to the primary care physician with whom they had the majority of their primary care services in the two years prior to the ED visit. If the patient was not enrolled with a family

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3 physician, nor could be assigned via virtual rostering, *and* there was less than two visits with any
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5 one family physician in the two years prior to the ED visit, the patient was assigned to the “no
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7 family physician” group. As a sensitivity analysis, we also examined the results if all patients
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9 were simply assigned via the virtual rostering method. Of note, this method tends to assign
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11 healthy patients to the “no family physician” group because they have not seen a family
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13 physician in several years, when in fact they may be enrolled with a family physician.
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20 **Study Population**

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22 We identified patients ages 18 to 105 with a primary ED diagnosis of atrial fibrillation (I480) and
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24 a valid Ontario Health Card number who were seen in an Ontario ED between April 1, 2006 and
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26 March 31, 2010; the primary ED diagnosis is the first diagnosis written on the ED chart (by the
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28 emergency physician), irrespective of whether the patient is admitted to hospital or discharged
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30 from the ED. Only the first, or index, visit during the study period was retained. Patients who
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32 died in the ED were excluded, as were patients who were admitted to hospital. Sites in the
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34 province that were not open 24 hours a day (which typically see lower acuity patients) were
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36 excluded, as were specialty EDs (i.e. solely pediatric, cancer, or mental health). We excluded
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38 patients who were given a low acuity ED triage score (Canadian Triage and Acuity Scale score
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40 of 4 or 5),²¹ and patients with a history of atrial fibrillation or flutter, defined as an ED visit,
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42 hospitalization, or outpatient visit that contained an ICD code for atrial fibrillation or flutter in
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44 the five years previous to the ED visit.
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52 Patients were followed for up to 30 days after ED discharge for a billing from a family physician,
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54 a cardiologist, or an internist. Patient comorbidities were determined using validated algorithms
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3 where available,²²⁻²⁶ or using either one hospitalization code or two outpatient visits with that
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5 comorbidity in the five years prior to the ED visit. Patients were divided into income categories
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7 based on the median household income in their neighbourhood using Statistics Canada Census
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9 data: postal codes were used to form quintiles based on average income in the dissemination
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11 area.²⁷ Rural residence was based on statistics Canada definitions of less than 10,000 residents,
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13 and immigration status was determined via linkage to the Ontario portion of the Citizenship and
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15 Immigration Canada data.
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22 **Outcome Measures**

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24 The primary outcome measure was the proportion of discharged emergency patients with a new
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26 diagnosis of atrial fibrillation who received outpatient follow-up care with either a family
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28 physician, cardiologist, *or* internist within seven days of discharge. Since current atrial
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30 fibrillation guidelines do not specifically comment on the time period within which a patient with
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32 incident atrial fibrillation should receive follow-up care,¹¹⁻¹³ we defined “timely” follow-up as
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34 within seven days, based on other cardiovascular disease recommendations (heart failure and
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36 severe hypertension).^{28,29} Secondary outcome measures included the proportion of patients with
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38 “rapid” follow-up (within 3 days), with “delayed” follow-up (within 30 days), and the adjusted
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40 association of emergency physician and family physician characteristics, including primary care
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42 model type (Box 1), with obtaining “timely” follow-up care.
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51 **Primary Data Analyses**

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53 The proportion of patients with a follow-up visit to a family doctor, cardiologist, or internist
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55 within three, seven, and 30 days was reported using descriptive statistics. Because deaths were
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3 infrequent in the cohort, we used logistic regression modeling to regress patient- and provider-
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5 level factors on receipt of “timely” follow-up care. Robust variance estimates were utilized to
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7 account for the clustering of patients within EDs. As a sensitivity analysis, we performed the
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9 same analysis using Cox Proportional Hazards modeling, with patient death and hospitalization
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11 treated as censoring events.
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17 To evaluate whether an association between primary care model type and receipt of follow-up
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19 care might change over time, a Cox Proportional Hazards model with the same variables was
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21 regressed on follow-up care within 30 days, and an interaction term was introduced. A
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23 significant interaction between primary care model type and time (in days) in the model indicates
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25 that the hazard of receiving follow-up care, for patients with a family physician in that primary
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27 care model type, changes over the 30 day period. From the interaction variable we calculated the
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29 hazard of obtaining follow-up care on days 14 and 30 by primary care model type, in patients
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31 who had not yet obtained follow-up care (e.g. they had not yet had an event), using the following
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33 equation: $e^{(HR_1 + (\# \text{ days } (HR_2)))}$, where HR_1 is the hazard ratio associated with that primary care
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35 model type, and HR_2 is the hazard ratio associated with the interaction term for that primary care
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37 model type.
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46 As a second sensitivity analysis we repeated the model of obtaining “timely” care using
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48 assignment of patients to the virtual rostering method, instead of using the Client Agency
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50 Program Enrolment Tables. All analyses were performed with SAS software (Version 9.2, SAS
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52 Institute Inc., Cary, NC).
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Findings

There were 14,907 qualifying index ED visits made at 157 EDs that resulted in discharge from the ED (Table 1). Mean age was 65.2 (s.d. 15.9), 53.3% were male, and 94.9% had a family doctor. Half (50.1%) had care with either a family physician, a cardiologist, or an internist by seven days after discharge (Table 2). A quarter (27.4%) acquired follow-up care within three days, and 82.0% saw a family physician, a cardiologist, or an internist within 30 days. The majority of the care was provided by the family physician. Less than 1% of patients died within 30 days.

In the logistic regression model of all 14,907 patients, the factor with the strongest association with achieving timely follow-up care was not having a family physician (OR 0.59; 95% CI, 0.48-0.72). In the model of the 14,146 patients with a family physician (Online Appendix A), those with a family physician in the capitation-based models (FHO or FHN) had a significantly decreased odds of obtaining follow-up care within seven days, regardless of whether they functioned as part of a family health team, compared to patients whose family physician was in one of the fee-for-service models (FHG or CCM) (Figure 2). There was no difference in the odds of being seen within seven days for patients whose family doctor was remunerated via traditional fee-for-service billings, compared to those with a family doctor who was reimbursed via a the primarily fee-for-service models (FHG or CCM). The only emergency physician characteristic that was independently associated with obtaining timely follow-up care was if the emergency physician had alternative specialty training (e.g. neurology, anesthesiology), compared to family medicine training. In the sensitivity analyses, results were similar using a Cox Proportional Hazards model (Online Figure 3), and where patients were assigned to the family physician

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3 using a virtual rostering method.
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8 The interaction between time and primary care model type was significant for all model types
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10 except for patients whose physician was reimbursed through traditional fee-for-service, and the
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12 capitation-based model FHO (with a Family Health Team). Using the interaction variable
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14 parameter estimates, we calculated that at 14 days (among patients who were not seen by 14 days
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16 after the ED visit), the differences between the capitation-based groups and the primarily fee-for-
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18 service models were attenuated: the hazard of being seen on day 14 was 0.91, 0.85, and 0.91 for
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20 the capitation-based models Family Health Network with a Family Health Team, without a
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22 Family Health Team, and Family Health Organization without a Team, respectively, compared
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24 to patients whose family physician was reimbursed via the primarily fee-for-service models. By
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26 30 days (again among *only* patients who had not already obtained any follow-up care by 30
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28 days), the hazard of being seen on day 30 was higher in most of the capitation-based model
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30 groups, compared to primarily fee-for-service model patients: 1.20, 1.11, and 1.02, for Family
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32 Health Network with a Family Health Team, without a Family Health Team, and Family Health
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34 Organization without a Team, respectively.
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44 Interpretation

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46 In this population-based study we found that only half of patients obtained follow-up care within
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48 a week of an emergency visit that resulted in a new diagnosis of atrial fibrillation. The proportion
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50 increased to 82% by 30 days, leaving 18% of patients without ongoing care for their disease. Not
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52 surprisingly, after adjustment for a myriad of patient- and provider-level characteristics, the
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54 single largest factor in obtaining follow-up care was whether one had a family physician.
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3 Fortunately only 5% of patients did not have a family physician; this suggests that policy-makers
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5 in Ontario might shift their emphasis from matching patients with a family physician, to
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7 improving timely access to them. Interestingly, most emergency physician characteristics,
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9 including physician age, sex, and the type of hospital they work in (as tertiary care centres might
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11 be expected to have better access to follow-up care options), were not associated with receipt of
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13 timely follow-up care for these patients.
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20 We found that patients whose family physician belonged to a capitation-based primary care
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22 model were 14-27% less likely to be seen by a family physician or specialist within a week of
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24 ED discharge, compared to patients whose family doctor was reimbursed via primarily fee-for-
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26 service models. Patients whose family physician was reimbursed through traditional fee-for-
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28 service billings had similar access as the blended fee-for-service model patients, lending support
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30 to the findings that patients whose family physician is reimbursed via fee-for-service methods
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32 are more likely to be seen within seven days than patients whose family physician is reimbursed
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34 primarily by capitation. It may be that the patient-by-patient billing in the fee-for-service models
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36 provides the physician with more incentive to fit the emergency patient into a tight schedule. Or
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38 it may be that capitation-based groups have such a high number of rostered patients that they
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40 cannot see unplanned patients within a week. Future studies are needed to examine the reasons
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42 behind the difference, including scheduling practices.³⁰
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50 Whether this difference in access to follow-up care impacts patient outcomes is unknown. The
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52 patient who has not received follow-up care is likely to have gone unprotected from a stroke, but
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54 the risk is relatively low in only a week.^{31,32} The risk of tachycardia-induced cardiomyopathy
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3 varies depending on the duration of tachycardia. The symptoms of atrial fibrillation, which
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5 include palpitations and fatigue, among others, may result in multiple ED visits if they are not
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7 managed. If the patient still had not seen a family physician, a cardiologist, or an internist by 30
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9 days, the impact of the family physician's primary care model type on receiving care was
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11 removed; however, given that emergency physicians want their patients with hypertension seen
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13 within seven days,²⁸ it is unlikely that they would recommend 30 days for follow-up in patients
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15 with a new diagnosis of atrial fibrillation. Studies on the short- and long-term outcomes related
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17 to timing of follow-up care are needed to validate the optimal time for follow-up care.
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24 If emergency physicians cannot be sure of timely follow-up, the usual alternative to discharging
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26 the patient is immediate hospital admission. Hospitalized patients receive daily evaluations by a
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28 physician and assessment of their vital signs several times a day by a nurse, their anti-
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30 coagulation is managed, and they usually receive diagnostic tests and medications; this is in
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32 contrast to the patient who is discharged home from the ED, who may worsen, unchecked, over
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34 many days. However hospitalizations constitute over 80% of the cost of managing atrial
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36 fibrillation,³³ and in the face of a predicted 250% increase in the prevalence of atrial fibrillation
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38 by the year 2050,^{1,2} hospitalizing all of these patients is not a viable option for the current health
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40 care system. Improving outpatient follow-up could diminish the need for immediate
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42 hospitalization; currently 38% of Ontario ED patients with atrial fibrillation are admitted to
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44 hospital,¹⁰ and more than 60% of ED visits result in a hospital stay in the U.S.³⁴ A far more cost-
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46 effective solution would be a systematic process to ensure timely outpatient follow-up care.
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51 Currently patients themselves operate as the conduit between the ED and follow-up care; while
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53 feasible and probably safe for younger patients, contacting the physician's office and relaying
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3 both the diagnosis and the importance of prompt follow-up care is likely far more challenging for
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6 older persons, particularly the frail elderly (the very patients who are at highest risk of a poor
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8 outcome without follow-up care).
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12 Our study has several limitations that warrant mention. Our study period began in 2007, when
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14 some emergency physicians in the province were transitioning between salaried funding and
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16 partial fee-for-service billings: during the transition period some billings were not registered.
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18 Therefore some ED visits could not be linked to a billing in the Ontario Health Insurance Plan;
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20 we used multiple imputation to impute the missing data. While the CAPE tables are updated
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22 annually, the size of them (3 million Ontarians) results in some delay in capturing patients who
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24 change doctors. To assess the impact of this we performed a sensitivity analysis assigning
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26 patients to the doctor whom they saw the most frequently, and the results did not change
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28 substantially. Bias is possible due to potential under-billing in capitation-based practices. For
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30 example, nurses may provide post-ED care for practices that are a part of Family Health Teams;
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32 however, since the findings were the same for capitation-based practices that were *not* part of a
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34 Family Health Team, this is unlikely to account for the differences observed. Capitated providers
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36 are incentivized to conduct follow up via phone and/or email, which would not result in a billing
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38 in the Ontario Health Insurance Plan; however an assessment of a new diagnosis of atrial
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40 fibrillation, a cardiovascular disease that can result in a tachycardiomyopathy, should include a
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42 physician examination for signs of heart failure, which would not be possible via these
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44 communication methods.^{12,13,35} Capitated providers may occasionally forget to submit billing
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46 data to the Ontario Health Insurance Plan since it has less impact on earnings. The extent of this
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48 is uncertain but taken with other reports of lesser access and high ED use in the capitation-based
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3 models,¹⁷ it is unlikely that these issues would be sizeable enough to overcome the observed
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5 associations.
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10 We looked only at visits to family physicians, internists, and cardiologists; we assumed that
11 during the very small proportion of visits to orthopedic surgeons, sports medicine physicians, etc.
12 following ED discharge, the atrial fibrillation was not managed by these practitioners; however
13 we do not have copies of patient charts to confirm this assumption.
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20 21 22 Conclusions

23
24 In the province of Ontario, only half of patients who are discharged from an ED with a new
25 diagnosis of atrial fibrillation obtained follow-up care within a week of leaving the ED. Having a
26 family physician had the greatest impact on receipt of timely follow-up care, while
27 characteristics of the managing emergency physician were not associated. Part of the mandate for
28 primary care models in Ontario was to improve access to care; for patients with a new diagnosis
29 of atrial fibrillation, access to follow-up care was slower if the family doctor remuneration was
30 capitation-based, compared to patients whose family doctor was reimbursed using a blended fee-
31 for-service model or traditional fee-for-service billing claims. Systems-wide solutions are needed
32 to ensure timely follow-up care after discharge from an ED with a new diagnosis of a
33 cardiovascular disease.
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Author Contributions: Dr Atzema had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Atzema, Austin, Ivers, Yu, Lee, Rochon.

Acquisition of data: Yu, Atzema.

Analysis and interpretation of data: Atzema, Austin, Ivers, Yu, Lee, Rochon.

Drafting of the manuscript: Atzema.

Critical revision of the manuscript for important intellectual content: Austin, Ivers, Yu, Lee, Rochon.

Statistical Analysis: Atzema, Austin, Yu.

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5 *or the Ontario MOHLTC is intended or should be inferred.*
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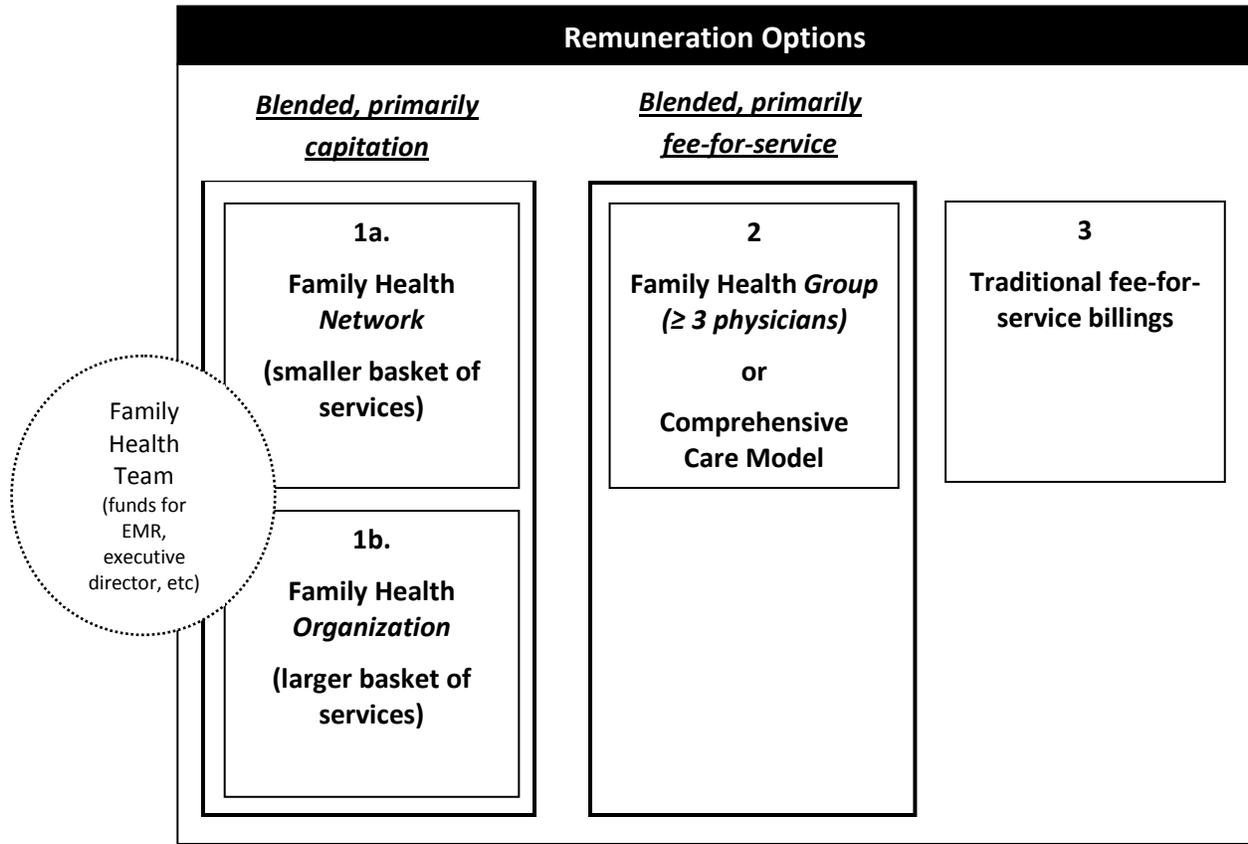
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Box 1. Description of Primary Care Model types in Ontario¹⁷

CHARACTERISTIC	ENHANCED FEE-FOR-SERVICE MODEL	CAPITATION MODEL
Patient enrolment	Optional	Required
After-hours call	Required	Required
Fee-for-service payments	Full payment plus 10% premium for 21 comprehensive care services	Payment at 10% of full rate for 56 services for enrolled patients; established maximum fee-for-service payments annually
Extended hours	One 3-hour evening or weekend session per physician per week, to a maximum of 5 sessions; exempted if > 50% of physicians provide emergency, anesthesia or obstetrics coverage	Same as enhanced fee-for-service model
After-hours care	Additional 20% of fee-for-service payment for enrolled and virtually enrolled patients for 9 basic office services	Same as enhanced fee-for-service model
Access bonus	Not applicable	Additional payment, reduced if enrolled patient sees a nonspecialist physician outside the group
Group management and leadership	Not applicable	Annual fee per enrolled patient
Management of heart failure care	Annual fee per enrolled patient for coordinating, providing and documenting required elements of heart failure care	Same as enhanced fee-for-service model
Unattached patient fee	A one-time fee for enrolling an acute care patient without a family physician following discharge from an inpatient hospital stay	Same as enhanced fee-for-service model
New patient premium	A one-time fee for up to 60 enrolled new patients without a family physician; increase in fee for patients aged 65–74, and further increase in fee for patients aged 75 and over	Same as enhanced fee-for-service model

Figure 1. Diagram of organization and remuneration options for primary care in Ontario



EMR: electronic medical records

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Table 1. Baseline characteristics of 14,907 patients discharged from the emergency department with a new diagnosis of atrial fibrillation, April 2006 to March 2011

Characteristic		Frequency	Percent
Age, mean (standard deviation)		65.2	(15.9)
Male sex		7942	53.28
Income quintile	1	2491	16.71
	2	2893	19.41
	3	2913	19.54
	4	3198	21.45
	5	3412	22.89
Rural residence		2088	14.01
LTC / nursing home residence		248	1.66
Immigrant		1195	8.02
Past Medical History			
Hypertension, recent diagnosis (in the last 1 year)		419	2.81
Hypertension, diagnosis made prior to last 2 year		8699	58.36
Heart failure, recent diagnosis (in the last 1 year)		225	1.51
Heart failure, diagnosis made prior to last 2 year		787	5.28
Acute myocardial infarction		2156	14.46
Coronary artery disease		1726	11.58
Coronary Artery Bypass Graft		361	2.42
Stroke		541	3.63
Diabetes Mellitus		2896	19.43
Dementia		550	3.69
Chronic Obstructive Pulmonary Disease		2426	16.27
Asthma		2014	13.51
Renal failure		527	3.54
Non-major cancer		1895	12.71
Major cancer		252	1.69
CHADS2 score ≥ 2		5830	39.11
ADG score, mean (standard deviation)		9.9	(4.2)
Emergency Department Visit Characteristics			
ED triage score (1 is highest acuity)	1 or 2	9916	66.52
	3	4991	33.48
Arrival by ambulance		4074	27.33
Presenting time of day	00:00-07:59	2872	19.27
	08:00-15:59	7640	51.25
	16:00-23:59	4395	29.48
Presenting day of week	Weekday	11492	77.09
	Weekend	3415	22.91
ED physician sex	Unknown	1895	12.71
	Female	2581	17.31
	Male	10431	69.97
ED physician specialty	3-year emergency medicine	5875	39.41
	5-year emergency medicine	1962	13.16
	Family medicine	3832	25.71

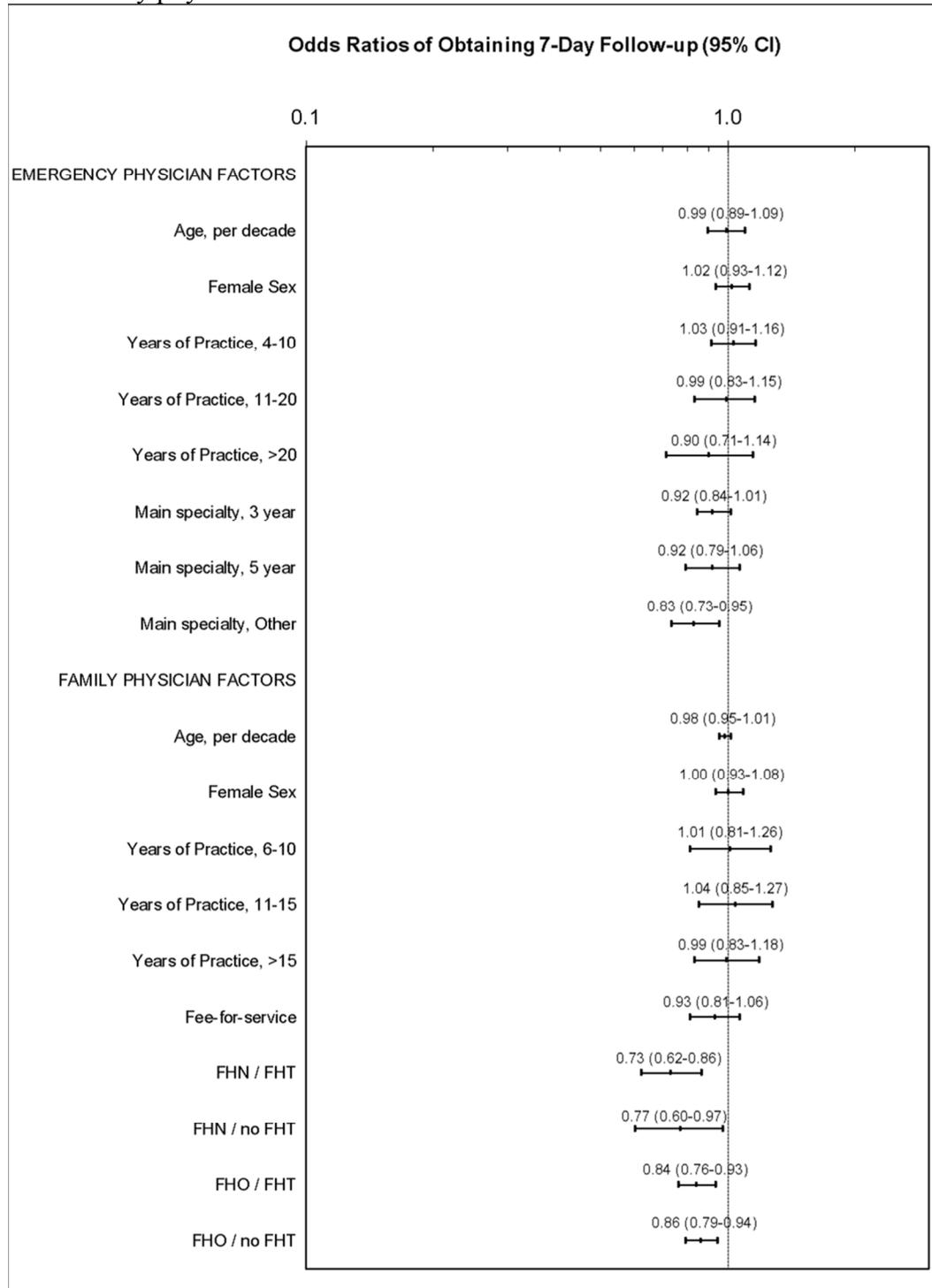
	Other	1345	9.02
	Unknown	1893	12.7
ED physician years of practice	0-3 years	1900	12.75
	4-10 yrs	3686	24.73
	11-20 yrs	4219	28.3
	>20 yrs	3159	21.19
	Unknown	1943	13.03
Hospital type	Community	11285	75.7
	Small	836	5.61
	Teaching	2786	18.69
Family Physician Characteristics			
Family physician sex	F	3804	25.52
	M	10333	69.32
	Unknown	770	5.17
Family physician main specialty	Family Medicine	13981	93.79
	Emergency Medicine	146	0.98
	Unknown	780	5.23
Family physician years of practice	0-5 years	542	3.64
	6-10 yrs	901	6.04
	11-15 yrs	1353	9.08
	>15 yrs	11329	76
	Unknown	782	5.25
Has a family physician		14146	94.9
Family physician's model type:	CCM or FHG	6613	44.36
CCM = primarily fee-for-service, < 3 physicians	FHN/FHT	692	4.64
FHG = primarily fee-for-service, ≥ 3 physicians	FHN/no FHT	315	2.11
FHN = primarily capitation, small basket of services	FHO/FHT	2271	15.23
FHO = primarily capitation, large basket of services	FHO/no FHT	3189	21.39
FFS = Traditional fee for service	FFS	1066	7.15
Family physician belongs to a Family Health Team (FHT)		2963	19.88

Follow-up Care for Incident Atrial Fibrillation

Table 2. Follow-up care among 14,907 patients discharged from the emergency department with a new diagnosis of atrial fibrillation

Time to follow-up care	Total seen	%	Saw Family Physician Only	%	Saw Cardiologist or Internist Only	%	Saw Cardiologist or Internist, +/- Family Physician	%	Saw Both Family Physician & Cardiologist or Internist	%	Saw Any of Family Physician, Cardiologist, or Internist	%	Died, within 3, 7, 30 days		
													3	7	30
Days 1-3	4085	30.5	3094	20.8	787	5.3	991	6.7	204	1.4	4085	27.4	14	21	61
Days 1-7	7473	54.6	5311	35.6	1414	9.5	2162	14.5	748	5.0	7473	50.1	14	34	97
Days 1-30	12229	86.3	6473	43.4	1765	11.8	5756	38.6	3991	26.8	12229	82.0	14	34	120
> 30 days	2678	18.0	—		—		—		—		—		6	14	24
Total	14907														

Figure 2. Adjusted odds of obtaining follow-up care by a family physician, cardiologist, or internist, within seven days of discharge from an emergency department, among patients who had a family physician



CCM (Comprehensive Care Model) or FHG (Family Health Group): mostly fee-for-service models (less than 3 physicians or 3+ physicians, respectively)

FHN (Family Health Network) and FHO (Family Health Organization): mostly capitation based reimbursement

FHT (Family Health Team): not a reimbursement model, includes an interdisciplinary team

Online Appendix A. Adjusted odds of obtaining follow-up care from a family doctor, cardiologist, or internist within 7 days of ED discharge, among discharged ED patients who had a family physician (n=14,146)

Characteristic		Odds Ratio (95% confidence interval)	p-value
Age, per decade increase		1.09 (1.05-1.12)	<.001
Female sex		1.05 (0.98-1.13)	0.18
Incquint quintile	2	1.07 (0.96-1.20)	0.21
	3	1.04 (0.93-1.16)	0.52
	4	0.95 (0.85-1.06)	0.35
	5	1.05 (0.94-1.17)	0.39
Rural residence		0.95 (0.85-1.07)	0.43
LTC / nursing home residence		0.77 (0.56-1.05)	0.09
Immigrant		1.18 (1.04-1.35)	0.01
Past Medical History			
Hypertension, recent diagnosis (in the last 1 year)		1.13 (0.92-1.40)	0.23
Hypertension, diagnosis made prior to last 2 year		1.15 (1.05-1.25)	0.002
Heart failure, recent diagnosis (in the last 1 year)		0.87 (0.66-1.14)	0.31
Heart failure, diagnosis made prior to last 2 year		0.75 (0.64-0.88)	< 0.001
Acute myocardial infarction		1.02 (0.92-1.14)	0.68
Coronary artery disease		0.83 (0.74-0.94)	0.003
Coronary Artery Bypass Graft		1.10 (0.86-1.40)	0.47
Stroke		0.78 (0.65-0.94)	0.01
Diabetes Mellitus		1.06 (0.96-1.17)	0.25
Dementia		0.84 (0.69-1.03)	0.09
Chronic Obstructive Pulmonary Disease		1.03 (0.93-1.13)	0.60
Asthma		1.04 (0.94-1.15)	0.43
Renal failure		0.69 (0.57-0.83)	< 0.001
Non-major cancer		0.84 (0.76-0.94)	0.002
Major cancer		0.98 (0.87-1.09)	0.67
CHADS2 score ≥ 2		1.02 (0.94-1.09)	0.70
ADG score		1.04 (1.03-1.05)	< 0.001
Emergency Department Visit Characteristics			
ED triage score (1 or 2: high acuity)		1.02 (0.94-1.09)	0.70
Arrival by ambulance		0.99 (0.91-1.07)	0.79
Presenting time of day	00:00-07:59	0.88 (0.80-0.97)	0.007
	16:00-23:59	0.92 (0.85-1.00)	0.04
Presenting day of week: weekend		0.94 (0.87-1.02)	0.14
ED physician, age per decade increase		0.99 (0.89-1.09)	0.79
ED physician, female sex		1.02 (0.93-1.12)	0.63
ED physician, mainspecialty	3 year	0.92 (0.84-1.01)	0.08
	5 year	0.92 (0.79-1.06)	0.25
	Other	0.83 (0.73-0.95)	0.009
ED physician, years of practice	4-10	1.03 (0.91-1.16)	0.63
	11-20	0.98 (0.83-1.15)	0.78
	>20	0.90 (0.71-1.14)	0.38

Hospital type	Small	0.82 (0.69-0.97)	0.02
	Teaching	1.14 (1.03-1.27)	0.02
Family Physician Characteristics			
Family physician, age per decade increase		1.08 (1.05-1.12)	<0.001
Family physician, female sex		1.01 (0.93-1.08)	0.99
Family physician, years of practice	6-10 yrs	1.01 (0.81-1.26)	0.93
	11-15 yrs	1.03 (0.85-1.27)	0.72
	>15 yrs	0.99 (0.83-1.18)	0.92
Family physician, reimbursement type*	FHN/FHT	0.73 (0.62-0.86)	<0.001
	FHN/no FHT	0.77 (0.60-0.97)	0.03
	FHO/FHT	0.84 (0.76-0.93)	<0.001
	FHO/no FHT	0.86 (0.79-0.94)	0.001
	FFS	0.93 (0.81-1.06)	0.26

*CCM = primarily fee-for-service, < 3 physicians

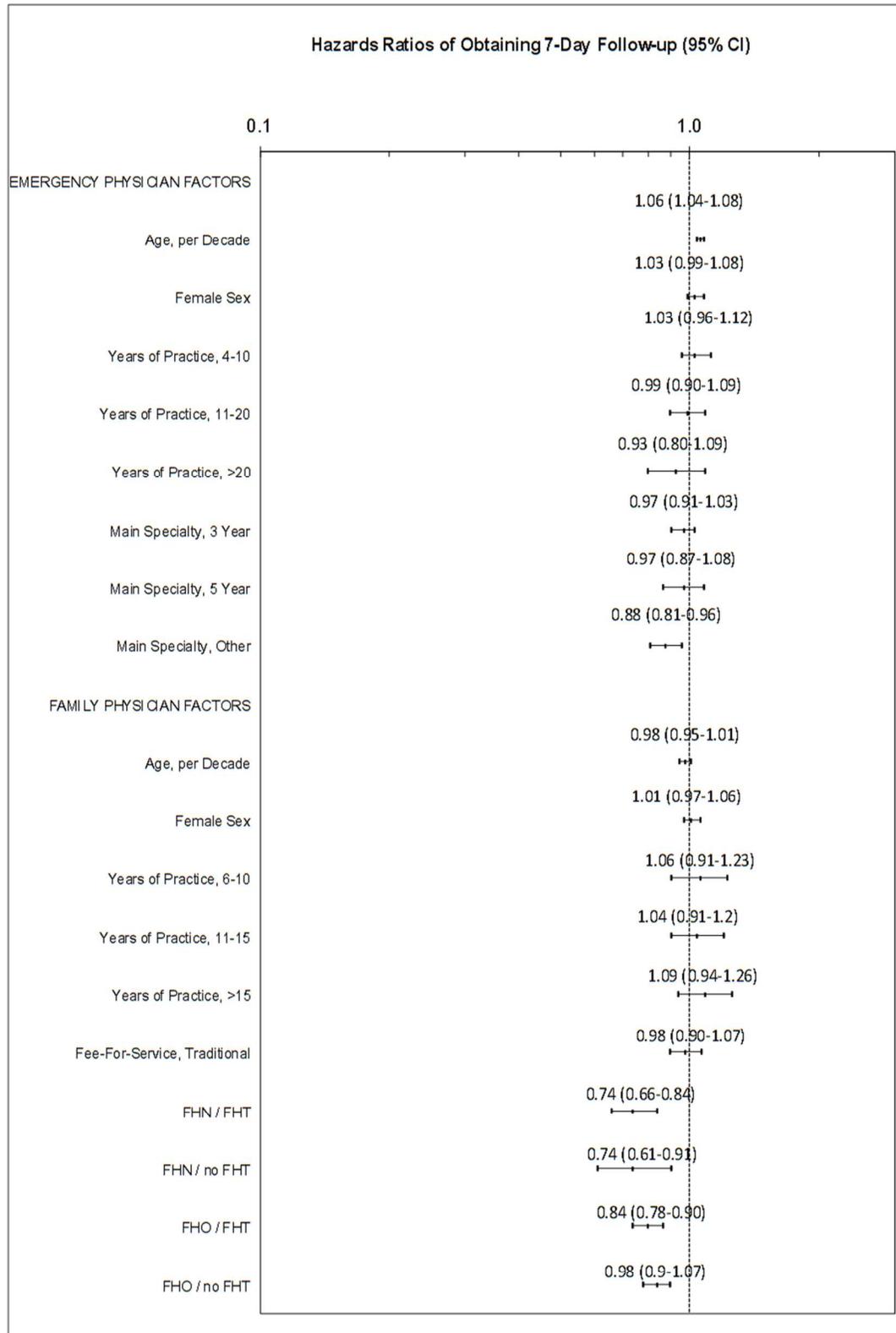
FHG = primarily fee-for-service, ≥ 3 physicians

FHN = primarily capitation, small basket of services

FHO = primarily capitation, large basket of services

FFS = Traditional fee for service

Online Figure 3. Adjusted hazard of obtaining follow-up care by a family physician, cardiologist, or internist, within seven days of discharge from an emergency department, among patients who had a family physician



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CCM (Comprehensive Care Model) or FHG (Family Health Group): mostly fee-for-service models (less than 3 physicians or 3+ physicians, respectively)
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