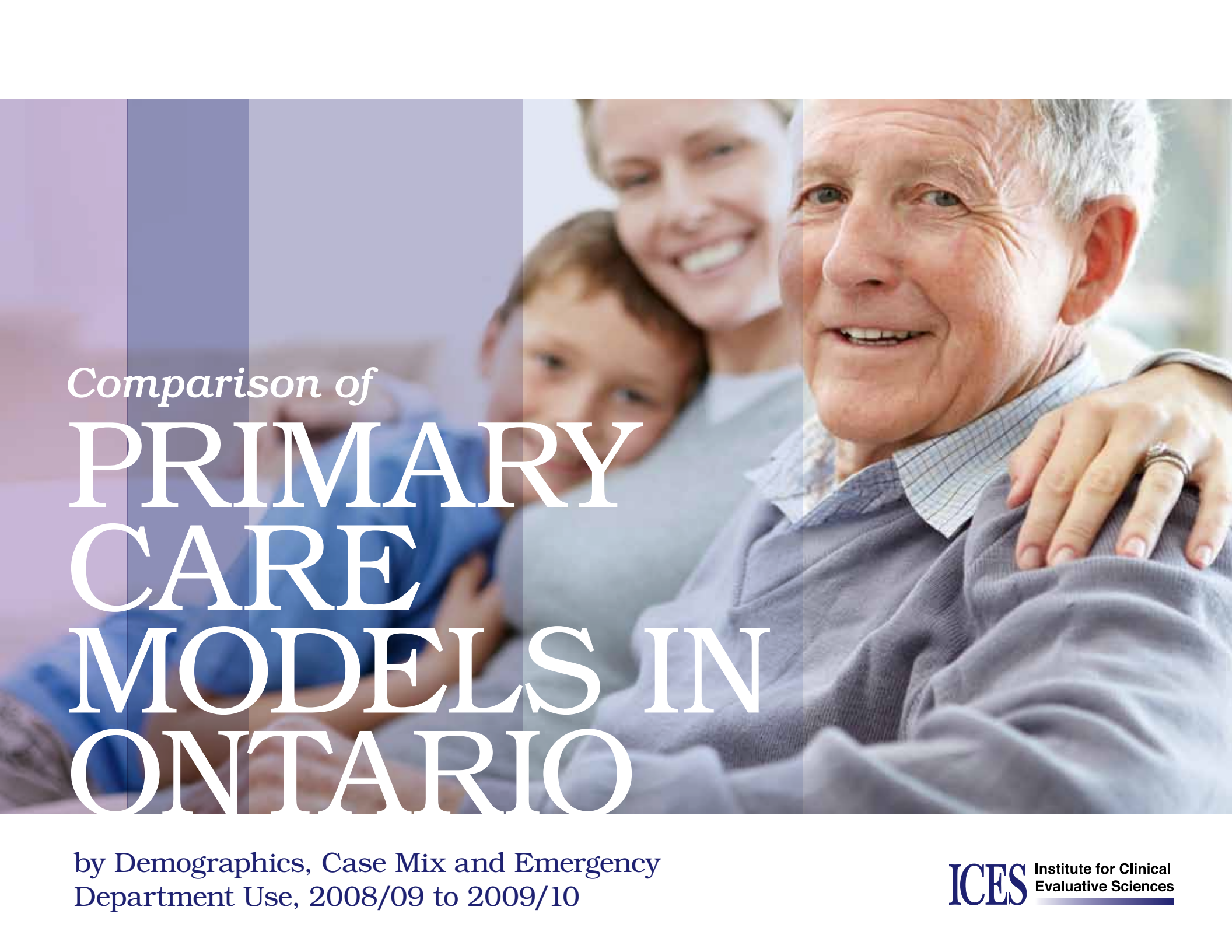




Comparison of

PRIMARY CARE MODELS IN ONTARIO

by Demographics, Case Mix and Emergency
Department Use, 2008/09 to 2009/10

Comparison of Primary Care Models in Ontario by Demographics, Case Mix and Emergency Department Use, 2008/09 to 2009/10

ICES Investigative Report

Authors

Richard H. Glazier

Brandon M. Zagorski

Jennifer Rayner

PUBLICATION INFORMATION

© 2012 Institute for Clinical Evaluative Sciences

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any format or by any means, electronic, mechanical, photocopying, recording or otherwise, without the proper permission of the publisher.

The opinions, results and conclusions included in this report are those of the authors and are independent from the funding sources. No endorsement by the Institute for Clinical Evaluative Sciences (ICES), the Ontario Ministry of Health and Long-Term Care (MOHLTC) or the Association of Ontario Health Centres (AOHC) is intended or should be inferred. The AOHC had no involvement in or control over the design and conduct of the study; the analysis and interpretation of the data; the decision to publish; or the preparation, review and approval of the manuscript.

Institute for Clinical Evaluative Sciences (ICES)

G1 06, 2075 Bayview Avenue
Toronto, ON M4N 3M5
Telephone: 416-480-4055
www.ices.on.ca

Canadian Cataloguing in Publication Data

Comparison of Primary Care Models in Ontario by Demographics, Case Mix and Emergency Department Use, 2008/09 to 2009/10. ICES Investigative Report.

Includes bibliographical references.

ISBN 978-1-926850-30-6 (PDF)

How to Cite This Publication

Glazier RH, Zagorski BM, Rayner J. Comparison of Primary Care Models in Ontario by Demographics, Case Mix and Emergency Department Use, 2008/09 to 2009/10. ICES Investigative Report. Toronto: Institute for Clinical Evaluative Sciences; 2012.

TABLE OF CONTENTS	
I Authors' Affiliations	
I Acknowledgements	
II About Our Organization	
III Executive Summary	
V List of Exhibits	
	1 BACKGROUND
	3 OBJECTIVE
	4 METHODS
	4 Participants
	4 Data Sources
	6 Case Mix
	7 Analyses
	8 FINDINGS
	23 DISCUSSION
	24 Limitations
	26 Policy Implications
	27 Implications for Evaluation and Research
	28 CONCLUSIONS

AUTHORS' AFFILIATIONS

Richard H. Glazier, MD, MPH, CCFP, FCFP, ABMP

Senior Scientist, Institute for Clinical Evaluative Sciences / Scientist, Centre for Research on Inner City Health, The Keenan Research Centre in the Li Ka Shing Knowledge Institute of St. Michael's Hospital / Professor, Department of Family and Community Medicine, University of Toronto / Family Physician, St. Michael's Hospital

Brandon M. Zagorski, MS

Analyst, Institute for Clinical Evaluative Sciences / Adjunct Professor, Institute of Health Policy, Management and Evaluation, University of Toronto

Jennifer Rayner, MSc

Regional Decision Support Specialist, London InterCommunity Health Centre

ACKNOWLEDGEMENTS

The study was sponsored by the Association of Ontario Health Centres and we are grateful for their assistance with collection of data from the participating Community Health Centres.

We are also grateful to Thérèse Stukel and Michael Schull for their insightful comments on the study results, and to Brian Hutchison, Michael Rachlis, Liisa Jaakkimainen, Mary Fleming, Laura Muldoon and Jan Hux who provided helpful feedback on earlier versions of this report.

ABOUT OUR ORGANIZATION

The Institute for Clinical Evaluative Sciences (ICES) is an independent, non-profit organization that produces knowledge to enhance the effectiveness of health care for Ontarians. Internationally recognized for its innovative use of population-based health information, ICES evidence supports health policy development and guides changes to the organization and delivery of health care services.

Key to our work is our ability to link population-based health information, at the patient level, in a way that ensures the privacy and confidentiality of personal health information. Linked databases reflecting 13 million of 33 million Canadians allow us to follow patient populations through diagnosis and treatment and to evaluate outcomes.

ICES brings together the best and the brightest talent across Ontario. 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 training, epidemiological backgrounds, project management or communications expertise. The variety of skill sets and educational backgrounds ensures a multi-disciplinary 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, our faculty and staff 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. These combined sources enable ICES to have a large number of projects underway, covering a broad range of topics. The knowledge that arises from these efforts is always produced independent of our funding bodies, which is critical to our success as Ontario's objective, credible source of evidence guiding health care.

“ICES brings together the best and the brightest talent across Ontario. 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.”

Executive Summary

ISSUE

Are there differences between Ontario's primary care models in who they serve and how often their patients/clients go to the emergency department (ED)?

STUDY

This study examined patients/clients enrolled in: Community Health Centres (CHCs, a salaried model), Family Health Groups (FHGs, a blended fee-for-service model), Family Health Networks (FHNs, a blended capitation model), Family Health Organizations (FHOs, a blended capitation model), Family Health Teams (FHTs, an interprofessional team model composed of FHNs and FHOs), 'Other' smaller models combined, as well as those who did not belong to a model. Electronic record encounter data (for CHCs) and routinely collected health care administrative data were used to examine sociodemographic composition, patterns of morbidity and comorbidity (case mix) and ED use. ED visits rates were adjusted to account for differences in location and patient/client characteristics.

KEY FINDINGS

- Compared with the Ontario population, CHCs served populations that were from lower income neighbourhoods, had higher proportions of newcomers and those on social assistance, had more severe mental illness and chronic health conditions, and had higher morbidity and comorbidity. In both urban and rural areas, CHCs had ED visit rates that were considerably lower than expected.
- FHGs and 'Other' models had sociodemographic and morbidity profiles very similar to those of Ontario as a whole, but FHGs had a higher proportion of newcomers, likely reflecting their more urban location. Both urban and rural FHGs and 'Other' models had lower than expected ED visits.
- FHNs and FHTs had a large rural profile, while FHOs were similar to Ontario overall. Compared with the Ontario population, patients in all three models were from higher income neighbourhoods, were much less likely to be newcomers, and less likely to use the health system or have high comorbidity. ED visits were higher than expected in all three models.
- Those who did not belong to one of the models of care studied were more likely to be male, younger, make less use of the health system and have lower morbidity and comorbidity than those enrolled in a model of care. They had more ED visits than expected.

IMPLICATIONS

Different models of primary care serve different patient populations and are associated with different outcomes. CHCs stood out in their care of disadvantaged and sicker populations and had substantially lower ED visit rates than expected. The reasons for these better outcomes are not known and require further investigation. Ontario's capitation models served more advantaged populations and had higher than expected ED rates. The details of physician reimbursement mechanisms in capitation are important for achieving desired results. Therefore, the payment and incentive structures underlying these models require re-examination. Ontarians not belonging to a model of care examined here had higher than expected ED use, suggesting that they experienced barriers in accessing primary care. Further evaluation of the performance of Ontario's primary care models in relation to costs, and comparisons with models elsewhere, is needed.

List of Exhibits

Exhibit 1 / Selected characteristics of primary care funding models in Ontario

Exhibit 2 / Number of rostered patients in different primary care payment models in Ontario (excluding Community Health Centres), 2004 to 2010

Exhibit 3 / Number and sociodemographic characteristics of Ontarians by primary care model, for all, urban and rural residents, 2008/09 to 2009/10

Exhibit 4 / Morbidity and comorbidity of Ontarians by primary care model, for all, urban and rural residents, 2008/09 to 2009/10

Exhibit 5 / Standardized ACG Morbidity Index (SAMI) of Ontario residents by primary care model, for all, urban and rural residents, 2008/09 to 2009/10

Exhibit 6 / Observed and expected mean emergency department (ED) visits per person for Ontario residents by primary care model, for all, urban and rural residents, 2008/09 to 2009/10

Exhibit 7 / Ratio of observed/expected mean emergency department (ED) visits per person for Ontario residents by primary care model, for all, urban and rural residents, 2008/09 to 2009/10

Background

The dominant model of primary care across Canada has traditionally rested on physicians practising solo or in groups and being reimbursed largely through fee-for-service billing claims to provincial health plans for eligible services. Over the past decade, many provinces have sought to expand and improve access to primary care, while at the same time enhancing the quality of care provided.¹ In some provinces the focus has been on structural changes (i.e., new payment systems and interdisciplinary teams), while in other provinces the changes have left existing practitioner arrangements intact but sought to enhance their access and capacity through fee enhancements and other supports, such as care coordinators.² At the same time, many provinces have had Community Health Centres (CHCs) existing alongside the reforms taking place in the rest of primary care delivery. 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.

CHCs have existed in Ontario for over 40 years. A total of 73 CHCs serve approximately 357,000 people in 110 communities throughout Ontario.³ Like many other CHCs in Canada, Ontario's CHC health professionals are reimbursed through salaried arrangements and are considered employees. In 2001, the *Family Health Network (FHN)* was introduced in Ontario. This new model of care was based on capitation reimbursement for physicians, blended with limited fee-for-service payments and incentives. It required formal rostering (enrolment) of patients with loss of access bonus payments if patients received primary care outside of the rostering group; evening and weekend clinics; and a physician on call '24/7' with teletriage nurse support. Incentives were provided for patients seen after hours, for chronic disease management and for achieving cumulative practice thresholds for certain preventive health care manoeuvres. Capitation payments were based on the expected frequency of office visits in each five-year age-sex group but were not adjusted for health care needs or social disparities. An additional monthly payment called the comprehensive care fee

was paid per rostered patient, and most office visits were paid at 10% of the full fee-for-service value. The FHN model therefore represented a blended reimbursement model with the majority of payments based on capitation. Another new model, the *Family Health Group (FHG)*, was introduced in 2003. It contained most of the same provisions as the FHN model but retained full fee-for-service payments, as well as the monthly comprehensive care fee per rostered patient. It therefore represented a blended reimbursement model with the majority of payments based on fee for service. Whereas the FHG model required a minimum of three physicians, the *Comprehensive Care Model (CCM)* had similar provisions as the FHG but was designed for solo physicians. In 2005, two older capitation models, the Health Service Organization and the Primary Care Network, were rolled into another new primary care model, the *Family Health Organization (FHO)*. Both older capitation models were based on age-sex payments and were not adjusted for health care needs or social disparities. Shortly after establishment of the FHO model, it was opened up to all primary care physician

groups in Ontario. The FHO had a larger basket of services and a larger capitation payment than the FHN, but otherwise the two models shared many of the same provisions. Another set of primary care models was developed in Ontario to meet specific community needs. These tended to be relatively small local models that had alternate payment plans. By 2010, over nine million Ontarians had rostered with one of the primary care models—FHO and FHG were the two largest models, each with approximately four million people. Ontario's primary care models are described in more detail by Health Force Ontario,⁴ and selected features of the major funding models are presented in [Exhibit 1](#).

In 2006, *Family Health Teams (FHTs)* were introduced. FHTs were not funding models but they required that physicians be paid through either one of the blended capitation models (FHNs or FHOs) or a blended salary model. Fee-for-service physicians and those in FHGs were not eligible to belong to a FHT. FHTs included an interdisciplinary team, funding for an executive director and electronic medical records. By 2010, 150 FHTs were serving over two million Ontarians and 50 more teams are currently being implemented.⁵

There have been efforts to characterize the dimensions of primary care and how well each model of care delivery performs across them.⁶ There have also been efforts to compare primary care models in Ontario.^{7–12} Differences in age-sex composition, urban-rural location and health needs make these comparisons challenging. For example, patients in a primary care model that is predominantly rural would be expected to make greater use of emergency department (ED) services than patients in a predominantly urban model, as there are few alternatives for after-hours care (e.g., walk-in clinics or urgent care centres) in a rural setting. A model that has generally older and/or sicker patients would also be expected to make more use of services.

The focus of this report is on the following dimensions of primary care and how well each funding model performs across these dimensions:

- Sociodemographic characteristics
- Patterns of morbidity and comorbidity (case mix)
- ED use

ED visits are frequently used as an indicator of access to primary care services in the community.^{13,14} Where primary care is readily available on an urgent basis and after-hours, ED visits should be lower than in areas where these services are not as accessible. Timely and after-hours access to primary care is a major challenge for Canadian jurisdictions. On patient surveys conducted in 11 developed countries, Canada had the highest ED use, the second highest inability to get same-day or next-day appointments with a doctor or nurse and the third highest difficulty accessing care after hours.¹⁵ This suggests that timely and after-hours access to primary health care ought to be a major policy focus for Ontario and, furthermore, raises questions about how well different models of care address this challenge. Since data on patient-reported access to care are not available by model, ED visits are used as a proxy measure for timely and after-hours access to care in this report. Use of the ED is also an important measure in its own right, given high rates of ED use in Canada, frequent ED overcrowding, and the demonstrated risks associated with ED overcrowding.¹⁶

Objective

Our objective was to characterize primary care models in Ontario by demographics, practice location and case mix and to examine ED use by patients/clients in each model before and after controlling for their characteristics.

Methods

PARTICIPANTS

All residents of Ontario eligible for health care in 2008/09 to 2009/10, with a physician visit during this time period and alive on March 31, 2010 were included. The models compared included CHCs, FHNs, FHGs, FHOs, other smaller models grouped together, and FHTs. The FHNs and FHOs that were part of a FHT were included in the FHT group and not included in the FHN and FHO groups. We also examined Ontarians not belonging to any of these groups (no other group—NON). The NON group was composed of those being seen in straight fee-for-service primary care, those seeing specialist physicians but not primary care physicians, and those being seen by physicians in a primary care model who were not formally enrolled.

The study time period was April 1, 2008 to March 31, 2010. CHC data were not routinely available at the time of the study, and for that reason CHCs were approached to participate. CHCs were required to have client encounter data during the study time period to be eligible, and CHC clients who had a face-to-face encounter with a physician during the study time period were included. Patients rostered to a physician in the other models as of March 31, 2010 were included if they had a physician visit during the study time period.

DATA SOURCES

Data were utilized from a variety of sources. CHC data were extracted from electronic records and linked with data holdings at the Institute for Clinical Evaluative Sciences (ICES) that were accessed through a comprehensive research agreement between ICES and Ontario's Ministry of Health and Long-Term Care. These included: CHC data, the Registered Persons Database; physician billings from the Ontario Health Insurance Plan; hospital Discharge Abstract Database; ED visits from the National Ambulatory Care Reporting System; the Ontario Drug Benefit Program; Client Agency Program Enrolment tables, the Rural-urban Index of Ontario for urban-rural residence, and 2006 Census of Canada data for sociodemographic variables. A brief explanation of each is provided below.

CHC Data

The electronic record systems used at the participating CHCs included Purkinje, P&P Data Systems and Health Screen Solutions. Data cleaning and validation was conducted by one of the authors (JR) prior to submitting the data for linkage to ICES. Linkage was performed using the health card number for each client on the CHC files. Following linkage, only the unique ICES encrypted identifier remained on the files used for analysis. The CHC data consisted of a unique site ID, physician and nurse practitioner encounters (date of encounter, issues addressed/reason for visit [using ICD-9] and provider type). Client demographics were also collected (unique client id, sex, age, health card number if applicable and postal code). In total, 71 CHCs and their satellites participated in this study, comprising 97.3% of those eligible to participate. Among CHC clients, 11.5% did not have a health card number and could not be linked to administrative data.

Registered Persons Database (RPDB)

The RPDB includes the resident population of Ontario eligible for health coverage by age, sex and residential address. Residents are eligible for health coverage if they are Canadian citizens, landed immigrants or convention refugees, make their permanent and principal home in Ontario, and are physically present in Ontario 153 days in any 12-month period. The RPDB also contains dates of eligibility for health care coverage which were used to identify those over the age of ten years who were first eligible for Ontario health care coverage during or after 1998. These newcomers are expected to be comprised largely of recent immigrants to Canada, with the remainder being inter-provincial migrants (some of whom would also be recent immigrants to Canada). In this report we used newcomer status to serve as a proxy for new immigrants to Ontario.

Ontario Health Insurance Plan (OHIP)

This database contains claims paid for by the Ontario Health Insurance Plan. The data cover all health care providers who can claim under OHIP, including physicians, groups, laboratories and out-of-province providers. Out-of-province claims were not included in this study.

Discharge Abstract Database (DAD)

Hospital discharge abstracts for the province are compiled by the Canadian Institute for Health Information. Each record in this dataset corresponds to one hospital stay, and available variables include patient sex, date of birth, postal code, diagnoses, procedures, attending physician, admission category and length of stay.

National Ambulatory Care Reporting System (NACRS)

NACRS contains information on outpatient visits to hospital and community-based ambulatory care, such as EDs, cancer clinics, renal dialysis clinics and others. NACRS was used in this report to identify all visits to EDs.

Ontario Drug Benefit Program (ODB)

The ODB program provides drug benefits for all adults aged 65 and older and those receiving social assistance in Ontario. The ODB was used to determine the proportion of patients on social assistance—welfare (Ontario Works) and disability (Ontario Disability Support Program)—who had received a prescription under the plan within the study period. Low-income seniors aged 65 and older were identified in the ODB using a means test. The proportion of low-income seniors was identified as the number of low-income seniors who filled a prescription divided by the total number of seniors. People on social assistance and low-income seniors would be under counted in these databases as they only include those who filled a prescription.

Client Agency Program Enrolment (CAPE) Tables

This information source was used to identify which patients had enrolled in which model with which physicians over time. A separate file provided by the Ministry of Health and Long-Term Care identified the physicians that were part of a FHT.

Rurality Index of Ontario (RIO)

Urban-rural residential location was assessed using the RIO. This index is widely used as an aid to define rural areas. It was recently updated with 2006 Canadian census information. These updates have also included changes to the methodology to increase the stability of the RIO.¹⁷ Those with a RIO score of 0–39 were considered urban and those with a RIO of 40 and above were considered rural. These measures were used to stratify the results, as demographics, patterns of morbidity and ED use are known to vary by urban-rural location.

Census of Canada

Data from the most recent Census of Canada (May 2006) were provided by Statistics Canada. The census takes place every five years in Canada and is a reliable source of information for population and dwelling counts, as well as demographic and other socioeconomic characteristics. For this study, the main data element used was income quintile, a measure of relative household income adjusted for household size and community. Roughly 20% of Ontarians fall into each income quintile, with quintile 1 having the lowest income and quintile 5 the highest. Income quintile was derived by linking the six-digit postal code of residence to census data at the smallest possible level (dissemination area), using the Postal Code Conversion File Plus (PCCF+).¹⁸

CASE MIX

Both the Johns Hopkins Adjusted Clinical Group (ACG) methodology, as well as disease cohorts, were used as measures of case mix. ACGs are used to measure patient illness burden.¹⁹ The system estimates the illness burden of individual patients and, when aggregated across individuals, of populations. The ACG methodology is one of several diagnosis-based risk adjustment systems developed to predict utilization of medical resources, and is based on the fact that patients who have certain groups of diagnoses tend to have similar health care utilization patterns. Patients using the most health care resources are not typically those with single diseases but rather those with multiple and sometimes unrelated conditions. This clustering of morbidity is a better predictor of health care utilization than the presence of specific diseases.²⁰ In the United States, ACGs are able to explain more than 50% of same-year resource use by individuals. Similar predictive ability has been reported in Canada.²¹ In contrast, age and sex only explain approximately 10% of the variation in resource use and cost.^{21,22}

The ACG system assigns all ICD-9 and ICD-10 codes to one of 32 diagnosis clusters known as Adjusted Diagnosis Groups (ADGs). Individual diseases or conditions are placed into a single ADG cluster based on five clinical dimensions: duration of the condition, severity of the condition, diagnostic certainty, etiology of the condition and specialty care involvement. In addition to ADGs, the ACG software was used to generate Resource Utilization Bands (RUBs) which involve aggregations of ACGs with similar expected utilization (1=low, 5=high) and the Standardized ACG Morbidity Index (SAMI). The SAMI was developed at the Manitoba Centre for Health Policy.²³ This index is a set of illness weights for the ACGs using average provincial health care costs, and can be used for examining differential morbidity at a practice level and explaining variation between practices. SAMI has been adapted by ICES for use in Ontario and has used the full value of in-basket FHO primary care services to weight the ACGs.²⁴ These weights are a measure of expected workload in a FHO practice.

All physician diagnoses, including those made by primary care physicians and specialists, and all hospital discharge abstracts were used to run the Johns Hopkins ACGs. CHC providers can record more than one diagnosis at each visit, but OHIP allows only a single diagnosis per visit. In order to allow fair comparisons across models, a random diagnosis was chosen for each CHC visit. In addition, analyses were limited to physicians because nurse practitioner data were available at the encounter level in CHCs but not in FHTs.

Disease cohorts were used as a secondary measure of case mix. In this study the following cohorts were included: diabetes, asthma, chronic obstructive pulmonary disease, and mental illness (psychotic and non-psychotic).²⁵⁻²⁸ Most of these cohorts derive from validated disease algorithms which include hospital admission data, require more than one physician visit and are cumulative over time. Our approach to producing disease cohorts that were comparable across models was to link CHC data with physician visits and hospital admissions. As there were only two years of CHC data available, we adapted these algorithms to use a single physician visit or hospital admission with a disease-specific diagnosis within a two-year period. This approach is similar to the validation used for mental health²⁹ but would result in slightly higher sensitivity and lower specificity for the other validated algorithms.

ANALYSES

Descriptive analyses were conducted to determine the number and proportion of people in each demographic, urban-rural location and case mix group. The number of ED visits and average number of ED visits were calculated for comparisons across models. Poisson multiple regression was conducted to produce a risk-adjusted rate of ED utilization per person (i.e., expected ED visits) controlling for age, sex, SAMI, income quintile and rurality. The observed utilization (unadjusted) is the actual number of ED visits. These data were used to produce the ratio of observed to expected ED visits and 95% confidence intervals.

This study was approved by Sunnybrook Health Sciences Centre Research Ethics Board.

Findings

Exhibit 2

- Exhibit 2 illustrates the uptake of various physician payment models over time. In 2008, the FHG model had the largest number of rostered patients, but by 2010, the number of patients rostered in the FHO model exceeded that in the FHG.

Exhibit 3

- Across Ontario, 11,896,508 residents were included in the study, with 10,759,566 (90.4%) residing in urban areas and 1,136,942 (9.6%) in rural areas. CHCs had close to 110,000 clients (0.9% of the total), FGHs close to four million patients (33.3%), FHNs close to 100,000 (0.8%), FHOs over two million (18.9%), FHTs close to 1.9 million (15.7%), 'Other' models about half a million (4.5%) and those not in a group (NON) just over three million (25.8%). FHNs and FHOs that were part of a FHT were included as FHT and not included in the FHN or FHO categories. The proportion of each group that was rural varied widely, from 3.4% in FGHs to 36.0% in FHNs.
- The percent female was larger than male for all models except those who were not in a CHC and not rostered (NON), where there were slightly more males.
- The proportion of children aged 18 years and younger was larger in rural than urban areas for all models and was highest in the NON group in both urban and rural areas. The proportion of seniors was lowest in the NON group and highest in the FHN group in urban areas and in 'Other' models in rural areas.
- By definition, the lowest income quintile represents close to 20% of residents in each community. Those living in the lowest income neighbourhoods were over-represented in CHCs in both urban and rural areas, reaching 34.5% in urban areas. Those living in low-income neighbourhoods were most under-represented in the FHN, FHO and FHT models in urban areas and in the FHG and FHN models in rural areas.
- Newcomers, a proxy for new immigrants to Ontario, were far more prevalent in urban than rural areas and were most over-represented in CHCs and in the NON group, in both urban and rural areas. Newcomers were under-represented in FHN, FHO and FHT models in urban areas, with roughly half or less of the proportion for Ontario.
- Those receiving prescriptions through welfare (Ontario Works) or disability (Ontario Disability Support Program) and seniors with low-income were over-represented in CHCs in both urban and rural areas.

Exhibit 4

- Serious mental illness was much more common in CHCs in urban and rural areas than in other models, reaching 6.0% in urban CHCs but less than 2% in any other model. Other mental illness was slightly lower in rural than urban areas and similar across models.
- The proportion with asthma was slightly higher in urban than rural areas and highest in urban and rural CHCs. Diabetes was highest in 'Other' models and lowest in the NON group in both urban and rural areas. Chronic obstructive pulmonary disease was higher in rural than urban areas, while across models it was highest in CHCs and lowest in the NON group in both urban and rural areas.
- Resource utilization bands (RUBs) represent quintiles of expected resource use. Those with no utilization and those in the lowest two RUBs had the greatest representation in the NON group in both urban and rural areas. CHCs had the largest representation of those with the highest expected resource use (RUB 4 and 5) in both urban and rural areas. A similar pattern was found for Adjusted Diagnosis Groups, a measure of comorbidity.

Exhibit 5

- The Standardized ACG Morbidity Index (SAMI) represents the mean ACG weight of expected resource use. For example, a SAMI of 1.85 (e.g., urban CHCs) can be interpreted as an expected need for health care that is 85% higher than in the general Ontario population, and a SAMI of 0.88 (e.g., rural NON group) can be interpreted as a 12% lower expected need for health care than in the general Ontario population.
- The SAMI was highest in CHCs and lowest in the NON group in both urban and rural areas. Among the remaining groups, the SAMI was highest for FHG and 'Other' models for both urban and rural areas.

Exhibit 6

- Observed mean ED visits were compared to expected ED visits (adjusted for age, sex, SAMI, income quintile and rurality). ED visits in rural areas were considerably higher than in urban areas for all groups.
- Observed rates of ED visits were highest in urban areas for CHCs, FHNs and FHTs; and in rural areas for 'Other' models and FHNs. Expected rates followed a similar pattern except for rural CHCs which had very high expected rates.

Exhibit 7

- The ratio of observed/expected ED visits varied across location and primary care model. An observed/expected ratio of 1.19 (e.g., urban FHNs) can be interpreted as ED visits that are 19% above the level expected while a ratio of 0.50 (e.g., rural CHCs) can be interpreted as 50% lower than that expected, given the location and characteristics of the population.
- For urban areas, CHCs (ratio 0.88), FHGs (ratio 0.87) and other models (ratio 0.99) had ratios less than 1.0, meaning that their ED visits were lower than expected. Other models and the NON group had ratios above 1.0, meaning that their ED visits were higher than expected. In rural areas, CHCs had a very low ratio (0.50) and FHG, FHO and 'Other' were below 1.0. The remaining models were above 1.0.
- These results can be interpreted to mean that after adjustment, CHCs, FHGs and 'Other' models were associated with lower ED visits, while FHN, FHO, FHT and NON models were associated with higher ED visits than in the general population. Given the large populations examined, the 95% confidence intervals for all of these ratios were narrow and none crossed 1.0, meaning that all of these results were statistically significant at a p-value of < 0.05.

Primary Care Model Profiles

The primary care models investigated in this report had sociodemographic, morbidity and comorbidity and ED use profiles that were quite different from each other. Based on the study findings, a brief profile of each model can be summarized as follows:

- **Community Health Centres (CHCs)** are distinct from other primary care models in Ontario in their focus on the needs of specific populations, salaried employment arrangements, orientation to outreach and health promotion and governance by community boards. Although a few FHTs have community governance, those community-governed FHTs could not be included in this report and are the focus of ongoing investigation. CHCs had populations that were slightly younger than other models and they were more likely to be rural than the population of Ontario. The remainder of the sociodemographic profile of CHCs was striking and distinct from the other models. CHCs served populations that were from lower income neighbourhoods. They also had a higher proportion of newcomers to Ontario and a higher proportion on social assistance. CHCs had the highest proportion of people with severe mental illness, asthma and chronic obstructive pulmonary disease, as well as a high level of morbidity and comorbidity. In both urban and rural areas, they had ED visit rates that were considerably lower than expected.
- **Family Health Groups (FHGs)** constitute the only formal primary care model that has the majority of physician reimbursement through fee for service. They include small capitation payments and many of the same commitments and incentives as the other primary care enrolment models. FHGs were almost all (97%) urban and had a sociodemographic profile very similar to that of Ontario as a whole but with a higher proportion of newcomers—likely reflecting their urban location. The morbidity and comorbidity profile of FHGs was also similar to that of Ontario as a whole. Both urban and rural FHGs had lower than expected ED visits.
- **Family Health Networks (FHNs)** were the first generally available primary care enrolment model. They have blended reimbursement with a large capitation component, along with partial fee-for-service payments (10% during the study time period) and a variety of obligations and incentives that are similar to other patient enrolment models. FHN was the smallest model examined and had a large rural representation (36% of FHN patients). FHNs had a high proportion of high income patients, especially in rural areas, and a relatively low proportion of low-income patients. FHNs looked after few newcomers. FHNs had the lowest proportion of patients with serious mental illness and relatively low proportions with chronic conditions, morbidity and comorbidity. ED visits in FHNs were higher than expected in both urban and rural areas.
- **Family Health Organizations (FHOs)** were initially introduced as a way to harmonize the Primary Care Networks and Health Service Organizations with other patient enrolment models; and the FHO model also became available to all primary care physicians in Ontario. FHO was very similar to the FHN but had a larger basket of services and a higher capitation payment rate. It rapidly gained popularity and by 2010 had become the most common patient enrolment model. Many FHTs are also FHOs but those practices are grouped with FHTs in this report. FHOs had a low proportion of patients from low-income neighbourhoods and in urban areas they had the highest proportion of any model of patients from high income neighbourhoods. They also looked after few newcomers. FHO was similar to FHN in its chronic condition, morbidity and comorbidity profile and had higher than expected ED visits in urban areas but lower than expected in rural areas.
- **Family Health Team (FHT)** is an inter-professional team model and not a funding model. The FHTs examined in this report were either FHNs or FHOs but were considered only as FHTs in this report. In terms of sociodemographics, FHTs had a high rural representation (17%). They were very similar to FHNs and FHOs in socio-demographic characteristics and they were also similar in the prevalence of chronic conditions and in morbidity and comorbidity. They had higher than expected ED visits in urban and rural areas.

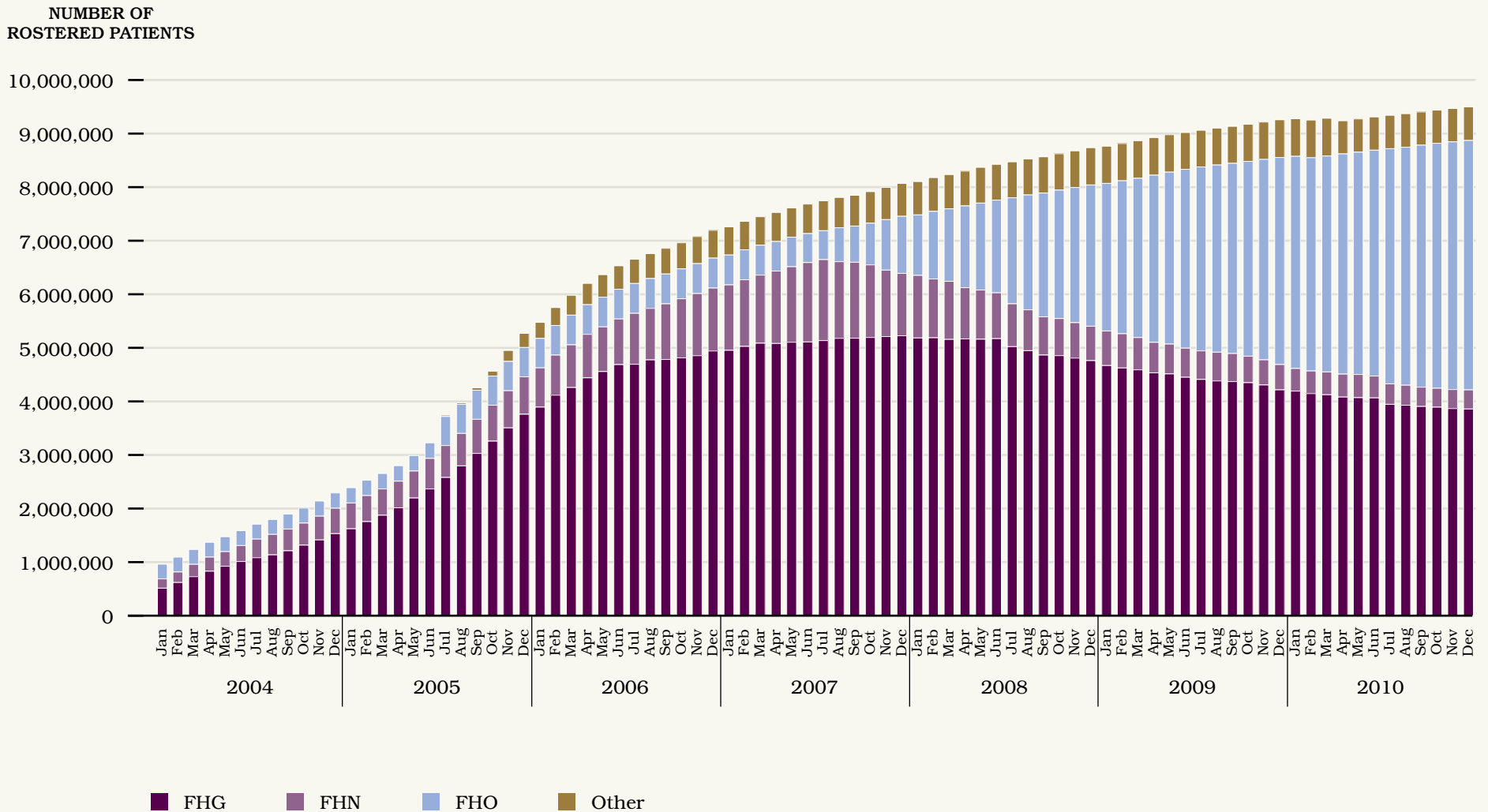
- **Other** models included several smaller models that were responsible for a variety of specific populations. This group had high rural representation (21%), more lower income patients and a high proportion of newcomers. It also had slightly higher morbidity and comorbidity than for Ontario in general and ED visits that were slightly lower than expected.
- **NON** patients that were not seen at CHCs and were not rostered in a patient enrolment model formed the third-largest group examined (after FHGs and FHOs). Unlike the other groups, it had a higher proportion of males than females and it also had a much larger proportion of children, especially in rural areas. Its sociodemographic profile was similar to that of the province as a whole but it had a many more health care non-users than any other group and a pattern of lower chronic disease, morbidity and comorbidity. It had slightly higher than expected ED visits in urban and rural areas.

EXHIBIT 1 Selected characteristics of primary care funding models in Ontario

	PRIMARY CARE FUNDING MODEL*			
	Community Health Centre (CHC)	Family Health Group (FHG)	Family Health Network (FHN)	Family Health Organization (FHO)
PHYSICIAN REIMBURSEMENT	Salary	Blended fee for service	Blended capitation	Blended capitation
GOVERNANCE	Community board	Physician-led	Physician-led	Physician-led
AFTER-HOURS REQUIREMENTS	Yes	Yes	Yes	Yes
ACCOUNTABILITY AGREEMENT WITH LOCAL HEALTH INTEGRATION NETWORK	Yes	No	No	No
FORMAL ENROLMENT	No	Yes	Yes	Yes
COMMUNITY OUTREACH AND HEALTH PROMOTION SERVICES	Yes	No	No	No
LOSS OF BONUS PAYMENT FOR OUTSIDE PRIMARY CARE USE	No	No	Yes	Yes

*Family Health Teams are excluded since they are not funding models

EXHIBIT 2 Number of rostered patients in different primary care payment models in Ontario* (excluding Community Health Centres), 2004 to 2010



FHG = Family Health Group, a group blended fee-for-service model FHN = Family Health Network, a group blended capitation model
 FHO = Family Health Organization, a group blended capitation model Other = Other small alternate payment models, mostly blended capitation models
 *Family Health Teams are excluded since they are not funding models

EXHIBIT 3 Number and sociodemographic characteristics of Ontarians by primary care model, for all, urban and rural residents, 2008/09 to 2009/10

	ALL RESIDENTS							
	CHC	FHG	FHN	FHO	FHT	OTHER	NON	ONTARIO
Number	109,689	3,967,171	97,790	2,253,234	1,871,124	531,712	3,065,788	11,896,508
FEMALE (%)	57.9	54.5	53.5	53.7	54.5	52.9	46.9	52.3
AGE IN YEARS (%)								
≤18	20.2	19.8	20.6	19.9	20.5	17.9	29.8	22.4
19–44	35.8	35.3	27.5	31.9	31.2	32.0	37.4	34.4
45–64	28.4	29.9	31.5	30.7	30.3	32.3	23.0	28.4
≥65	14.0	15.0	20.4	17.5	18.0	17.8	9.9	14.8
INCOME QUINTILE (%)								
1 (low)	34.5	19.1	13.6	15.2	17.1	22.1	21.8	19.0
2	19.6	19.9	17.9	17.6	19.1	22.3	19.5	19.3
3	16.9	20.6	20.7	19.4	20.0	20.1	18.7	19.7
4	14.5	20.8	20.8	22.1	21.5	17.9	18.4	20.4
5 (high)	12.5	18.6	25.6	24.5	21.0	16.5	17.9	19.8
NEWCOMER** (%)	16.4	13.6	2.6	5.9	4.7	11.6	14.6	10.9
WELFARE (ONTARIO WORKS) (%)	9.2	2.9	1.8	2.0	2.2	2.9	3.8	2.9
DISABILITY (ONTARIO DISABILITY SUPPORT PROGRAM) (%)	11.0	2.6	2.6	2.5	2.8	4.0	3.1	2.7
LOW-INCOME SENIOR (%)	3.6	3.2	2.9	2.4	2.4	3.8	2.1	2.9

CHC = Community Health Centre, an employee salary model FHG = Family Health Group, a group blended fee-for-service model

FHN = Family Health Network, a group blended capitation model FHO = Family Health Organization, a group blended capitation model (not part of a FHT)

FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs Other = Other small alternate payment models, mostly blended capitation models

NON = Not a CHC client and not rostered to a primary care group

**Used as a proxy for new immigrants to Ontario

continued on next page...

EXHIBIT 3 CONTINUED...

	URBAN RESIDENTS							
	CHC	FHG	FHN	FHO	FHT	OTHER	NON	ONTARIO
Number	93,695	3,830,931	62,567	2,068,252	1,558,589	422,423	2,723,109	10,759,566
FEMALE (%)	58.8	54.5	54.3	53.8	54.7	53.1	46.8	52.4
AGE IN YEARS (%)								
≤18	20.1	19.2	20.2	19.1	19.8	17.5	28.5	21.6
19–44	38.0	35.8	29.3	32.6	32.5	34.1	38.5	35.3
45–64	27.7	30.0	30.4	30.8	30.3	31.7	23.2	28.5
≥65	12.8	15.0	20.2	17.4	17.4	16.8	9.9	14.6
INCOME QUINTILE (%)								
1 (low)	36.1	19.2	15.1	14.9	16.5	21.4	22.3	19.0
2	19.6	20.1	18.8	17.4	18.6	22.0	20.1	19.4
3	16.2	20.7	24.0	19.7	20.0	20.3	19.4	20.0
4	14.9	21.0	20.7	22.5	22.4	19.1	19.2	20.9
5 (high)	12.9	18.9	21.2	25.5	22.3	17.0	18.8	20.5
NEWCOMER** (%)	18.4	14.0	2.9	6.2	5.2	14.0	15.7	11.6
WELFARE (ONTARIO WORKS) (%)	10.1	2.9	2.0	2.0	2.2	3.1	3.9	2.9
DISABILITY (ONTARIO DISABILITY SUPPORT PROGRAM) (%)	11.9	2.6	2.8	2.4	2.8	3.9	3.1	2.8
LOW-INCOME SENIOR (%)	3.3	3.2	2.8	2.3	2.2	3.7	2.2	2.8

CHC = Community Health Centre, an employee salary model FHG = Family Health Group, a group blended fee-for-service model

FHN = Family Health Network, a group blended capitation model FHO = Family Health Organization, a group blended capitation model (not part of a FHT)

FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs Other = Other small alternate payment models, mostly blended capitation models

NON = Not a CHC client and not rostered to a primary care group

**Used as a proxy for new immigrants to Ontario

continued on next page...

EXHIBIT 3 CONTINUED...

	RURAL RESIDENTS							
	CHC	FHG	FHN	FHO	FHT	OTHER	NON	ONTARIO
Number	15,994	136,240	35,223	184,982	312,535	109,289	342,679	1,136,942
FEMALE (%)	52.2	52.5	52.2	52.6	53.1	52.0	47.7	51.2
AGE IN YEARS (%)								
≤18	21.1	36.6	21.3	28.6	24.2	19.8	39.9	30.6
19–44	22.6	22.5	24.4	24.5	24.9	24.0	28.6	25.5
45–64	32.1	25.9	33.6	29.3	30.2	34.6	21.2	27.4
≥65	21.5	15.0	20.7	17.7	20.6	21.6	10.3	16.5
INCOME QUINTILE (%)								
1 (low)	24.8	16.5	10.9	18.7	20.1	24.7	17.4	18.9
2	19.5	15.2	16.3	20.6	21.4	23.7	14.4	18.5
3	21.4	16.8	14.9	16.9	19.5	19.3	13.3	16.7
4	12.2	15.1	20.9	17.9	17.4	13.3	11.9	15.2
5 (high)	9.8	10.1	33.5	13.6	14.4	14.6	10.6	13.1
NEWCOMER** (%)	4.3	3.0	2.2	3.2	2.2	2.7	5.7	3.6
WELFARE (ONTARIO WORKS) (%)	3.8	2.9	1.3	2.1	2.0	2.3	3.4	2.6
DISABILITY (ONTARIO DISABILITY SUPPORT PROGRAM) (%)	5.7	3.1	2.1	3.3	3.0	4.7	3.2	3.3
LOW-INCOME SENIOR (%)	5.0	2.6	3.1	3.1	3.2	4.0	1.9	2.8

CHC = Community Health Centre, an employee salary model FHG = Family Health Group, a group blended fee-for-service model

FHN = Family Health Network, a group blended capitation model FHO = Family Health Organization, a group blended capitation model (not part of a FHT)

FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs Other = Other small alternate payment models, mostly blended capitation models

NON = Not a CHC client and not rostered to a primary care group

**Used as a proxy for new immigrants to Ontario

**EXHIBIT 4 Morbidity and comorbidity of Ontarians by primary care model,
for all, urban and rural residents, 2008/09 to 2009/10**

	ALL RESIDENTS							
Number	CHC 109,689	FHG 3,967,171	FHN 97,790	FHO 2,253,234	FHT 1,871,124	OTHER 531,712	NON 3,065,788	ONTARIO 11,896,508
MENTAL HEALTH STATUS (%)								
Serious mental illness	5.6	1.6	1.4	1.6	1.7	1.6	1.4	1.5
Mental illness	22.0	25.7	19.8	22.9	19.7	24.4	18.6	22.2
No mental illness	72.0	72.3	75.7	74.5	76.5	72.3	76.8	74.6
ASTHMA (%)	8.2	7.7	5.1	6.2	5.4	6.6	6.9	6.8
DIABETES (%)	9.5	9.8	9.0	8.6	8.0	10.4	5.7	8.3
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (%)	4.3	2.3	2.9	2.6	2.7	2.9	1.7	2.3
RESOURCE UTILIZATION BANDS (RUBS) (%)								
No utilization	1.7	11.2	11.6	11.3	11.7	10.2	15.9	12.4
RUB 1 (low morbidity)	7.1	4.3	5.8	5.7	6.2	4.6	8.7	6.1
RUB 2	18.6	15.1	18.3	17.9	19.2	16.0	22.4	18.3
RUB 3	49.2	50.4	46.5	47.8	45.9	49.8	40.4	46.6
RUB 4	17.3	14.6	12.7	12.9	12.5	14.3	9.5	12.6
RUB 5 (high morbidity)	6.1	4.4	5.1	4.4	4.5	5.1	3.1	4.1
ADJUSTED DIAGNOSTIC GROUPS (ADGS) (%)								
No utilization	1.7	11.2	11.6	11.3	11.7	10.2	15.9	12.4
1–3 ADGs (low comorbidity)	28.8	24.0	32.7	30.5	33.9	27.8	38.5	30.8
4–7 ADGs	42.2	40.5	38.2	39.1	37.7	39.6	32.1	37.6
8–10 ADGs	17.3	16.4	12.2	13.3	11.7	15.1	9.4	13.2
11+ ADGs (high comorbidity)	6.1	7.9	5.3	5.9	5.0	7.3	4.1	6.1

CHC = Community Health Centre, an employee salary model FHG = Family Health Group, a group blended fee-for-service model

FHN = Family Health Network, a group blended capitation model FHO = Family Health Organization, a group blended capitation model (not part of a FHT)

FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs Other = Other small alternate payment models, mostly blended capitation models

NON = Not a CHC client and not rostered to a primary care group

continued on next page...

EXHIBIT 4 CONTINUED...

	URBAN RESIDENTS							
Number	CHC 93,695	FHG 3,830,931	FHN 62,567	FHO 2,068,252	FHT 1,558,589	OTHER 422,423	NON 2,723,109	ONTARIO 10,759,566
MENTAL HEALTH STATUS (%)								
Serious mental illness	6.0	1.6	1.5	1.6	1.8	1.7	1.4	1.6
Mental illness	22.9	25.8	21.3	23.2	20.3	25.5	19.1	22.8
No mental illness	70.8	72.2	75.1	74.3	76.4	71.9	76.9	74.4
ASTHMA (%)	8.6	7.8	5.4	6.3	5.5	6.8	7.2	7.0
DIABETES (%)	9.3	9.9	9.1	8.7	7.9	10.2	5.8	8.4
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (%)	4.2	2.3	2.8	2.6	2.5	2.6	1.6	2.2
RESOURCE UTILIZATION BANDS (RUBS) (%)								
No utilization	1.5	10.9	11.5	10.9	11.4	9.9	15.2	12.0
RUB 1 (low morbidity)	7.1	4.4	5.8	5.8	6.3	4.6	8.9	6.1
RUB 2	18.6	15.2	18.0	18.0	19.3	15.9	22.7	18.3
RUB 3	48.8	50.6	46.6	48.0	46.1	50.3	40.7	46.9
RUB 4	17.8	14.6	13.0	13.0	12.5	14.4	9.5	12.7
RUB 5 (high morbidity)	6.1	4.3	5.2	4.4	4.4	4.9	3.0	4.0
ADJUSTED DIAGNOSTIC GROUPS (ADGS) (%)								
No utilization	1.5	10.9	11.5	10.9	11.4	9.9	15.2	12.0
1–3 ADGs (low comorbidity)	27.9	23.9	32.0	30.3	33.7	26.7	38.2	30.4
4–7 ADGs	42.4	40.6	38.4	39.3	38.0	40.2	32.6	37.9
8–10 ADGs	17.8	16.5	12.5	13.5	11.8	15.6	9.7	13.5
11+ ADGs (high comorbidity)	6.1	8.0	5.6	6.0	5.1	7.6	4.2	6.2

CHC = Community Health Centre, an employee salary model FHG = Family Health Group, a group blended fee-for-service model

FHN = Family Health Network, a group blended capitation model FHO = Family Health Organization, a group blended capitation model (not part of a FHT)

FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs Other = Other small alternate payment models, mostly blended capitation models

NON = Not a CHC client and not rostered to a primary care group

continued on next page...

EXHIBIT 4 CONTINUED...

	RURAL RESIDENTS							
	CHC	FHG	FHN	FHO	FHT	OTHER	NON	ONTARIO
Number	15,994	136,240	35,223	184,982	312,535	109,289	342,679	1,136,942
MENTAL HEALTH STATUS (%)								
Serious mental illness	2.8	1.3	1.0	1.2	1.2	1.5	1.0	1.2
Mental illness	16.7	20.3	17.3	19.2	17.0	20.2	13.8	17.1
No mental illness	79.4	76.1	76.9	76.8	77.0	74.2	75.6	76.2
ASTHMA (%)	5.5	6.2	4.7	5.3	4.8	6.1	4.9	5.2
DIABETES (%)	10.8	7.5	9.0	8.3	8.3	11.2	5.0	7.6
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (%)	4.6	3.4	3.0	3.6	3.4	4.1	2.3	3.2
RESOURCE UTILIZATION BANDS (RUBS) (%)								
No utilization	2.8	19.3	11.9	15.5	13.3	11.1	20.8	16.2
RUB 1 (low morbidity)	6.6	3.6	5.7	5.2	6.1	4.5	7.4	5.9
RUB 2	18.5	13.4	18.8	17.2	18.7	16.6	20.1	18.0
RUB 3	51.5	46.2	46.5	45.5	44.9	48.1	38.5	43.7
RUB 4	14.5	12.3	12.1	11.9	12.0	13.7	9.3	11.4
RUB 5 (high morbidity)	6.1	5.2	4.9	4.7	4.9	6.0	4.0	4.7
ADJUSTED DIAGNOSTIC GROUPS (ADGS) (%)								
No utilization	2.8	19.3	11.9	15.5	13.3	11.1	20.8	16.2
1–3 ADGs (low comorbidity)	33.8	26.6	33.8	32.8	34.9	32.3	40.5	35.0
4–7 ADGs	41.3	36.5	37.9	36.0	36.2	37.2	28.4	34.1
8–10 ADGs	14.8	12.2	11.8	11.1	10.9	13.0	7.2	10.2
11+ ADGs (high comorbidity)	7.3	5.4	4.6	4.7	4.6	6.3	3.1	4.5

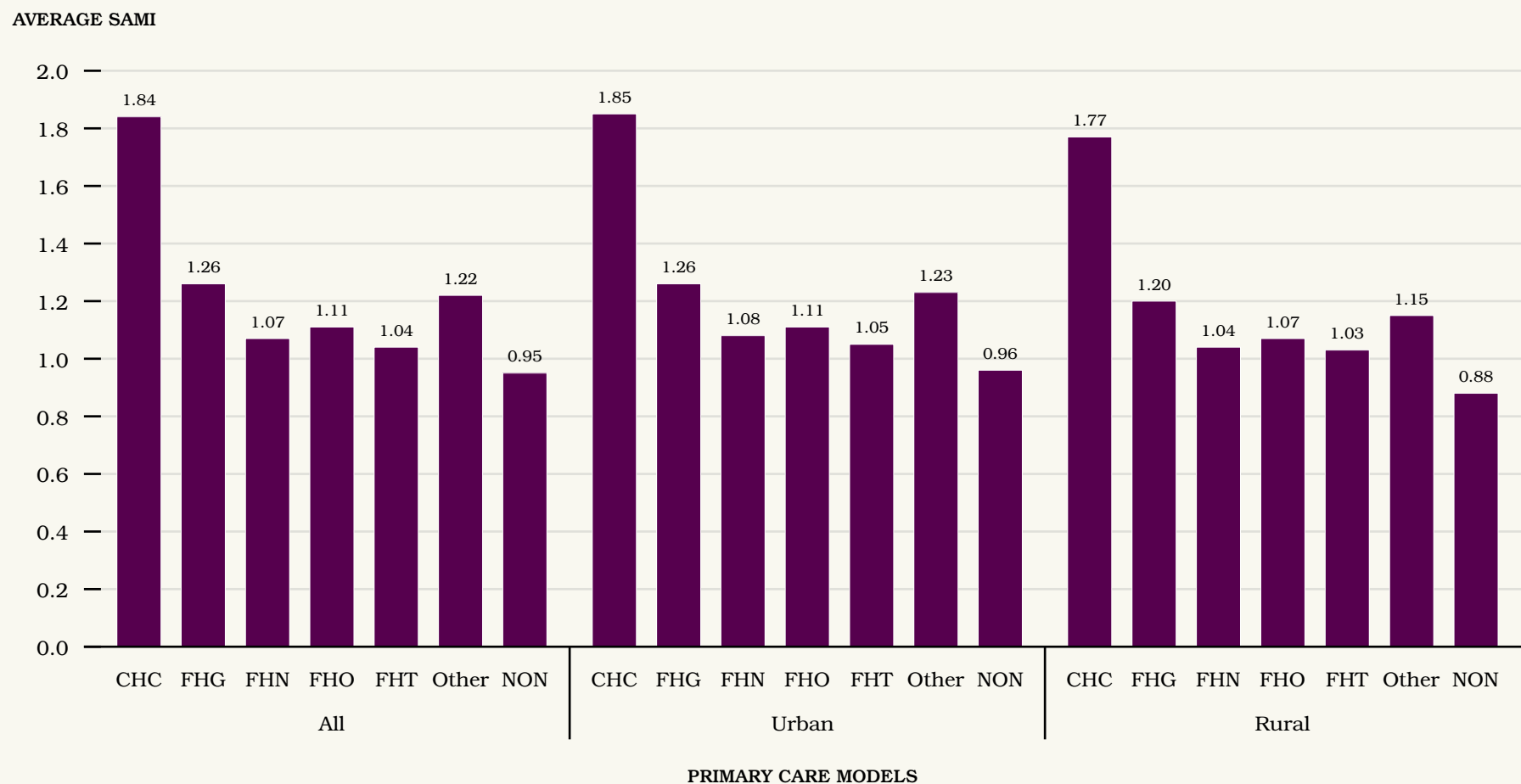
CHC = Community Health Centre, an employee salary model FHG = Family Health Group, a group blended fee-for-service model

FHN = Family Health Network, a group blended capitation model FHO = Family Health Organization, a group blended capitation model (not part of a FHT)

FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs Other = Other small alternate payment models, mostly blended capitation models

NON = Not a CHC client and not rostered to a primary care group

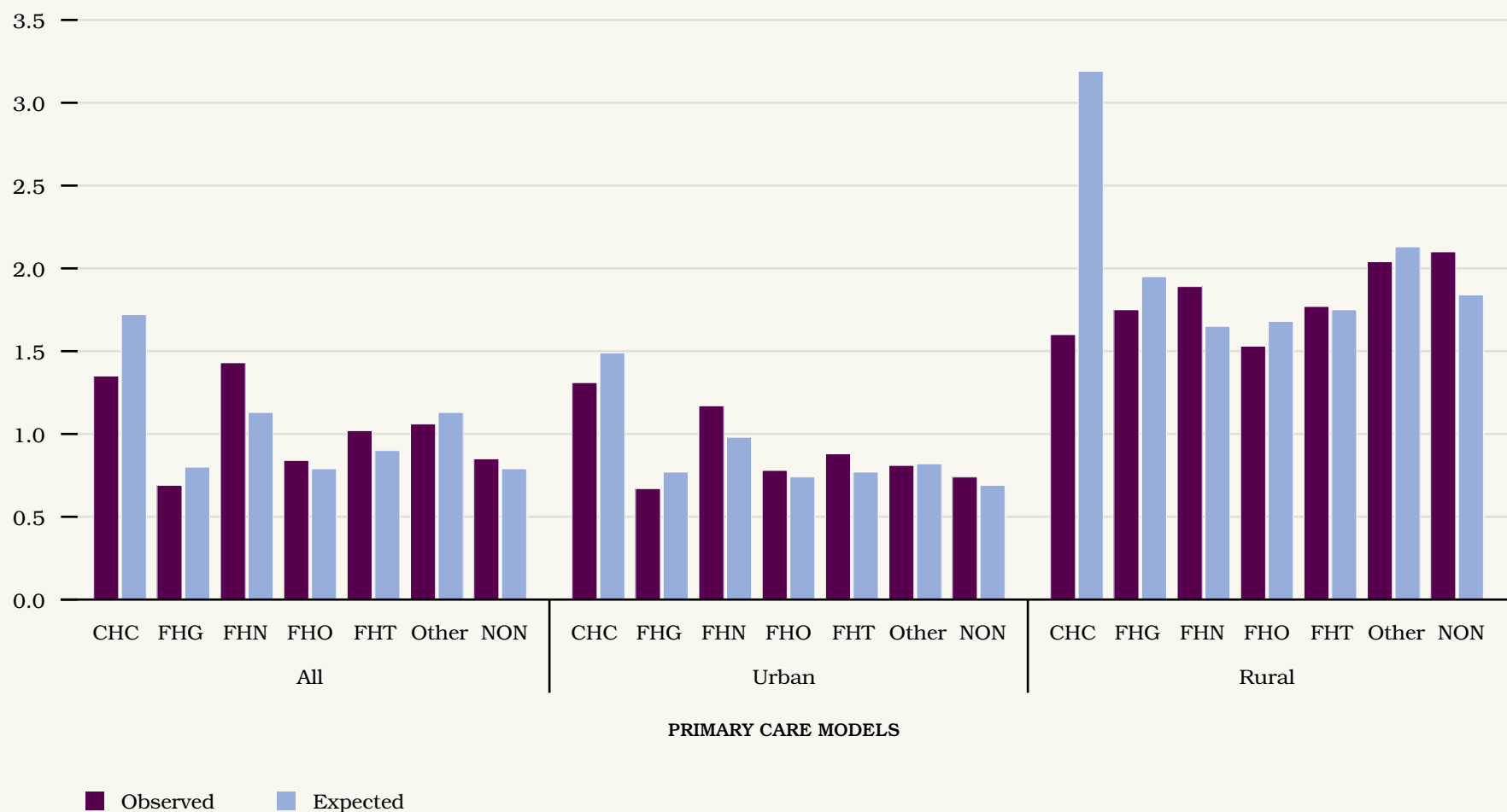
EXHIBIT 5 Standardized ACG Morbidity Index (SAMI) of Ontario residents by primary care model, for all, urban and rural residents, 2008/09 to 2009/10



ACG = Johns Hopkins Adjusted Clinical Groups (ACG) Case-Mix System SAMI = Standardized ACG Morbidity Index, with ACG weights standardized to the Ontario population (1.0 = average Ontario resident)
 CHC = Community Health Centre, an employee salary model FHG = Family Health Group, a group blended fee-for-service model FHN = Family Health Network, a group blended capitation model
 FHO = Family Health Organization, a group blended capitation model (not part of a FHT) FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs
 Other = other small alternate payment models, mostly blended capitation models NON = not a CHC client and not rostered to a primary care group

EXHIBIT 6 Observed and expected mean emergency department (ED) visits per person for Ontario residents by primary care model, for all, urban and rural residents, 2008/09 to 2009/10

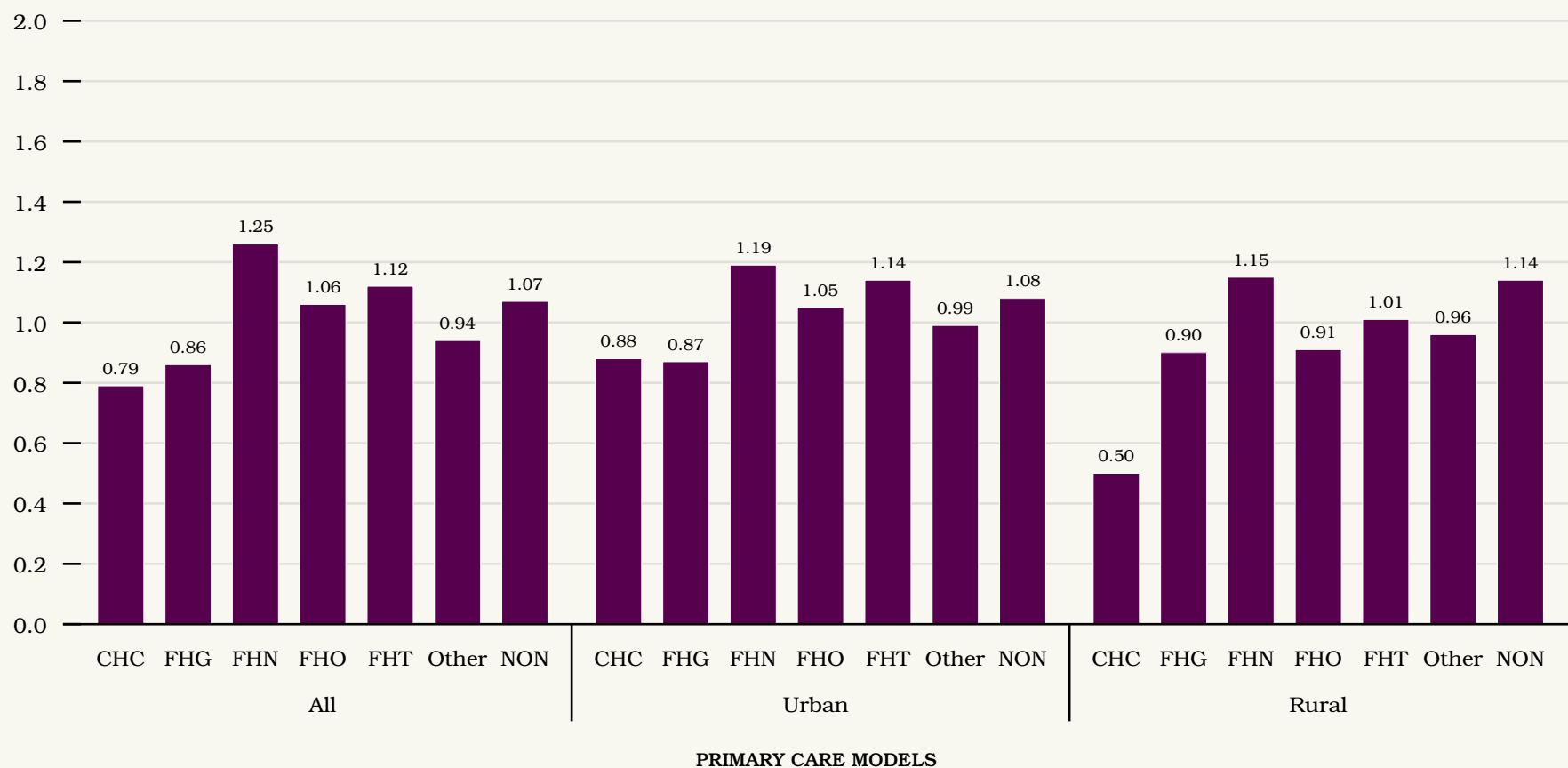
ED VISITS PER PERSON



Expected = after adjustment for age, sex, rurality (for all and urban) and Johns Hopkins Adjusted Clinical Groups (ACGs) CHC = Community Health Centre, an employee salary model
 FHG = Family Health Group, a group blended fee-for-service model FHN = Family Health Network, a group blended capitation model
 FHO = Family Health Organization, a group blended capitation model (not part of a FHT) FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs
 Other = other small alternate payment models, mostly blended capitation models NON = not a CHC client and not rostered to a primary care group

EXHIBIT 7 Ratio of observed/expected mean emergency department (ED) visits per person for Ontario residents by primary care model, for all, urban and rural residents, 2008/09 to 2009/10

OBSERVED/EXPECTED
ED VISITS PER PERSON



Expected = after adjustment for age, sex, rurality (for all and urban) and Johns Hopkins Adjusted Clinical Groups (ACGs) CHC = Community Health Centre, an employee salary model
 FHG = Family Health Group, a group blended fee-for-service model FHN = Family Health Network, a group blended capitation model
 FHO = Family Health Organization, a group blended capitation model (not part of a FHT) FHT = Family Health Team, an interdisciplinary team model consisting of FHNs and FHOs
 Other = other small alternate payment models, mostly blended capitation models NON = not a CHC client and not rostered to a primary care group

Discussion

These analyses have demonstrated distinctly different patterns for Ontario's various primary care models. CHCs served high-needs clients and had lower than expected ED visits. FHGs and a number of 'Other' models served patients that were representative of the population and had lower than expected ED visits. FHNs, FHOs and FHTs—Ontario's capitation models—served higher income populations and had few newcomers. They also had somewhat lower patterns of chronic disease, morbidity and comorbidity and had higher than expected ED visits. Many of those not in any of the models examined appeared to be younger, male and have fewer health care needs.

In the past few years, major new investments have been made in primary care models in Ontario, especially team and capitation models. Ontario's Auditor General reported that \$1.6 billion was spent on non-fee-for-service payments to family physicians in 2009/10, amounting to 43% of total payments to family physicians.²⁹ The majority of these payments would have gone to physicians in FHNs and FHOs, including those that were in FHTs. By 2009/10, mean government

payments per physician were higher in the FHN and FHO models than in other models of care.³⁰ Additional funding for FHTs beyond physician payment was \$244 million in 2010/11.²⁹ The models of care most benefiting from these substantial investments (FHNs, FHOs and FHTs) all appear to proportionally serve more socially advantaged populations and those with fewer health care needs than other Ontario models. These findings likely reflect pre-existing patterns among the physicians and groups that chose to join these models.³¹ Capitation schemes in many other jurisdictions adjust payments for patient health care needs, socioeconomic disparities or both. Lack of such adjustment may have created barriers to entry for physicians with sicker practices^{24,32} and provided an incentive for those with healthier practices to choose a capitation payment model. As patients with high socioeconomic status tend to be healthier, these healthier practices would also be expected to be wealthier. Higher than expected ED visits in capitation practices are also likely to have been features of these practices before they converted from fee for service.³¹ Ontario's capitation models have a major disincentive for outside use of family

physicians or walk-in clinics (they can lose a potential access bonus of up to 18.6% of capitation payments), but there is no penalty for ED use. Therefore, practices in communities with few walk-in clinics, urgent care centres or physicians outside of their group may receive access bonus payments even if they provide inadequate access. Physicians in these types of communities may have been attracted to a larger income boost from switching to capitation. Until recently, physicians were able to make decisions about switching models based on Ministry-provided income projections. The lack of adjustment for health care needs and the structure of the access bonus may have contributed to the patterns found in this study. However, the exact mechanisms remain to be elucidated and require further study and policy analysis.

Both FHTs and CHCs are designed to meet local community needs, but CHCs are distinct from other models in having a broader group of services that include health promotion and that address social determinants of health. They also have governance through a community board and accountability agreements with Local Health Integration

Networks. CHCs serve disadvantaged populations as a consequence of their community mandate, but the reasons why they are associated with lower than expected ED visits is not known. Possible factors include health promoting services, community engagement, longer appointment duration, the presence of long-established interdisciplinary teams, extended hours, client preferences, provider practice styles, practice location in relation to existing services and the nature of appointment scheduling. The mechanisms responsible for lower than expected ED visits are important for health policy decisions and require further investigation, as does the efficiency of CHCs in relation to outcomes.¹²

LIMITATIONS

This report has a number of limitations that should be considered when interpreting its findings.

- Among CHC clients, 11.5% did not have a health card number and could not be linked to Ontario databases. The CHC profile is therefore not representative of all CHC clients, but it does include close to 90% of clients seen in the previous two years. The characteristics and patterns of ED use of those lacking health coverage requires further investigation.
- Nurse practitioners often see patients who do not see physicians. Nurse practitioner encounter data were available for CHCs but not FHTs and for that reason, nurse practitioner encounters (representing 22% of clients in CHCs) were excluded. Inclusion of nurse practitioner data may have resulted in lower levels of morbidity and comorbidity for CHCs and FHTs if nurse practitioners had practices that were less complex than those of physicians. In keeping with that assumption, inclusion of nurse practitioner data for CHCs resulted in a SAMI value of 1.67, lower than that for physician visits only (1.84) but still considerably higher than that in other models (data not shown).
- Patients and clients who died before April 1, 2010 were excluded from the analysis. This may have underestimated the complexity within all of the models because those who died may have had complex problems and high resource utilization needs during the period prior to death.
- Income quintiles represent area-level income and may not accurately reflect income levels of individuals. They are very commonly used in health services research, however, and do correlate with individual-level income.
- The completeness of data may have been an issue at CHCs, especially those that more recently began to use electronic records, and it may also have been an issue in capitation models (FHN, FHO, FHT) that shadow bill, as the completeness of shadow billing is not known.
- These analyses are cross-sectional and do not help to distinguish whether physicians altered their practices or mix of patients as a result of joining a model of care or whether the patterns seen here were pre-existing. An earlier comparison of ED visits in FHNs and FHGs found that higher rates of ED visits were pre-existing in FHNs³¹ and were not likely the result of changing practice.

- There are some subtle differences between models that could have affected results. Visit frequency in capitation-based payment practices may be lower than in fee-for-service,³³ resulting in fewer diagnoses and therefore lower levels of morbidity and comorbidity on the measures used in this study. Visit frequency in CHCs could also have affected these measures, but the direction of the effect is not known, nor is the effect of using a single random diagnosis for CHC visits. Both CHCs and FHTs have interdisciplinary teams but those teams and their roles were at a formative stage in FHTs and well-established in CHCs during the timeframe of this study.
 - Encounter data for CHCs were derived from local electronic records while for other groups physician billing claims were used. These differences in data sources may have introduced differences in measured patterns of morbidity and comorbidity but the nature and direction of such effects are not known. It was possible for an individual to appear in both CHC data and among patients rostered in a primary care model, although that happened rarely. In those cases, the individual was assigned to the CHC.
 - The link between ED visits and access to primary care is mediated by a number of factors that we were unable to measure. These include the availability and appropriateness of local resources, such as walk-in clinics and urgent care centres, patient preferences for place of care, physician practice styles, distances to facilities, availability of parking or public transit and hours of operation. It is likely that these unmeasured factors were responsible for some of the variation in ED visits we found across groups.
 - Finally, many ED visits are not avoidable, even with the best primary care. The existing consensus on avoidable ED visits has identified a very small proportion,³⁴ consisting of minor acute infections, but the actual proportion that is avoidable is not known. Triage level has been used as a proxy for avoidable ED visits.³¹ It was not used in this report because coding was substantially revised during the study period,^{35,36} and how coding changed across urban and rural areas is not known. Nonetheless, a substantial proportion of ED visits appear to be linked to lack of access to timely primary care.^{37,38}
- This work also helped to identify several provincial data limitations.
- Foremost among these is the absence of CHC encounter data in Ontario's health databases. This made it challenging to compare models as CHC data had to be collected manually from electronic records, while records for encounters in other models are collected routinely as part of physician billing claims.
 - A second major issue was the lack of encounter data for nurse practitioners and other non-physician providers in all models. It will be very difficult to determine the contribution of these providers, especially nurse practitioners, without systematically collecting data about their activities at the level of patients and clients.
 - Although capitation models shadow bill, the completeness of shadow billing is unknown and requires study and validation. Finally, many health numbers in the RPDB have outdated addresses, making geographic inferences (such as urban-rural or income quintiles) subject to misclassification.

POLICY IMPLICATIONS

These findings provide several implications for policy.

1 / CHC Model: The CHC model appears to play an especially important role in Ontario for disadvantaged populations. A continuing influx of immigrants to Ontario and growing income inequalities suggest an increasingly important need for care in these populations. Other research has found that health care at CHCs is associated with better chronic disease management and geriatric care, more comprehensive care and greater community orientation.⁷⁻¹¹ The current analyses find that CHC care is also associated with lower than expected ED visits.

2 / Capitation Rates: FHGs and 'Other' models care for a profile of average Ontarians and also have lower than expected ED visits. The capitation models (FHN, FHO, FHT) serve more advantaged Ontarians with a lower illness profile and have higher than expected ED use. Adjusting capitation rates to account for health care needs could help to bring more high needs patients and more high needs practices into these models. Currently, FHGs that switch to capitation can expect to lose income³² in large part due to having sicker than average practices. This barrier to joining capitation models is also a barrier to joining FHTs because only capitation models are allowed. This situation would likely change with appropriate capitation adjustment.

3 / Payment Incentives: The current access bonus payment for avoiding outside primary care use appears to be the wrong incentive to remedy Ontario's very high use of hospital EDs¹⁶ as it does nothing to discourage ED use. As well, many practices receive little or no access bonus and this often occurs in settings with many alternate sources of care, such as major urban centres. Practices in those settings that provide excellent access receive the same treatment (no bonus) as those that fail to provide access. The access bonus may also act as a deterrent for providers in different groups and models to work together to provide timely and after-hours access to members of their community. Another reason to re-examine the access bonus is that access to timely care and after-hours care has not improved in recent years despite an increasing number of Ontarians having a family doctor.³⁹ If payment incentives for access remained a desirable feature of primary care models, the current access bonus could be redesigned to incorporate ED visits, to reflect observed versus expected outside use, or to be based on the availability of same-day and after-hours appointments. A more person-centred approach would be to base incentives or other forms of expectations or accountabilities on patient-reported access to care. For example, access questions on the English General Practice Survey are used for practice-based pay-for-performance, with adjustment for patient characteristics.⁴⁰ In that setting, practices are rewarded for

offering both timely appointments and for offering the ability to book ahead of time. Survey results are publicly available at the practice and regional level.⁴⁰

4 / ED Use: Ontario's high rate of ED use is also an important policy target. Enforcement of existing after-hours commitments has been problematic but is now receiving greater Ministry attention.²⁹ Further expansion of hours, pooling of resources across groups and models of care to meet community needs,⁴¹ incentivizing of home visits, and office redesign to ensure timely access to appointments^{42,43} could all play important roles in reducing ED use.

IMPLICATIONS FOR EVALUATION AND RESEARCH

These findings also provide implications for evaluation and research. The December 2011 report from the Ontario Auditor General noted that the Ministry of Health and Long-Term Care "...had not yet conducted any formal analysis of whether the expected benefits of these more costly alternative funding arrangements have materialized."²⁹ In the same report, the challenges of doing that type of analysis, as well as the complexity of primary care models and payments in Ontario, were acknowledged. There are no true experiments and few longitudinal analyses available to understand the impact of new primary care models³³ and these are much needed to help separate causes from effects. Investments may have positive effects that are not easily discerned in province-wide trends, such as the reversal of the shrinking primary care physician workforce after 2000/01, without which access to care may have worsened rather than remained the same.³⁰ Comparisons with other Canadian jurisdictions would be valuable, as would comparisons with primary care reforms in other developed countries. Strong primary care is the foundation of high-performing health systems⁴⁴⁻⁴⁶ but how best to organize primary care is not as well understood. Each model of primary care appears to have both

strengths and weaknesses.⁶ The details of capitation payment schemes may be especially important for ensuring timely access to care and the inclusion of disadvantaged and sicker populations. It is extremely challenging to understand what mix of models is best in order to meet population and health system needs. Very little work has been done to understand value for money in Ontario's primary care models^{12,33,47,48} and such studies are long overdue.

"Very little work has been done to understand value for money in Ontario's primary care models and such studies are long overdue."

Conclusions

Ontario's primary care models serve different populations and are associated with different outcomes. A move away from fee-for-service reimbursement may be desirable for a high functioning health care system, but how alternate payment mechanisms are structured appears to matter a great deal. The largest current models of care have been costly but have had limited impact on population access to care, which was a key aim. The capitation and team models that have received the most new resources are looking after relatively advantaged groups and are associated with higher than expected ED visits. The payment and incentive structures underlying these models therefore require re-examination. The CHC model offers an attractive alternative in many respects, but CHCs serve a different role than the other primary care models and are resourced and governed quite differently. Where they fit within primary care in Ontario should also be the subject of further policy consideration.

So far, little work has been done to understand value for money in Ontario's primary care models and such analyses are long overdue. Ontario's diversity of primary care models, if properly evaluated, can provide a wealth of information for policy makers. Decision-makers in Ontario and other provinces and countries are grappling with how to make health systems more effective and efficient. Ontario has a unique opportunity to redesign primary care by understanding and applying evidence about its many models of care. It is hoped that this report may help policy makers to understand how Ontario's primary care models relate to the types of patients served and the outcome of ED visits, with a view towards re-orienting existing resources and future investments.

REFERENCES

- 1 Hutchison B, Levesque JF, Strumpf E, Coyle N. Primary health care in Canada: systems in motion. *Milbank Q.* 2011; 89(2):256–88.
- 2 Health Canada. First Minister's Meeting on the Future of Health Care, 2004. Accessed January 25, 2012 at <http://www.hc-sc.gc.ca/hcs-sss/delivery-prestation/fptcollab/2004-fmm-rpm/index-eng.php>.
- 3 Ontario's Community Health Centres. Accessed January 26, 2012 at <http://www.ontariochc.ca>.
- 4 HeathForceOntario. Primary Health Care. Accessed January 25, 2012 at <http://www.healthforceontario.ca/HealthcareInOntario/PrimaryCare.aspx#category06>.
- 5 Ontario Ministry of Health and Long-Term Care. Family Health Teams. Accessed January 26, 2012 at http://www.health.gov.on.ca/transformation/fht/fht_mn.html.
- 6 Lamarche PA, Beaulieu MD, Pineault R, Contandriopoulos AP, Denis JL, Haggerty J. *Choices for Change: The Path for Restructuring Primary Healthcare Services in Canada*. Ottawa: Canadian Health Services Research Foundation; 2003. Accessed January 26, 2012 at http://www.chsrf.ca/Migrated/PDF/ResearchReports/CommissionedResearch/choices_for_change_e.pdf.
- 7 Russell GM, Dahrouge S, Hogg W, Geneau R, Muldoon L, Tuna M. Managing chronic disease in Ontario primary care: the impact of organizational factors. *Ann Fam Med.* 2009; 7(4):309–18.
- 8 Dahrouge S, Hogg WE, Russell G, et al. Impact of remuneration and organizational factors on completing preventive manoeuvres in primary care practices. *CMAJ.* 2012; 184(2):E135–43.
- 9 Dahrouge S, Hogg W, Tuna M, et al. Age equity in different models of primary care practice in Ontario. *Can Fam Physician.* 2011; 57(11):1300–9.
- 10 Liddy C, Singh J, Hogg W, Dahrouge S, Taljaard M. Comparison of primary care models in the prevention of cardiovascular disease – a cross sectional study. *BMC Fam Pract.* 2011; 12:114.
- 11 Muldoon L, Dahrouge S, Hogg W, Geneau R, Russell G, Shortt M. Community orientation in primary care practices: results from the Comparison of Models Of Primary Health Care in Ontario Study. *Can Fam Physician.* 2010; 56(7):676–83.
- 12 Milliken O, Devlin RA, Barham V, Hogg W, Dahrouge S, Russell G. Comparative efficiency assessment of primary care service delivery models using data envelopment analysis. *Can Public Policy.* 2011; 37(1):85–109.
- 13 McCusker J, Roberge D, Lévesque JF, et al. Emergency department visits and primary care among adults with chronic conditions. *Med Care.* 2010; 48(11):972–80.
- 14 Sharon K. Long SK, Stockley K, Dahlen H. Massachusetts health reforms: uninsurance remains low, self-reported health status improves as state prepares to tackle costs. *Health Aff (Millwood).* 2012; 31(2):444–51.
- 15 Schoen C, Osborn R, Squires D, Doty MM, Pierson R, Applebaum S. How health insurance design affects access to care and costs, by income, in eleven countries. *Health Aff (Millwood).* 2010; 29(12):2323–34.
- 16 Guttman A, Schull MJ, Vermeulen MJ, Stukel TA. Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada. *BMJ.* 2011; 342: d2983.

- 17 Kralj B. *Measuring Rurality – RIO2008 BASIC: Methodology and Results*. [Toronto: Ontario Medical Association; 2008.] Accessed January 25, 2012 at http://www.health.gov.on.ca/english/providers/program/uap/docs/up_rio_methodology.pdf.
- 18 Statistics Canada. Postal Code Conversion File Plus (PCCF+). Accessed January 25, 2012 at <http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=82F0086X&lang=eng>.
- 19 The Johns Hopkins University. The Johns Hopkins ACG System. Accessed January 25, 2012 at <http://www.acg.jhsph.org/index.php>
- 20 Starfield B. *Primary Care: Balancing Health Needs, Services and Technology*. New York: Oxford University Press; 1998: 35–54.
- 21 Reid RJ, MacWilliam L, Verhulst L, Roos N, Atkinson M. Performance of the ACG case-mix system in two Canadian provinces. *Med Care*. 2001; 39(1):86–99.
- 22 Reid RJ, MacWilliam L, Roos NP, Bogdanovic B, Black C. *Measuring Morbidity in Populations: Performance of the Johns Hopkins Adjusted Clinical Group (ACG) Case-Mix Adjustment System in Manitoba*. Winnipeg, MB: Manitoba Centre for Health Policy and Evaluation; 1999. Accessed January 25, 2012 at <http://mchp-appserv.cpe.umanitoba.ca/reference/acg.pdf>.
- 23 Reid R, Bogdanovic B, Roos NP, Black C, MacWilliam L, Menec V. *Do Some Physician Groups See Sicker Patients Than Others? Implications for Primary Care Policy in Manitoba*. Winnipeg, MB: Manitoba Centre for Health Policy and Evaluation; 2001. Accessed January 25, 2012 at <http://mchp-appserv.cpe.umanitoba.ca/reference/acg2001.pdf>.
- 24 Sibley LM, Glazier RH. Evaluation of the equity of age-sex adjusted primary care capitation payments in Ontario, Canada. *Health Policy*. 2012; 104(2):186–92.
- 25 Hux JE, Ivis F, Flintoft V, Bica A. Diabetes in Ontario: determination of prevalence and incidence using a validated administrative data algorithm. *Diabetes Care*. 2002; 25(3):512–6.
- 26 Gershon AS, Wang C, Vasilevska-Ristovska J, Cicutto L, To T. Identifying patients with physician diagnosed asthma in health administrative databases. *Can Respir J*. 2009; 16(6):183–8.
- 27 Gershon AS, Wang C, Guan J, Vasilevska-Ristovska J, Cicutto L, To T. Identifying individuals with physician diagnosed COPD in health administrative databases. *COPD*. 2009; 6(5):388–94.
- 28 Steele LS, Glazier RH, Lin E, Evans M. Using administrative data to measure ambulatory mental health service provision in primary care. *Med Care*. 2004; 42(10):960–5.
- 29 Office of the Auditor General of Ontario. 2011 *Annual Report*. Funding Alternatives for Family Physicians. Accessed January 25, 2012 at http://www.auditor.on.ca/en/reports_en/en11/306en11.pdf
- 30 Henry DA, Schultz SE, Glazier RH, Bhatia RS, Dhalla IA, Laupacis A. *Payments to Ontario Physicians from Ministry of Health and Long-Term Care Sources, 1992/93 to 2009/10*. ICES Investigative Report. Toronto: Institute for Clinical Evaluative Sciences; 2012. Accessed February 8, 2012 at http://www.ices.on.ca/file/ICES_PhysiciansReport_2012.pdf.
- 31 Glazier RH, Klein-Geltink J, Kopp A, Sibley LM. Capitation and enhanced fee-for-service models for primary care reform: a population-based evaluation. *CMAJ*. 2009; 180(11):E72–81.
- 32 Hutchison BG, Buckley N, Hurley J, et al. *Needs-adjusted Primary Care Capitation Payment: Development and Comparison of Models*. Hamilton, ON: Centre for Health Economics and Policy Analysis; 2006.

- 33 Kantarevic J, Kralj B. *Quality and Quantity in Primary Care Mixed Payment Models: Evidence from Family Health Organizations in Ontario*. Bonn, Germany: Institute for the Study of Labor; 2011. Accessed January 25, 2012 at <http://ftp.iza.org/dp5762.pdf>.
- 34 Altmayer CA, Ardal S, Woodward GL, Schull MJ. Variation in emergency department visits for conditions that may be treated in alternative primary care settings. *CJEM*. 2005; 7(4):252–6.
- 35 Warren DW, Jarvis A, LeBlanc L, Gravel J, CTAS National Working Group. Revisions to the Canadian Triage and Acuity Scale paediatric guidelines (PaedCTAS). *CJEM*. 2008; 10(3):224–32.
- 36 Bullard MJ, Unger B, Spence J, Grafstein E, CTAS National Working Group. Revisions to the Canadian Emergency Department Triage and Acuity Scale (CTAS) adult guidelines. *CJEM*. 2008; 10(2):136–42.
- 37 Steele S, Anstett D, Milne WK. Rural emergency department use by CTAS IV and V patients. *CJEM*. 2008; 10(3):209–14.
- 38 Field S, Lantz A. Emergency department use by CTAS Levels IV and V patients. *CJEM*. 2006; 8(5):317–22.
- 39 Health Quality Ontario. *Quality Monitor: 2011 Report on Ontario's Health System*. Toronto: Queen's Printer; 2011. Accessed January 25, 2012 at http://www.ohqc.ca/pdfs/2011_report_-_english.pdf
- 40 UK Department of Health. The GP Patient Survey. Accessed January 25, 2012 at <http://www.gp-patient.co.uk/info/>
- 41 van Uden CJ, Giesen PH, Metsemakers JF, Grol RP. Development of out-of-hours primary care by general practitioners (GPs) in The Netherlands: from small-call rotations to large-scale GP cooperatives. *Fam Med*. 2006; 38(8):565–9.
- 42 O'Hare CD, Corlett J. The outcomes of open-access scheduling. *Fam Pract Manag*. 2004; 11(2):35–8.
- 43 Quality Improvement and Innovation Partnership. Advancing Improvement in Primary Healthcare in Ontario. Accessed January 25, 2012 at http://www.qiip.ca/primary_health_care.php.
- 44 Starfield B. Primary care: an increasingly important contributor to effectiveness, equity, and efficiency of health services. SESPAS report 2012. *Gac Sanit*. 2012 Jan 20 [Epub ahead of print].
- 45 Macinko J, Starfield B, Shi L. Quantifying the health benefits of primary care physician supply in the United States. *Int J Health Serv*. 2007; 37(1):111–26.
- 46 Engström S, Foldevi M, Borgquist L. Is general practice effective? A systematic literature review. *Scand J Prim Health Care*. 2001; 19(2):131–44.
- 47 Kantarevic J, Kralj B, Weinkauff D. Enhanced fee-for-service model and physician productivity: evidence from Family Health Groups in Ontario. *J Health Econ*. 2011; 30(1):99–111.
- 48 Hurley J, DeCicca P, Li J, Buckley G. *The Response of Ontario Primary Care Physicians to Pay-for-Performance Incentives*. Hamilton, ON: Centre for Health Economics and Policy Analysis; 2011. Accessed January 25, 2012 at http://www.chepa.org/Libraries/PDFs/CHEPA_WP_11-2_1.sflb.ashx.

Institute for Clinical
Evaluative Sciences (ICES)

G1 06, 2075 Bayview Avenue
Toronto, Ontario M4N 3M5

Email: info@ices.on.ca
416.480.4055

www.ices.on.ca

ICES Institute for Clinical
Evaluative Sciences