# Primary Care Physicians' Specialist Referral Rates in Ontario: Blended Capitation versus Enhanced Fee-for-Service

Nadine Chami and Arthur Sweetman

ABSTRACT

*** *Preliminary and not for distribution* ***

*Purpose:* Economic theory suggests that physicians whose primary method of payment is fee-for-service (FFS) have less incentive to refer patients to specialists than physicians in a capitated payment model. This study aims to understand the impact of transitioning from an enhanced FFS payment model, known as a Family Health Group (FHG), to a mixed capitated payment model, identified as a Family Health Organization (FHO), on referral patterns of primary care physicians to specialists in Ontario.

*Methods:* Using five years of Ontario administrative data, we result in a panel of 3101 primary care physicians who were all in a FHG in the beginning of the sample period, April 1st 2006, and either remain in a FHG or switch to a FHO by the end of the sample period. March 31st 2011. The estimation technique used is a fixed effects difference-in-differences estimation using weights generated from propensity score matching because it is believed that the underlying identifying assumption is conditional independence. Additionally, paired bootstrapping is employed because the weights generated are estimates and not true parameters.

*Results:* On average, the number of listed referrals of primary care physicians that join the FHO model is greater than that of physicians who remain in the FHG model, but the overall number of specialist visits of enrolled patients either remains constant or decreases once the physician joins the FHO model. For virtually rostered patients, both listed referrals and specialist visits decrease once the physician joins the FHO model compared to physicians who remain in the FHG model. Additional estimation shows that the difference in referral rates between FHG and FHO physicians appears in years after the year of the switch.

*Conclusions:* Results are not in line with economic theory. Therefore, the blended capitation model seems to be successful in reducing the incentive of capitated physicians to increase their specialist referrals. Further, interdisciplinary teams seem to reduce referral rates.

**How Does Primary Care Affect Laboratory Utilization in Ontario?**

Nadine Chami and Arthur Sweetman

ABSTRACT

*** *Preliminary and not for distribution* ***

*Purpose:* The purpose of this paper is to examine how the primary care model affects physicians' lab utilization, especially physicians that belong to an interdisciplinary Family Health Team (FHT) where there is concern of greater lab test use. The effect of patient enrolment on lab utilization of primary care physicians is also studied by comparing a switch from a FHG (Family Health Group) model which does not have enrolment requirements, to a FHO (Family Health Organization) model which has patient enrolment requirements.

*Methods:* Ontario administrative data from April 1st 2006 to March 31st 2011 is used to create a panel of 2943 primary care physicians. A differences-in-differences fixed effects model applying weights from a propensity score matching estimation is used to study the effects of switching from the predominantly fee-for-service FHG model to the blended capitation FHO model.

*Results:* Results show that physicians do not significantly change their lab referrals, labs ordered, or total value of labs once they join the FHO model, but only if they are not affiliated with a FHT. FHT physicians are shown to increase their lab utilization by approximately 10% for continuously rostered patients once switching from a FHG if the physician joined a FHT later in the sample period.

*Conclusions:* Enrolment requirements and/or continuity of care improvements may contribute to increased laboratory utilization. Additionally, interdisciplinary teams may have a greater intensity of lab use.

# PRIMARY CARE PHYSICIANS' REFERRAL RATES IN ONTARIO

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# Research Questions

Impact of switching from FHG (enhanced fee-for-service) to FHO (blended capitation) on primary care physicians':

1. Specialist referral rate
2. Laboratory referral rate

# Motivation

- To understand the behavioural responses of physicians to Primary Care Reform

- Key limitation:
  - Not able to look at long-run effects due to short panel length (5 years)

## 1. Specialist Referrals:

- Simple Economic Theory: switch from a FFS payment model to a "pure" capitated payment model has incentives for higher specialist referral rates
  - FHO physicians not remunerated per service provided

    → incentive to send patients to a specialist
  - However, the incentive is less pronounced, and maybe even avoided, in blended capitation compared to pure capitation
    - Does Ontario's blended model alleviate this incentive?

## 2. Lab Referrals:

- Concern that interdisciplinary teams use more testing
  - Alternatively, improved continuity of care may lead to more or less testing in different contexts
- Effect of enrolment requirements on laboratory utilization of primary care physicians

# Outline

Part 1: Specialist Referral Rate

Part 2: Lab Referral Rate

For each

- Data
- Descriptive Statistics
- Empirical Model
- Results
- Conclusion

# Specialist Referral Rate

# Data

- Initially, all physicians affiliated with a FHG as of April 1st 2006
  - Then, either remain in a FHG or switch to a FHO by March 31st 2011
- Panel data set of 3101 primary care physicians
  - Unit of observation is the physician
- 5 year panel

# Definitions

- **Official Roster:** patients rostered with the same primary care physician each and every year of the sample period

- **Virtual Roster:** patients assigned to family physicians in that year who have the greatest dollar value in total billings in the previous 2 years

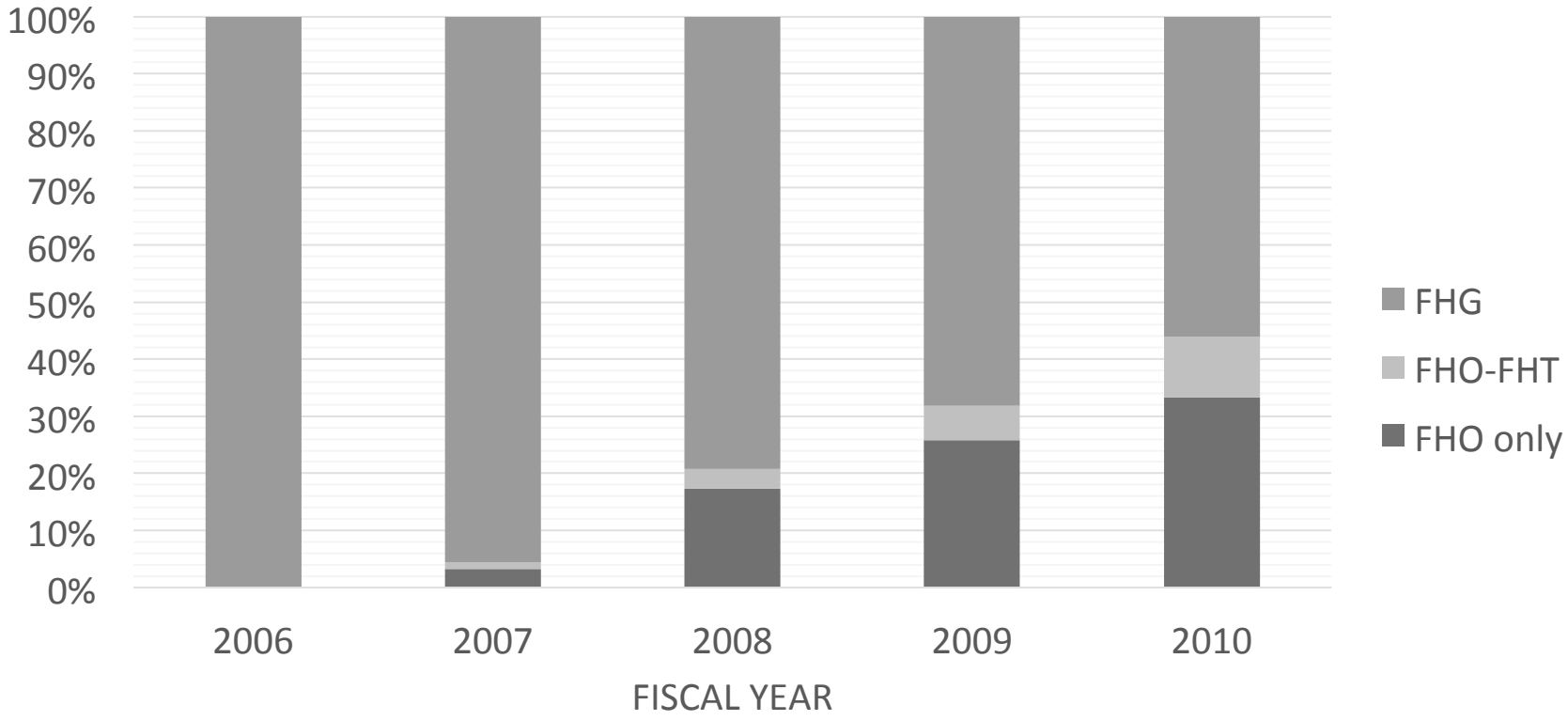
- **Referral Rate of a Physician:** number of referrals divided by number of patients rostered in the year of the referral

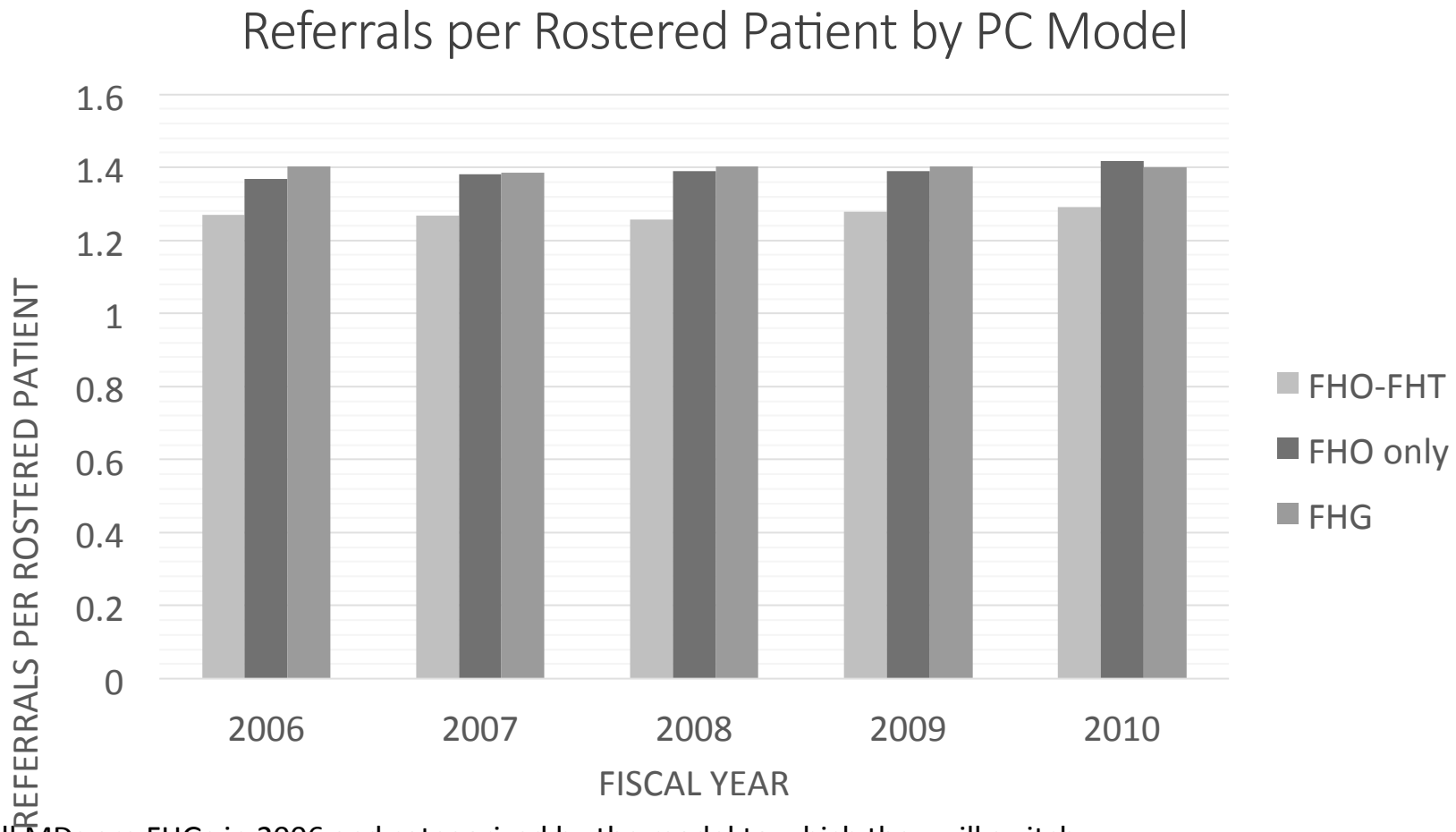
# Two measures of a Referral:

- **Listed Referral:** rostering primary care physician is listed as a referring physician

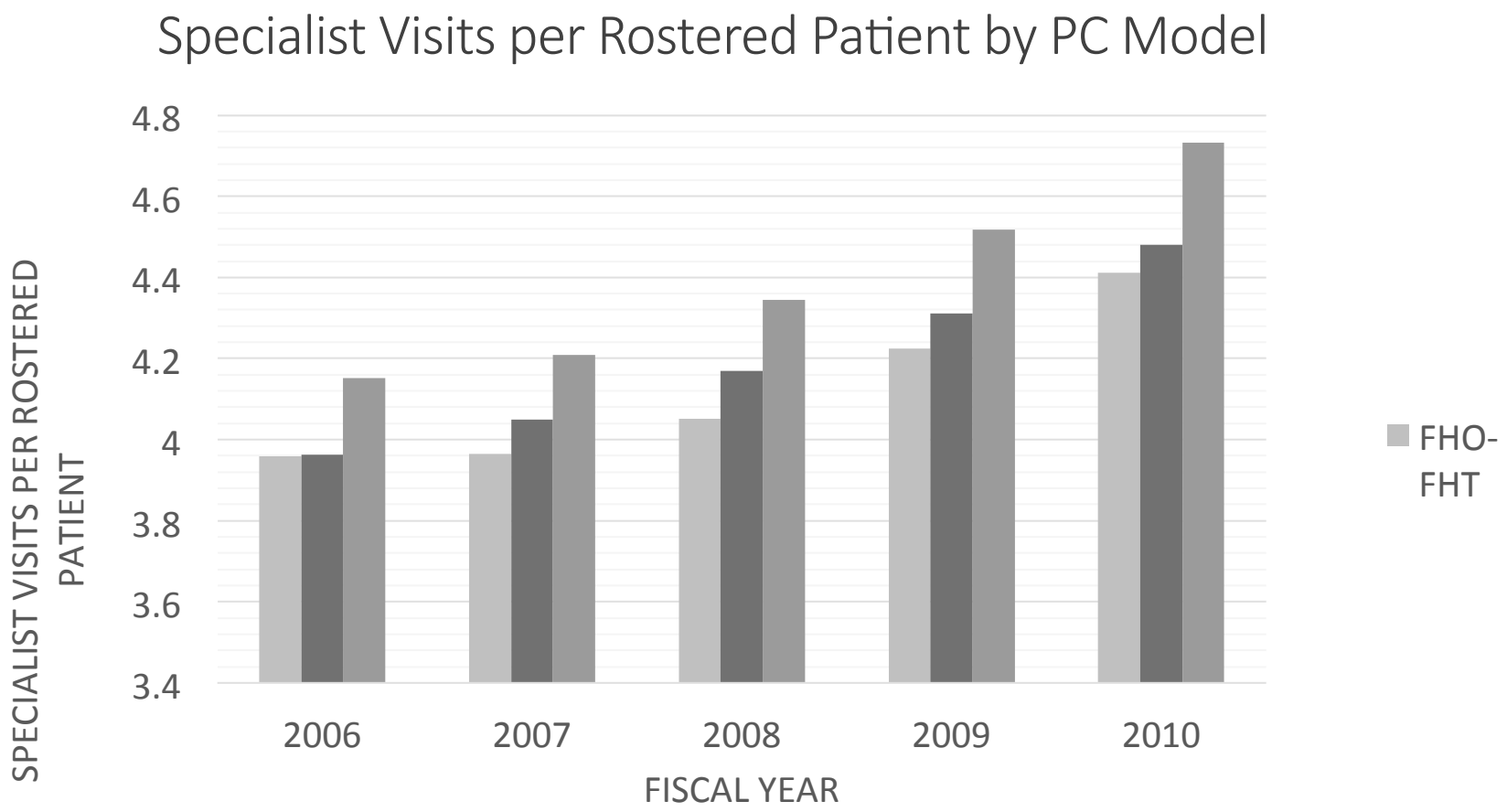
- **Specialist Visit:** all visits in the year with any specialist by patients rostered with the primary care physician regardless of identification of the referring physician

# Distribution of physicians across models by year






All MDs are FHGs in 2006 and categorized by the model to which they will switch


Specialist Visits per Rostered Patient by PC Model
SPECIALIST VISITS PER ROSTERED PATIENT
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
2006
2007
2008
2009
2010
FISCAL YEAR
FHO-
FHT

# Empirical Model

Propensity weighted difference-in-differences fixed effects model:

$$log(R_{it}) = \alpha_i + \lambda_t + \beta X_{it} + \delta_1 EarlyFHO_{it} + \delta_2 LateFHO_{it} + \mu_1 EarlyFHT_{it} + \mu_2 LateFHT_{it} + u_{it}$$

$EarlyFHO_{it}$= 1 if FHO all year if switched in 2007 or 2008
= 0 if FHG all year if switched in 2007 or 2008
= % of year affiliated with FHO if part year if switched in 2007 or 2008

$LateFHO_{it}$= 1 if FHO all year if switched in 2009 or 2010
= 0 if FHG all year if switched in 2009 or 2010
= % of year affiliated with FHO if part year if switched in 2009 or 2010

| Summary Statistics, 2006 | | | |
|---|---|---|---|
| | | Comparison (FHG) | |
| | Treatment (FHO+FHT) | Full Sample | Weighted Matched Sample |
| Number of Physicians | 1362 | 1739 | 1359 |
| Visits per patient | 3.49 | **3.67*** ** | **3.58*** |
| Services per patient | 4.78 | **5.27*** ** | **4.93**** |
| Daily Visits | 29 | **31*** ** | 29 |
| Daily Services | 39 | **45*** ** | 40 |
| Annual Working Days | 249 | 250 | 251 |
| Roster Size | 1387 | **1296*** ** | 1406 |
| Virtual Roster Size | 1502 | **1573*** ** | 1534 |
| Average Physician Age | 53 | **55*** ** | 53 |
| Male physicians | 63% | 65% | 63% |
| Years of Practice | 23 | **25*** ** | 23 |
| Income Gain | $23,286 | -**$25,448*** ** | $17,895 |
| *Geographic Area of Practice* | | | |
| Major Urban | 46% | **58%*** ** | 47% |
| Non-major Urban | 49% | **40%*** ** | 47% |
| Rural | 5% | **2%*** ** | 6% |
| *Place of Graduation* | | | |
| Canada | 85% | **73%*** ** | 84% |
| Foreign | 15% | 27% | 16% |

* p<0.10, ** p<0.05, *** p<0.01

| Propensity Weighted Difference-in-Differences Fixed Effects Model | | | | |
|---|---|---|---|---|
| | Official Roster | | Virtual Roster | |
| | Listed Referrals | Specialist Visits | Listed Referrals | Specialist Visits |
| EarlyFHO | **.0368*** ** | .0010 | **.0130** ** | .0001 |
| | (.0121) | (.0069) | (.0099) | (.0070) |
| LateFHO | .0041 | **-.0147*** ** | **-.0202*** | **-.0088*** |
| | (.0151) | (.0079) | (.0156) | (.0081) |
| EarlyFHT | -.0132 | **-.0535*** ** | **-.0293*** | **-.0354*** ** |
| | (.0288) | (.0233) | (.0276) | (.0170) |
| LateFHT | **.0290*** ** | .0060 | **-.0237** ** | **-.0133*** |
| | (.0188) | (.0132) | (.0168) | (.0133) |
| $R^2$ | | | | |
| *Within* | .1322 | 0.2860 | 0.1506 | 0.4379 |
| *Between* | .0072 | 0.1213 | 0.0128 | 0.2363 |
| *Overall* | .0024 | 0.0629 | 0.0063 | 0.0592 |
| N | 3101 | 3101 | 3172 | 3172 |
| T | 5 | 5 | 5 | 5 |
| N*T | 15505 | 15505 | 15860 | 15860 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

# Dealing with Wait Times

- Problem: date primary care physician requested specialist visit is not known
- Need to consider lag between date referral was made and date of specialist visit
- Consider 4 models:
  - Physicians who switched to FHO in 2007
  - Physicians who switched to FHO in 2008
  - Physicians who switched to FHO in 2009
  - Physicians who switched to FHO in 2010

E.g. Physicians who switched to FHO in 2007

$$log(R_{it}) = \alpha_i + \lambda_t + \beta X_{it} + \delta_1 FHO7_{it} + \delta_2 FHO8_{it} + \mu_1 FHO9_{it} + \mu_2 FHO10_{it} + u_{it}$$

where $FHO_{it}$ is a variable interacted with year dummy variables to control for the lag

| | Propensity Weighted DinD FE Model by Year of Switch, Listed Referrals | | | |
|---|---|---|---|---|
| | Switched in 2007 | Switched in 2008 | Switched in 2009 | Switched in 2010 |
| FHO7 | . 0151 | - | - | - |
| | (.0325) | - | - | - |
| FHO8 | . 0146 | . 0133 | - | - |
| | (.0279) | (.0119) | - | - |
| FHO9 | .0171 | **.0350** *** | -.0189 | - |
| | (.0144) | (.0102) | (.0158) | - |
| FHO10 | **.0567** *** | **.0650** *** | **.0240** * | .0233 |
| | (.0165) | (.0112) | (.0130) | (.0174) |
| FHT7 | . 0575 | - | - | - |
| | (.1656) | - | - | - |
| FHT8 | -**.0885**** | .0411 | - | - |
| | (.0358) | (.0281) | - | - |
| FHT9 | -**.0981***** | **.0652***** | .0306 | - |
| | (.0368) | (.0216) | (.0301) | - |
| FHT10 | .0349 | **.0619***** | .0005 | .0186 |
| | (.0293) | (.0223) | (.0173) | (.0259) |
| N | 1915 | 2290 | 2074 | 2046 |

* p < 0.10, ** p < 0.05, *** p < 0.01

| Propensity Weighted DinD FE Model by Year of Switch, Specialist Visits | | | | |
|---|---|---|---|---|
| | Switched in 2007 | Switched in 2008 | Switched in 2009 | Switched in 2010 |
| FHO7 | **-.0418*** | - | - | - |
| | (.0247) | - | - | - |
| FHO8 | -.0134 | . 0065 | - | - |
| | (.0099) | (.0085) | - | - |
| FHO9 | **-.0217*** | **. 0012** | -.0113 | - |
| | (.0131) | (.0056) | (.0080) | - |
| FHO10 | **. 0035** | **. 0055** | -.0105 | **-.0207**** |
| | (.0148) | (.0070) | (.0072) | **(.0105)** |
| FHT7 | -.1651 | - | - | - |
| | (.1127) | - | - | - |
| FHT8 | **-.0967***** | -.0195 | - | - |
| | (.0317) | (.0178) | - | - |
| FHT9 | **-.1003***** | -.0171 | . 0233 | - |
| | (.0330) | (.0167) | (.0221) | - |
| FHT10 | **-.0708***** | **. 0204** | -.0035 | . 0052 |
| | (.0235) | (.0179) | (.0125) | (.0164) |
| N | 1915 | 2290 | 2074 | 2046 |

* p < 0.10, ** p < 0.05, *** p < 0.01

# Conclusion (Specialist Referral Rate)

- Blended capitation model seems to be successful in reducing the incentive of capitated physicians to increase their specialist referrals

- Further, interdisciplinary teams seem to reduce referral rates

# Lab Utilization

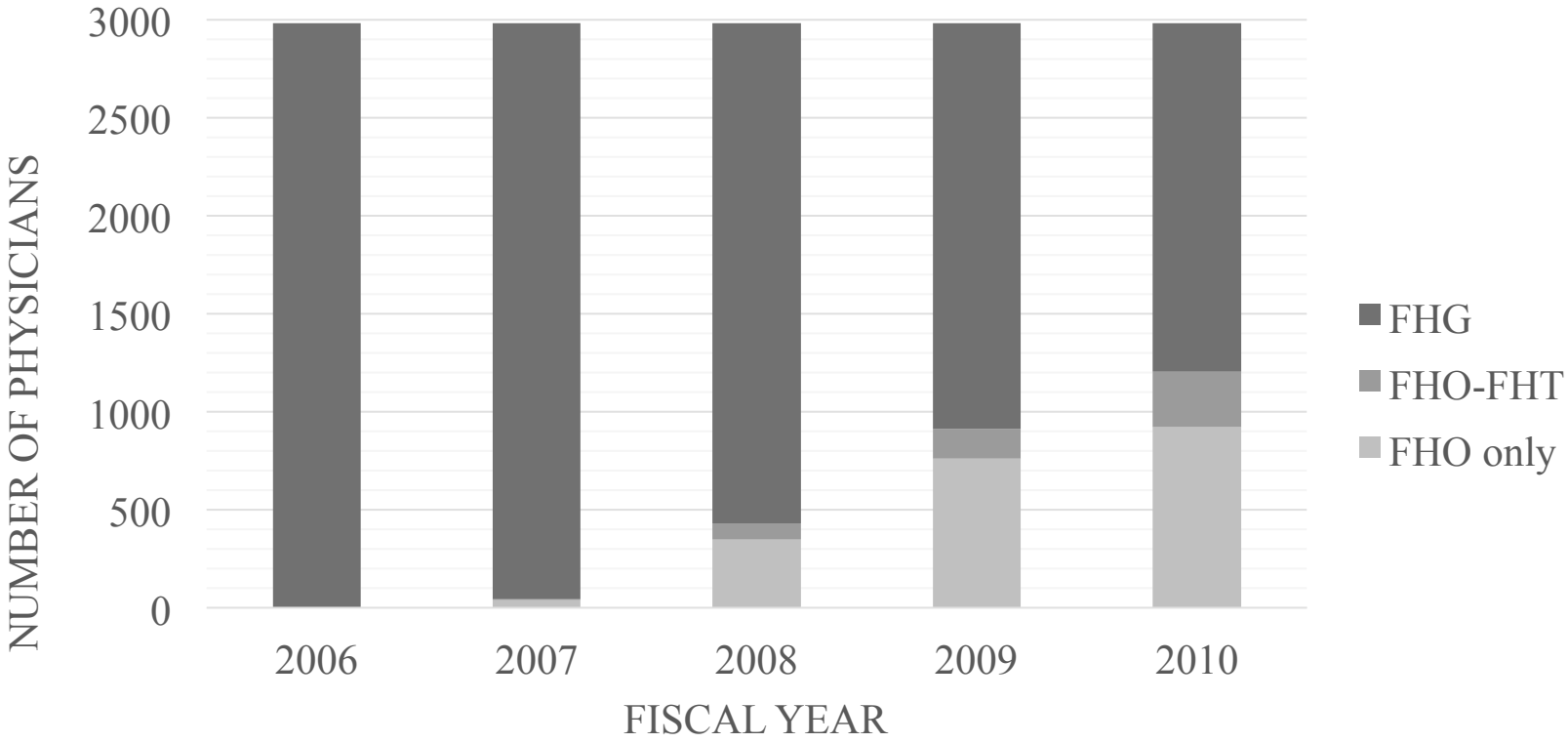
# Data and Definitions

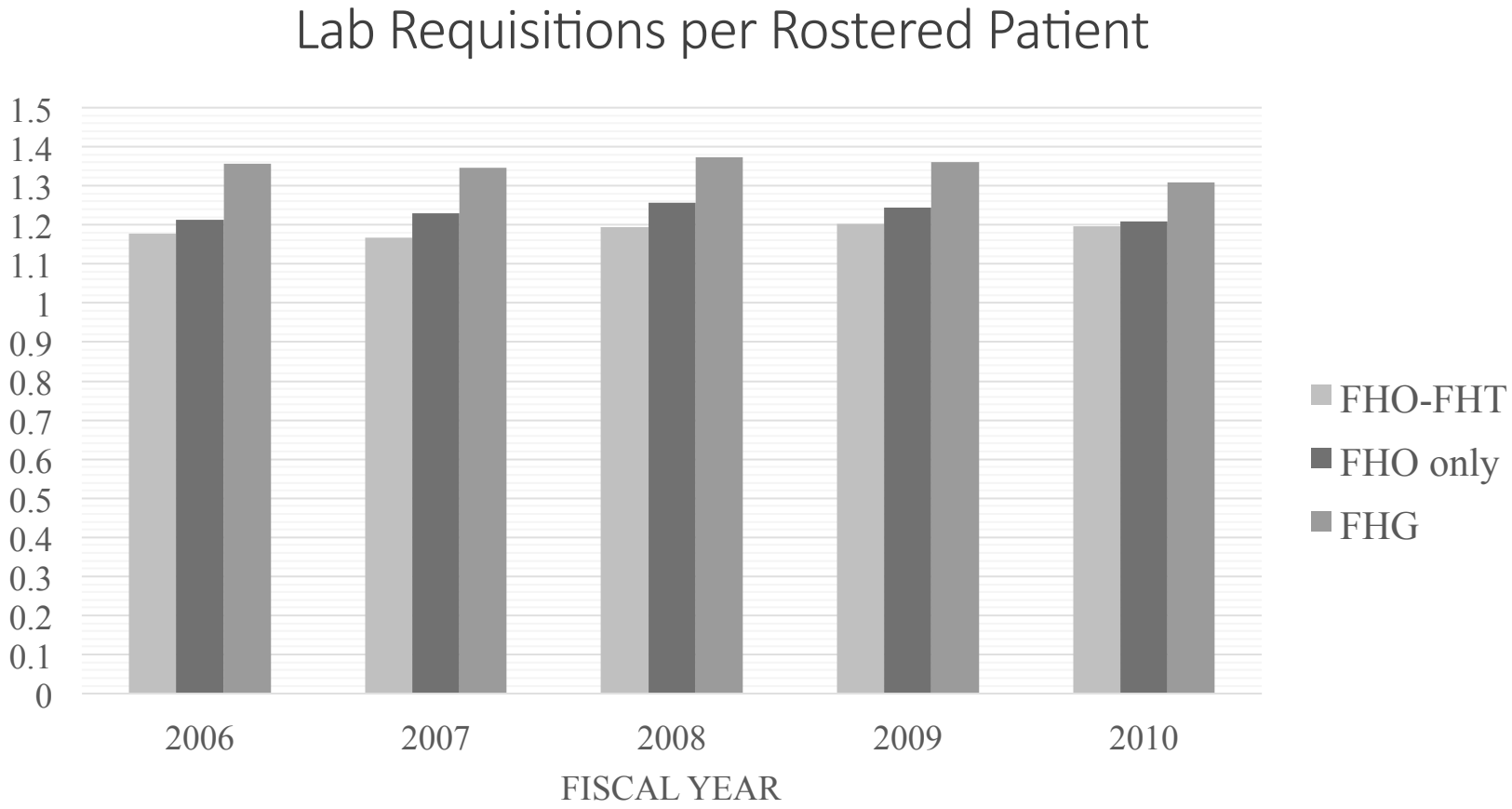
- **Lab requisition:** all lab tests ordered by a primary care physician to the same patient on the same day

- **Lab requisition per patient:** number of lab requisitions divided by number of patients continuously rostered by physician in each year

- 2979 primary care physicians

# Distribution of Physicians by PC Model






All MDs are FHGs in 2006 and categorized by the model to which they will switch

# Empirical Model

Propensity weighted difference-in-differences fixed effects model:

$$log(L_{it}) = \alpha_i + \lambda_t + \beta X_{it} + \delta FHO_{it} + \mu FHT_{it} + u_{it}$$

Table 2: Summary Statistics – All Patients, 2006

| | Treatment (FHO+FHT) | Comparison (FHG) | |
|---|---|---|---|
| | | Full Sample | Weighted Matched Sample |
| Number of Physicians | 1,326 | 1,653 | 1,362 |
| Lab Requisitions | 1,127 | **1,093*** ** | **1,157*** |
| Labs Ordered | 7,242 | **7,589*** ** | **7,530**** |
| Lab Value | $41,463 | **43,830*** ** | **43,651*** ** |
| Patients with at least 1 lab ordered | 470 | **448*** ** | **481*** ** |
| Daily Visits | 29 | **32*** ** | 29 |
| Daily Services | 40 | **45*** ** | 40 |
| Annual Working Days | 249 | 251 | 251 |
| Roster Size | 1,412 | **1,341*** ** | 1,423 |
| Average Physician Age | 53 | **55*** ** | 53 |
| Lab requisitions for male patients | 40% | **41%** | 40% |
| Male physicians | 63% | 65% | 62% |
| Years of Practice | 24 | **25*** ** | 24 |
| Income Gain | $25,366 | **-$20,778*** ** | $24,974 |
| *Geographic Area of Practice* | | | |
| Major Urban | 46% | **58%*** ** | **48%*** |
| Non-major Urban | 49% | **40%*** ** | **46%**** |
| Rural | 5% | **2%*** ** | 6% |
| *Place of Graduation* | | | |
| Canada | 85% | **73%*** ** | 84% |
| Foreign | 15% | 27% | 16`% |

* p<0.10, ** p<0.05, *** p<0.01

| Propensity Score Weighted Difference-in-Differences Fixed Effects | | |
|---|---|---|
| | Continuously Rostered Patients | |
| | Rostering Physician | All Physicians |
| FHO only | .0003 | **-.0377*** ** |
| | (.0175) | (.0118) |
| FHT | **.0782** ** | .0128 |
| | (.0460) | (.0231) |
| $R^2$ | | |
| *Within* | 0.1364 | .1597 |
| *Between* | 0.0206 | .0273 |
| *Overall* | 0.0109 | .0297 |
| N | 2,979 | 2,979 |
| T | 5 | 5 |
| N*T | 14,895 | 14,895 |

* p < 0.10, ** p < 0.05, *** p < 0.01

# Results

- All lab requisitions for continuously rostered patients are about 4% less for FHOs compared to FHGs when physician joins FHO
- However, a focus on lab requisitions ordered by the rostering physician show no change when rostering physician joins FHO
- FHT physicians increase their lab utilization by approximately 8% for continuously rostered patients after switching from a FHG

# Conclusion (Lab Utilization)

- Enrolment requirements and/or continuity of care improvements may contribute to increased laboratory utilization
- Interdisciplinary teams may have a greater intensity of lab use