

Primary Care Physician Responses to Pay-for-Performance – Evidence from a Natural Experiment

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Motivation

- Recent trend of using explicit Pay-for-Performance (P4P) incentives to improve quality of care
- Escalating debates on P4P programs
- Theoretical predictions are unclear
- Rare and inconclusive empirical evidence
- Important to quantify the P4P incentive effects to provide solid evidence and policy recommendations

Objective

- Empirically identify P4P incentive effects
 - exploit a natural-experiment of GP funding practice in Ontario, Canada
- Contribution to the literature
 - primary care reform in Ontario provides a good “experiment”
 - exploit rich administrative data sources
 - the universal public insurance system in Canada provides a good study setting
 - examines the heterogeneity of the P4P incentive effects to identify the context in which the P4P incentives may exert larger influence on physician behaviour

Research Questions

- Ontario's primary care performance-based incentive payments
- Research questions
 - 1) Have the performance-based incentive payments for five preventive care services and for six defined sets of physician services increased the provision of these services in the targeted populations?
 - 2) Do the incentive effects vary by physician age, practice size and baseline level of compliance?
- The analysis is limited to a set of
 - 1) 5 preventive care incentives —
Pap Smear, Mammogram, Senior Flu Shot, Toddler Immunization, Colorectal Cancer Screening
 - 2) 6 special payments --
Obstetrical Deliveries, Hospital Services, Palliative Care, Office Procedures, Prenatal Care, Home Visits

Performance-based Incentive Payments

- Preventive Care Service Enhancement Payments

- Contact Payment

- Cumulative Preventive Care Bonuses

Senior Flu Shot bonus: target level based on percentage of rostered patients age 65+ who received a flu shot during the last flu season. A physician receives--

\$220 (60% of patients)

\$440 (65%)

\$770 (70%)

\$1,100 (75%)

\$2,200 (80%)

- Special payments for Defined Sets of Services

- Obstetrical services special payment—

A physician receives a payment of \$3,200 if attended 5 or more births for 5 or more women during the previous fiscal year

Institutional Background

- The natural experiment

Traditional FFS practice vs. 4 primary care renewal models: the Family Health Network model (FHN), the Family Health Group model (FHG), the Comprehensive Care Model (CCM) and the Family Health Organization (FHO)

Table 1. Eligibility timelines for the 5 preventive care bonuses by practice types

	2002	2003	2004	2005	2006	2007	2008
Senior Flu Immunization. Toddler Immunization, Pap Smear and Mammogram							
FHN	April						
FHG							April
CCM							April
FHO							April
Colorectal Cancer Screening							
FHN						April	
FHG						April	
CCM						April	
FHO							April

Institutional Background

Table 2. Eligibility timelines for the 6 special payments by practice types

	2002	2003	2004	2005	2006	2007	2008
Obstetrical Services, Hospital Services, Office Procedures, Prenatal Care and Home Visits							
FHN	April						
FHG	- never eligible -						
CCM	- never eligible -						
FHO						November	
Palliative Care							
FHN	April						
FHG			July				
CCM	- never eligible -						
FHO						November	

Institutional Background

- Differences between the PCR models and traditional FFS practice

Table 3. Fee-for-service and Primary Care Reform models in this Study

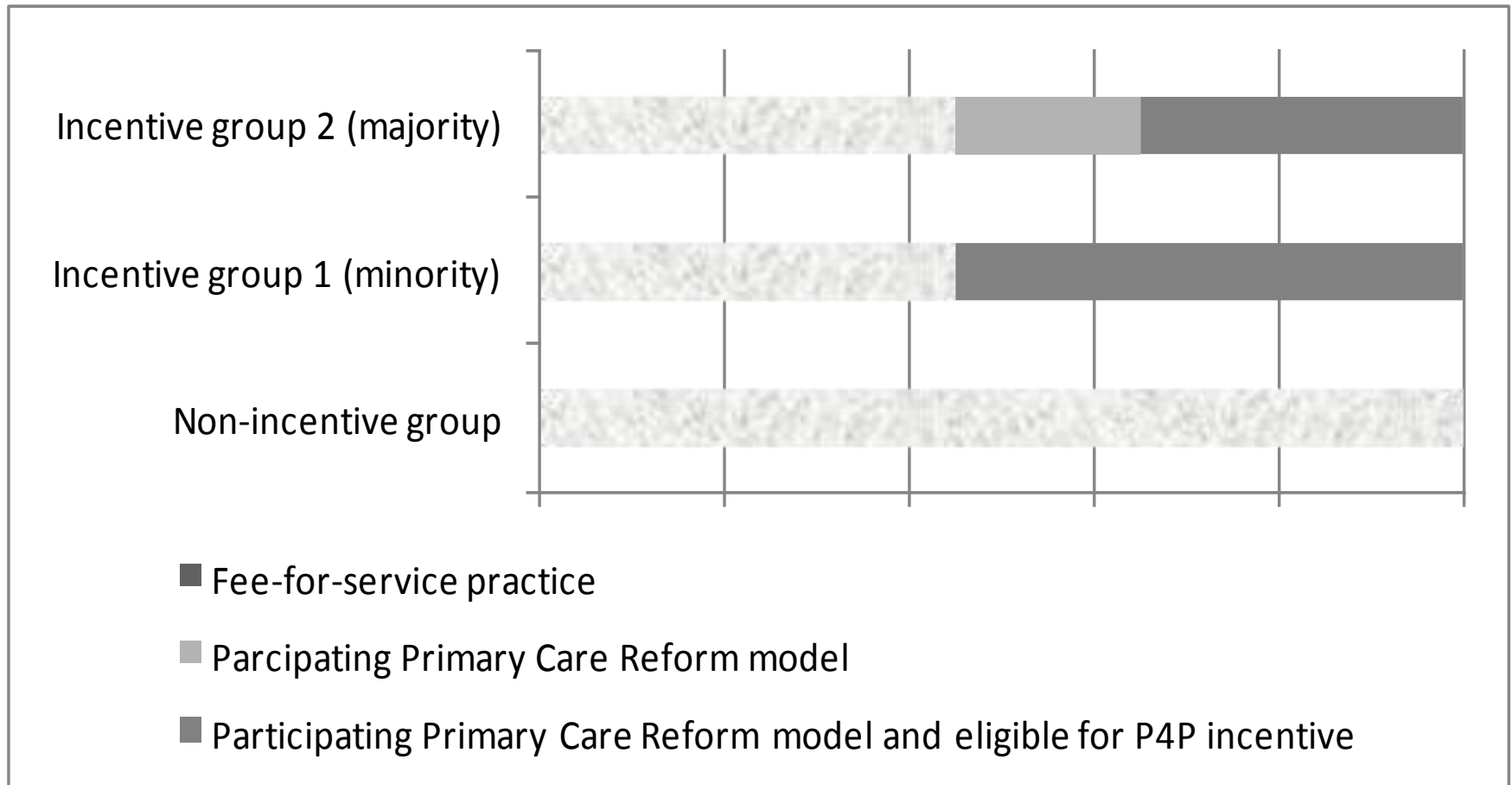
Model	Funding	Size/Rostering	After-hours Requirements
Traditional Fee-for-service (FFS)	FFS	None	None
Family Health Network (FHN)	Blended capitation	Physician: at least 3 FPs Rostering: minimum roster size	Extended hours, Nurse-staffed Telephone Health Advisory Services (THAS), On-call services
Family Health Group (FHG)	Enhanced FFS	Physician: at least 3 FPs Rostering: voluntary	Yes
Comprehensive Care Model (CCM)	Enhanced FFS	Physician: solo practice Rostering: required, no size regulation	Yes
Family Health Organization (FHO)	Blended capitation	Physician: at least 3 FPs Rostering: required, no size regulation	Yes

Identification Strategy

- Policy intervention serves as a natural experiment
 - compares mean changes in provision of FPs exposed to the incentive against those not exposed.
- Strategies to mitigate **selection bias**
 - control for important aspects of physician characteristics and practice characteristics
 - a difference-in-differences approach with individual fixed effects with suitably chosen control and treatment groups.
- Strategies to mitigate **confounding effects**
 - exploit timing of the P4P incentives eligibility
 - exploit differences in various PCR models
 - trend-adjusted difference-in-differences approach to relax parallel trend assumption (PTA)

Identification Strategy

- Figure 1. Groups of physicians with different timing in PCR participation and P4P incentive exposure



Empirical Framework

- Difference-in-differences with individual fixed effects

$$Y_{itj} = \beta_j' X_{it} + \gamma_j T_t + \rho_j D_i + \delta_j T_t * D_i + \theta_{tj} + \varphi_{ij} + \mu_{itj} \quad (1)$$

- Y_{itj} is the utilization score of service j under study for physician i in fiscal year t ;
- T_t is the treatment dummy which equals to 1 if this is post-period and 0 otherwise;
- D_i is the treatment dummy which equals to 1 if this physician is in treatment group and 0 otherwise;
- $T_t * D_i$ is the interaction term taking on a value of 1 if GP i were exposed to the P4P incentives at time t ;
- X_{it} is a set of controls of observable characteristics (physician demographics, practice characteristics, patient population characteristics, etc.);
- θ_{tj} is a set of year dummies;
- μ_{itj} is a temporary individual-specific effect.

Data and Analysis Sample

- Data source: merged four MOHLTC administrative data sets
- Study period: April 1, 1998-March 31, 2008 , 10 fiscal years
- Unit of analysis: physician
- Sample selection criteria to ensure the FP
 - is a family physician in an established practice and engaged regular service provision
 - provides a broad range of services
 - all required data are available
- Sample size: core sample 2,185 FPs
- For each FP, we
 - 1) define the practice population
 - 2) construct the dependent variable as
 - five bonuses, the proportion of practice population that received the service
 - six special payments, dichotomized value: 1 is the FP met the criteria, 0 otherwise
 - 3) construct independent variables: “treatment” status, other measures to control for characteristics of a physician and the physician’s practice, general time trends

Descriptive Results

Figure 2: Share of Target Practice Population Receiving Targeted Service — Colorectal cancer screening

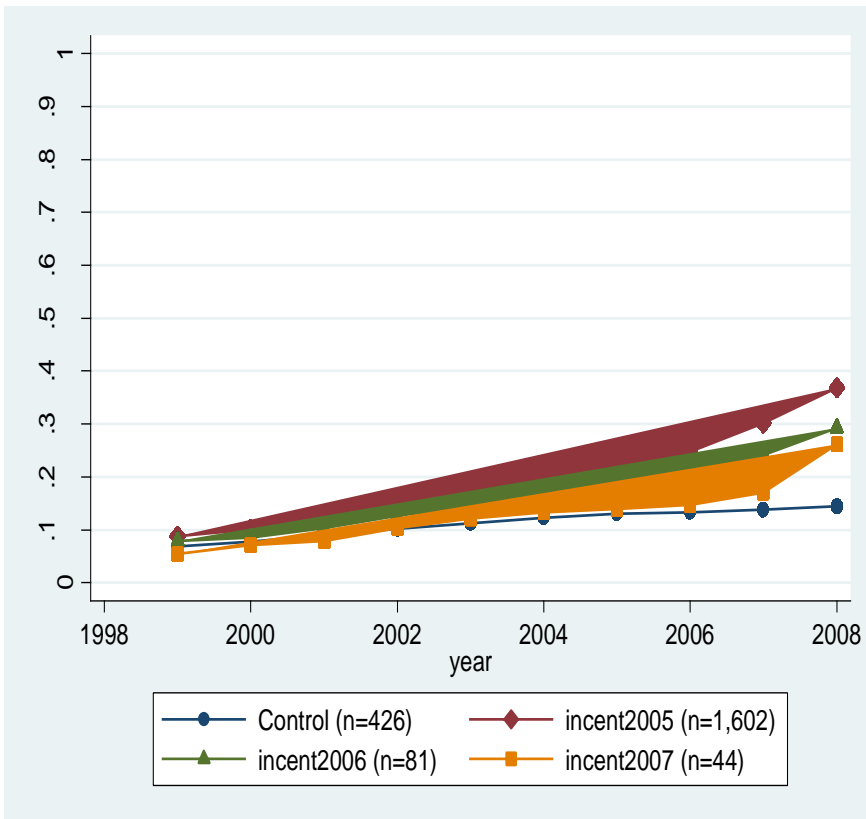
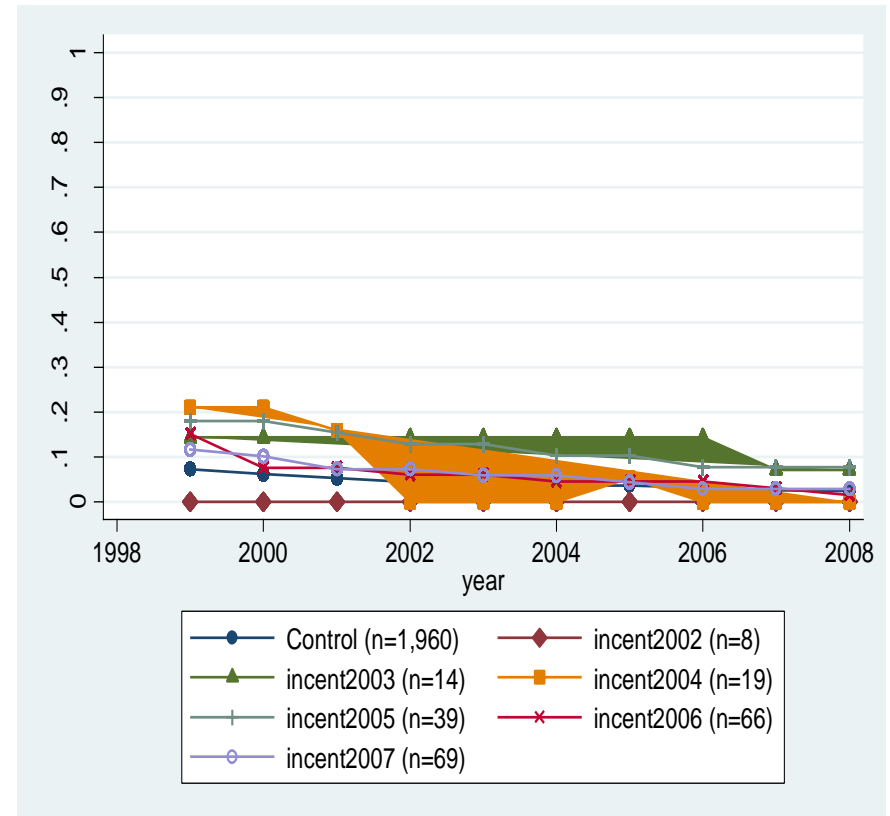


Figure 3: Proportion of Physicians Achieving the Targeted Performance Level of Service — Obstetrical deliveries



Estimation Results

Table 4. Preventive Care Bonuses, Estimated Marginal Effects, Difference-in-Differences Estimators

Targeted Services	Baseline compliance level in 2003	DID with pooled OLS Marginal Effect (St. Error)	DID with physician FE Marginal Effect (St. Error)	DID with differential trend Marginal Effect (St. Error)	Specification test (PTA) Wald test statistic (P-value)
Senior Flu Shot	0.554	0.013 (0.010)	0.028*** (0.007)	0.036*** (0.009)	2.71 (0.100)
Toddler Immunization	0.543	-0.007 (0.013)	0.011 (0.011)	0.004 (0.014)	0.66 (0.417)
Pap Smear	0.589	0.031*** (0.006)	0.041*** (0.004)	0.050*** (0.006)	12.17 (0.001)
Mammogram	0.646	0.004 (0.007)	0.018*** (0.005)	0.022*** (0.006)	1.44 (0.230)
Colorectal Cancer Screening	0.150	0.095*** (0.009)	0.085*** (0.005)	0.113*** (0.006)	66.30 (0.000)

Estimation Results

Table 5. Special Payments, Estimated Marginal Effects, Difference-in-Differences Estimator (no physician-specific fixed effects)

Targeted Services	Baseline compliance in 2003	Marginal Effect (St. Error)	Sample Size: # obs (# FPs)	Marginal Effect (St. Error)	Sample Size: # obs (# FPs)	Marginal Effect (St. Error)	Sample Size: # obs (# FPs)
		<u>FPs Eligible in 2005</u>		<u>FPs Eligible in 2006</u>		<u>FPs Eligible in 2007</u>	
Obstetrical Services	0.043	-0.0004 (0.005)	19,934 (1,998)	-0.004 (0.004)	20,187 (2,025)	0.013 (0.024)	20,196 (2,028)
Hospital Services	0.272	-0.013 (0.035)	19,777 (1,985)	-0.005 (0.074)	20,052 (2,012)	-0.019 (0.037)	20,138 (2,021)
Office Procedures	0.405	0.006 (0.064)	19,897 (1,995)	0.075 (0.127)	20,175 (2,022)	-0.141*** (0.053)	20,209 (2,026)
Prenatal Care	0.544	0.314*** (0.107)	19,857 (1,991)	0.106 (0.070)	20,109 (2,016)	0.184 (0.127)	20,151 (2,020)
Home Visits	0.045	0.007 (0.007)	18,814 (1,893)	0.003 (0.012)	19,251 (1,934)	0.084 (0.078)	19,557 (1,961)
		<u>FPs Eligible in 2003</u>		<u>FPs Eligible in 2004</u>		<u>FPs Eligible in 2005</u>	
Palliative Care	0.011	0.009 (0.012)	9,681 (1,078)	0.004 (0.005)	8,495 (946)	0.032 (0.031)	9,928 (1,104)

Discussion

- Main results: finds evidence of a response by FPs to performance-based incentives for preventive care services; fails to find evidence for the special payments.
- Subgroup analyses: more responsive for younger FPs, FPs with lower baseline compliance; no specific pattern for practice size
- Potential reasons for different responses
 - different costs of complying
 - providing preventive services are consistent with professional standards
 - preventive care payments are complementary to other PCR features

Discussion

- Policy implications
 - low power of using these P4P incentives
 - tailoring the size of P4P incentive according to complying costs
 - effectiveness is context dependent
- Limitations of the study
 - only examined the effect of P4P incentives on provision
 - data limitation for analyses of senior's flu shot
 - can not fully control for all sources of selection and confounding
- Future studies
 - test whether is a “spill-over” effects
 - assess physician strategic gaming behaviour

Thank you!