Paying for primary care:
Relationship between payment reform and patient selection based on case-mix

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Different ways to pay doctors

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Retrospective Payment

Prospective Payment
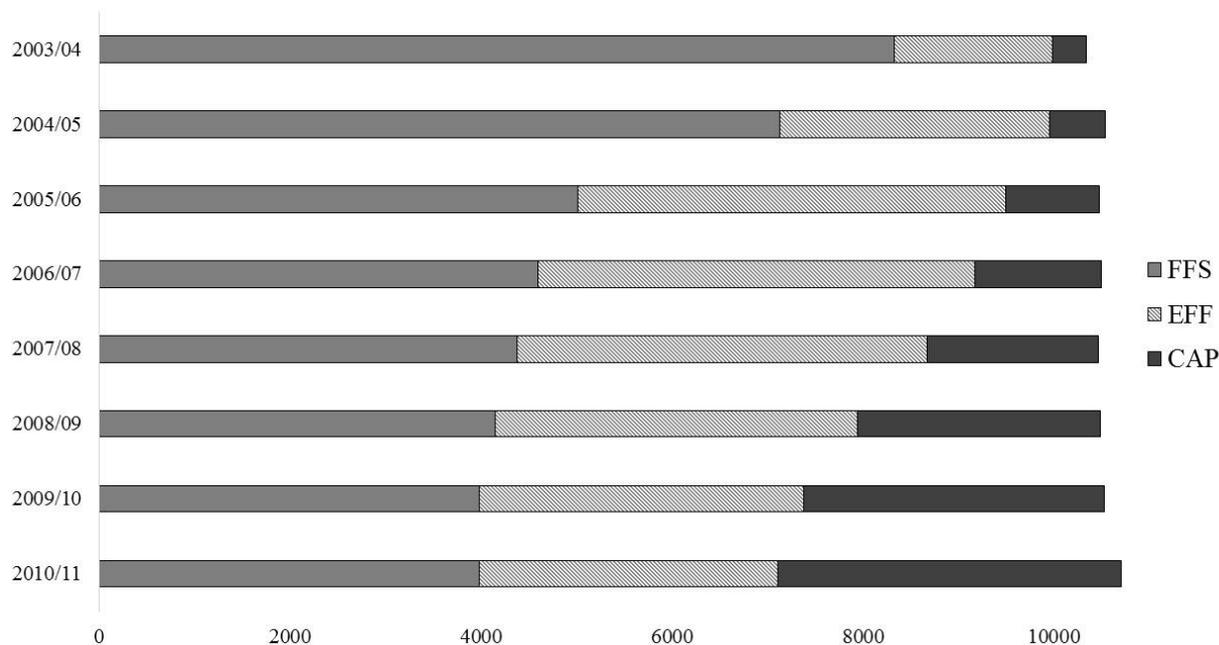
- Capitation
- Salary

Mixed Payment

Background

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Government of Ontario implemented a number of payment types for primary care physicians (PCPs):

Family Health Network (FHN)   2001/02
Family Health Group (FHG)   2003/04
Comprehensive Care Model (CCM)   2004/05
Family Health Organization (FHO)   2007/08

PCP transitions into payment models
(2003/04 - 2010/11)

Motivation

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Glazier et al. (2009) found capitation PCPs had healthier patients than PCPs in other payment models.

Due to self-selection?

Or incentive effects?

Theory suggests that pure capitation payment will encourage providers to avoid complex patients

Blended Capitation in Ontario

Mixed retrospective and prospective payment:

- Age-sex adjusted capitation for in-basket services

- Age-sex account for about 10% of the variation in healthcare costs (Newhouse 1994)

- Overpayment for healthy patients and underpayment for complex patients

Blended Capitation in Ontario

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Mixed retrospective and prospective payment:

- Age-sex adjusted capitation for in-basket services

- Fee-for-service for out-basket services

- Fee-for-service for non-rostered clients

  - Found that PCPs in Blended Capitation were less likely to roster high cost patients (Rudoler et al. 2015b)

Incentive Study
What has been done

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Patients in blended capitation are more likely to be healthy, and healthy patients were more costly in capitation (Glazier et al. 2009; Rudoler et al. 2015b)

No significant patient age-sex differences between enhanced FFS and blended capitation PCPs (Kralj & Kantarevic 2013)

No evidence of risk-selection of vulnerable patients targeted by financial incentive to roster vulnerable patients (Kantarevic & Kralj 2014)

Incentive Study
What this study adds

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Using a self-selection model to obtain unbiased estimates of the effect of payment on patient selection

Takes into account changes in selection probabilities over time

Outcomes based on adjusted clinical group (ACG) derived case-mix

Incentive Study
Methods

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Administrative data stored at Institute for Clinical Evaluative Sciences

Repeated observations (panel data) on PCPs from 2003/04 - 2010/11
(Obs = 80,764; PCPs = 13,009)

Included **all** PCPs who were in FFS, EFF or CAP

Panel was **"unbalanced"** meaning PCPs could enter and exit

Patients were "virtually rostered" to PCPs

Incentive Study
Methods

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Multinomial selection model (Bourguignon et al. 2005) **in panel context** (Semykina & Wooldridge 2010)

Follows from Maddala (1983) who suggests the use of selection models to analyze the benefit of social programs:

Gross benefit from program =

Expected outcome with program - Expected outcome without program

$E[y_{1i} | I = 1]$ - $E[y_{2i} | I = 1]$

Incentive Study
Methods

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Two Part Model:

- **Part 1:** Estimate **multinomial logit** for each year in panel (t = 8)

- **Part 2:** Estimate three **pooled OLS** models in second stage -- one for each payment model
  - **Group means** to control for unobservables
  - Include predicted probabilities from first stage
  (Bourguignon et al. 2005; Dubin & McFadden 1984)

Incentive Study
Methods

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Exclusion Restriction:

- Expected Earnings in EFF/FFS - Expected Earnings in CAP
  - Expected earnings in EFF/FFS based on FFS billings
  - Expected earnings in CAP based on capitation payments to virtually rostered patients

- Sensitivity Analysis
  - Trimmed lowest and highest 5% of values
  - Trimmed lowest and highest 10% of values
  - Increased and decreased FFS/EFF by 10% and decreased capitation payments by 10%
  - Added $56,000 to CAP expected earnings for PCPs with > 2,400 patients

Incentive Study
Methods

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Outcome Variables

- Proportion of the roster that has an RUB score of 1

- Proportion of the roster that has an RUB score of 4 & 5

- Proportion of the roster that has 10+ ADGs

Incentive Study
Results

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Gross Difference -- CAP vs. FFS

$E[y_{CAP} \mid CAP = 1]$ - $E[y_{FFS} \mid CAP = 1]$

Gross Difference -- CAP vs. EFF

$E[y_{CAP} \mid CAP = 1]$ - $E[y_{EFF} \mid CAP = 1]$

Incentive Study
Results
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Outcome	CAP - FFS		CAP - EFF	
	Selection Model	Unconditional Model	Selection Model	Unconditional Model
%RUB = 1	-0.26	-0.44	0.14	1.18
%RUB = 4&5	0.35	-0.43	0.72	-1.34
%ADG = 10+	-1.10	-1.41	-0.38	-2.14

All values statistically significant at $p < 0.05$.

Incentive Study
Results
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Outcome	CAP - FFS		CAP - EFF	
	Selection Model	Unconditional Model	Selection Model	Unconditional Model
%RUB = 1	-0.26	-0.44	0.14	1.18
	0.18	0.05		
%RUB = 4&5	0.35	-0.43	0.72	-1.34
	0.03	0.02		
%ADG = 10+	-1.10	-1.41	-0.38	-2.14
	-1.13	-1.12		

Comprehensive FFS PCPs. All values statistically significant at $p < 0.05$.

Key Findings

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- There is evidence that PCPs respond to incentives to risk-select

- **Conditioning on self-selection** decreases the magnitude of this effect (particularly when comparing CAP and EFF)

Study Limitations

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1. Exclusion restriction

2. Do not account for PCPs leaving the province

3. We do not use individual patient-level data

4. Formally rostered vs. virtually rostered

Conclusions

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- Study suggests incentive effects do exist, but they are diminished or dominated by selection effects

  - Further research could consider whether new patients are healthier than pre-existing patients

- Incentive effects inherent to pure capitation models may be addressed by mix of retrospective and prospective payment

Acknowledgements

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Questions

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