

The Impacts of Team-Based Primary Care on Outpatient Health Care Services Utilization and Costs:

Quebec's Family Medicine Groups

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The Context for Reform: Quebec in 2002

- Many Quebecers did not have a family doctor
- Delivery of health care services was fragmented across providers and settings
- Lack of accessible PHC services outside of regular office hours: over-burdened EDs with long waits
- Uncoordinated care: duplicated services and difficult access to specialists



(Pomey et al 2009)

“Integrated Primary Care” Models

- Team-centered approaches based on:
 - Multidisciplinary teams of health professionals (physicians, nurses, dieticians, etc)
 - Patients enrolling with a specific group of physicians for a fixed time period (rostering)
 - Access to a comprehensive range of primary care services for enrolled patients outside of regular office hours
 - Specialist referrals by primary care physicians
 - Physician payment methods that blend elements of capitation and fee-for-service, sometimes pay-for-performance
 - Integration of health promotion and illness prevention strategies
 - Integration of electronic medical records



Quebec's Family Medicine Groups

- 6-12 full-time equivalent physicians, working in close collaboration with nurses and other health professionals (e.g., social workers, nutritionists, and pharmacists)
 - Nurses play a key role: interviews and screening, patient follow-up, patient education, and disease prevention and health promotion activities
- 1,000-2,200 registered patients per FTE physician
- FMGs contract with regional health boards, agreeing to provide increased services (e.g., extended-hours access) in exchange for additional public funding (for computer equipment and salaries for nurses and administrative assistants) (Pomey et al 2009)
- Physicians maintain the same remuneration policy (i.e., fee-for-service) as non-FMG physicians; no pay-for-performance component
- As of March 2012, there were 239 groups across the province employing 3,657 family physicians (55%) and covering 2,895,639 patients (36%) (MSSS 2012)



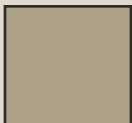
PHC Reforms in Various Health Care Systems

- Family Health Teams and Family Health Groups in Ontario
- Patient-Centered Medical Homes in the U.S.
- Multidisciplinary Medical Homes in France
- General Practitioner Fundholders in the U.K.
- Family Medicine Groups in Quebec
- And others...



Our Contribution

- We estimate changes in system-level outcomes that can plausibly be considered causal effects of the policy
- Existing empirical work on primary health care and reforms is largely descriptive or focused on other outcomes
- Participation is voluntary, so we need to address the potential for selection bias
 - Both observed and unobserved confounding
- Utilization and cost data with non-normal distributions create additional challenges; longitudinal data creates opportunities



Cohort Administrative Database

■ Patients

- Administrative data on about 800,000 vulnerable patients from 2000-2010
 - 7-year panel for each individual
- Primary and specialty outpatient care, inpatient care; associated costs; mortality information
- Geographic, demographic and socioeconomic characteristics

■ Physicians

- These patients' primary care physicians (~5,000)
- Practice characteristics, income sources, demographics



Methods

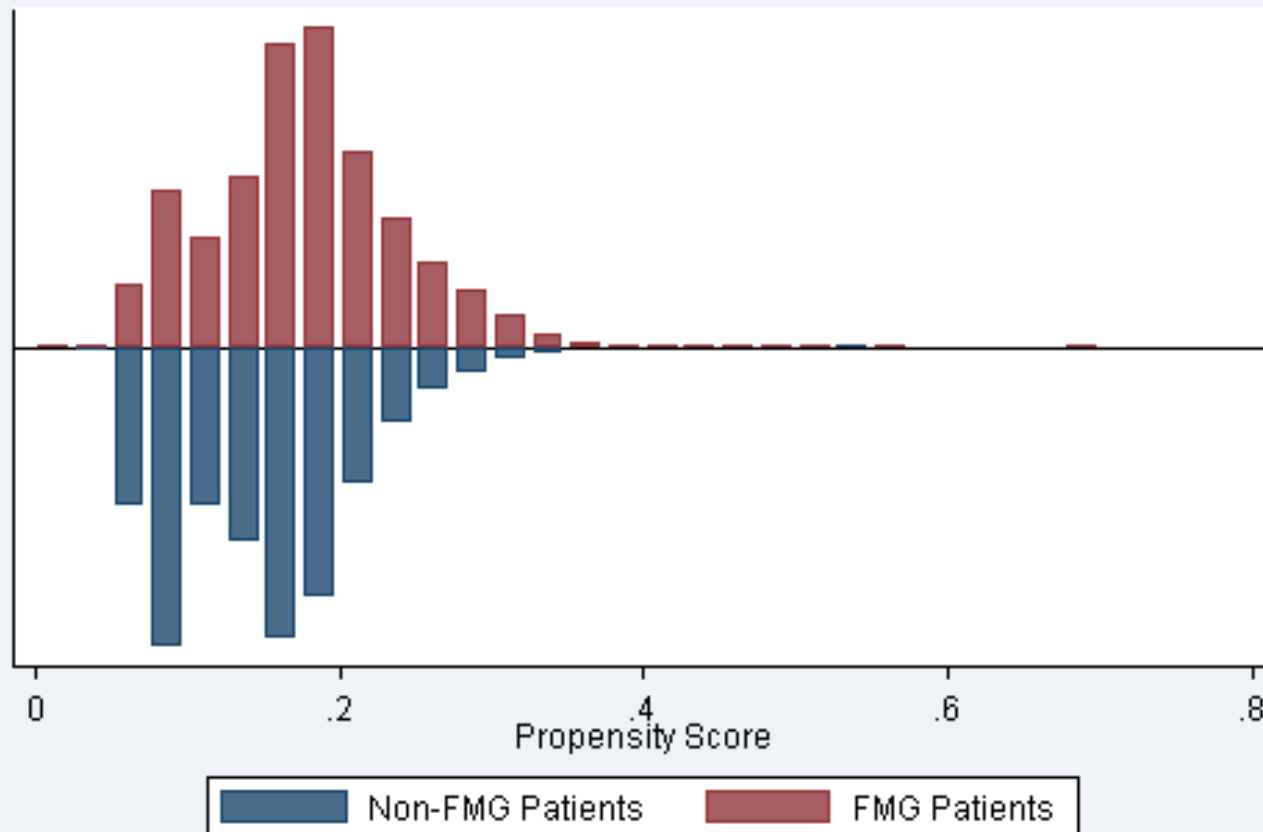
- Estimating the intent-to-treat (ITT) effect is our goal, given the voluntary policy environment
- Individuals who die, enter a long-term care facility, move to a different region (4 types), or live in very remote regions of QC are not included in the analysis
- Propensity score weighting
 - Predicted probability of GMF participation based on pre-period characteristics
 - Weight by inverse probability of “treatment” actually received
- Difference-in-differences regressions
 - Compare utilization changes for GMF patients relative to controls
 - Controls for shared time trends and fixed differences between FMG and non-FMG
 - Individual-level fixed effects to control for fixed unobserved differences
 - Robust se’s to account for intra-person correlation over time
- Negative binomial and generalized linear models
 - Accommodate over-dispersed utilization and cost data



Patient Propensity Scores

$Pr(GMF) = \text{Geographic region} + \text{Age} + \text{Sex} + \text{SES} + \text{comorbid conditions} + \text{RUB} + \text{ER utilization} + \text{ambulatory care utilization} + \text{hospital utilization} + \text{UPC} + \text{geography} * \text{all variables} + \text{sex} * \text{all variables}$

Distribution of patients' propensity scores



Common support:
(0.0017; 0.6779)



Health Care Utilization: Count Data, Skewed Distributions with Many Zeros

Pre	Mean	SD	Min	Max	Median	% zero
GPs	5.07	4.68	0	190	4	8.34
Specialist	4.13	5.78	0	221	2	23.99
ED	0.58	1.32	0	89	0	70.43
Outpatient	9.20	8.27	0	233	7	3.58



Post	Mean	SD	Min	Max	Median	% zero
GPs	5.31	4.67	0	261	4	6.60
Specialist	4.45	7.31	0	258	3	22.30
ED	0.62	1.35	0	94	0	68.8
Outpatient	9.76	9.37	0	281	8	2.56

Health Care Costs: Skewed Distributions with Many Zeros

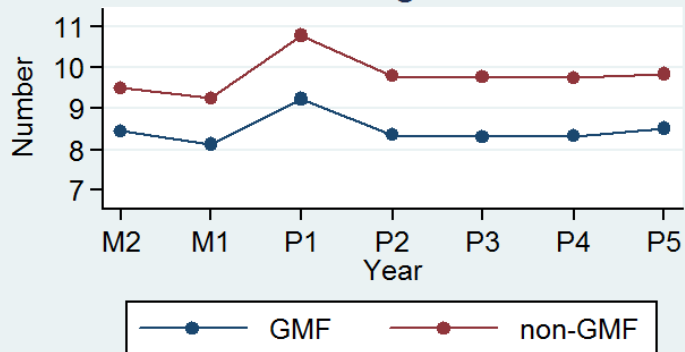
Pre	Mean	SD	Min	Max	Median	% zero
GPs	\$153	\$146	0	\$8,106	\$121	9.82
Specialist	\$211	\$304	0	\$11,633	\$106	24.00
ED	\$32	\$99	0	\$6,990	\$0	70.43
Outpatient	\$364	\$359	0	\$11,703	\$261	3.85



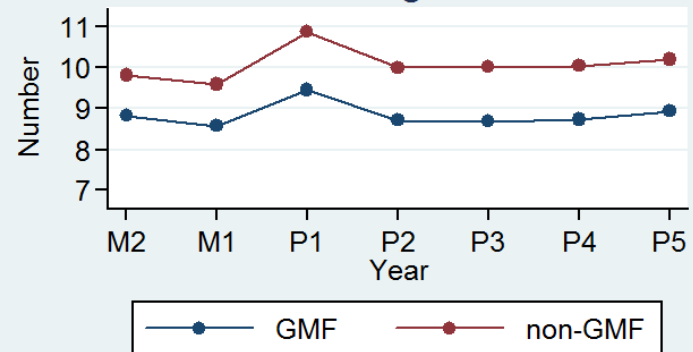
Post	Mean	SD	Min	Max	Median	% zero
GPs	\$211	\$184	0	\$11,623	\$175	5.73
Specialist	\$257	\$392	0	\$16,410	\$131	22.31
ED	\$49	\$141	0	\$7,391	\$0	68.8
Outpatient	\$471	\$455	0	\$16,699	\$349	2.13

Outpatient Utilization

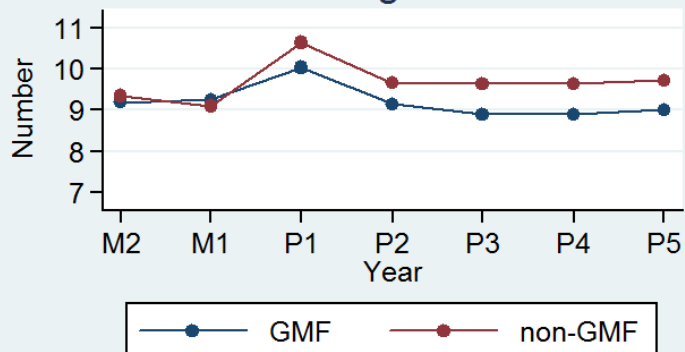
Number of Visits Unweighted



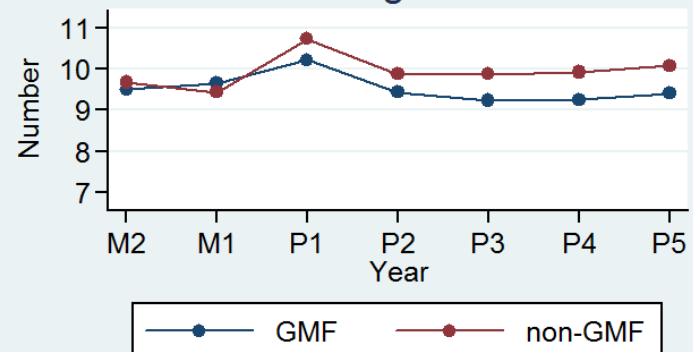
Number of Visits - Users Only Unweighted



Number of Visits Weighted



Number of Visits - Users Only Weighted



*does not include individuals who died or enter LTC or moving



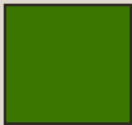
Impacts of FMG on Outpatient Health Care Services Utilization

Marginal effects (incremental)	NB	Pooled NB	FE NB
	Mean (SE)	Mean (SE)	Mean (SE)
Outpatient	-0.8527*** (.0264)	-0.6411*** (.0250)	-1.0885*** (.0110)
<i>GP</i>	-0.9096*** (.0201)	-0.6695*** (.0166)	-2.2037*** (.0185)
<i>Specialist</i>	-0.1289*** (.0105)	-0.0997*** (.0127)	-0.1611*** (.0044)
Emergency room	-0.1115*** (.0263)	-0.0708** (.0241)	-0.2762*** (.0570)

N=4,150,993.

Results from full controls and IPTW only. Controls include year, sex, age group, Pampalon index, RSS, RUB..

*p<=.05, **p<=.01, ***p<=.001



Impacts of FMG on Health Care Services Costs

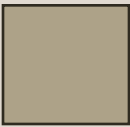
Marginal effects (incremental)	GLM			GEE		
	FMG	Non FMG	Diff	FMG	Non FMG	Diff
Outpatient	\$416	\$451	\$-35	\$405	\$435	\$-30
<i>GP</i>	\$187	\$208	\$-21	\$185	\$203	\$-18
<i>Specialist</i>	\$270	\$284	\$-14	\$258	\$272	\$-14
Total*	\$1608	\$1699	\$-91	\$1582	\$1667	\$-85

N=4,150,993. Bootstrapped se's to come.

Recycled predictions: predicted costs for FMG and non-FMG patients after the treatment everything else equal.

Results from full controls and IPTW only. Controls include year, sex, age group, Pampalon index, RSS, RUB. Results from GEE log link and gamma family with exchangeable working correlation only.

*Parameter of interest insignificant for inpatient and ER costs: recycled predictions are therefore not computed separately, but are included in the total.



Impacts of FMGs on Outpatient Utilization and Costs

- The relative difference is
 - Outpatient: -7% for utilization and costs
 - GPs: -6% for utilization, -9% for costs
 - Specialists: -10% for utilization, -5% for costs
- Savings per patient should be contrasted with FMG costs
 - The cost of FMG (implantation and maintenance) per vulnerable patient over 5 years is estimated between \$182 and \$195
 - The direct net cost of FMG per vulnerable patient over 5 years is between \$97 and \$105
 - ~ \$20 / year / vulnerable patient
 - Caveat that fixed costs are difficult to allocate and any benefits among non-vulnerable patients have not been measured yet



Findings and Potential Mechanisms

- FMG reform decreases the costs and utilization of outpatient health care services
 - Unexpected decrease for GPs' services
 - Substitution effect with nurses?
 - For specialists' services the reduction in number of visits is larger than the decrease in costs
 - Suggests that reduction in utilization is among lower-cost visits



Next Steps

- Examine evolution of impacts over time
- Target subgroups of patients and services:
 - Individuals with multimorbidities
 - Guideline-recommended preventive services
- Future work needs to address health impacts and effects on quality of care



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