

Effect of Family Medicine Groups on visits to the emergency department among diabetics in Quebec between 2000 and 2011: A population-based segmented regression analysis of an interrupted time series

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Background

Family Medicine Groups (FMGs) were introduced in Quebec in 2002 to reorganize primary care practices and encourage team-based and inter-professional approaches to service delivery.

Objective

To examine the change in the rate of visits to the emergency department (ED) to treat acute diabetes complications following the implementation of the FMG model.

Methods

Study design: Population-based retrospective study using a segmented regression analysis of an interrupted time series. A control series was included that would not be sensitive to primary care yet sensitive to changes that would also affect acute diabetes complications.

Data source: The Quebec Integrated Chronic Disease Surveillance System (QICDSS)

Study population: Type I and type II diabetics over 20 years old (*exclusions: gestational diabetes and 4 health and social services regions*)

Intervention: Family Medicine Groups introduced in November 2002

Outcomes: Acute diabetes complications: hyperglycemic and hypoglycemic emergencies (*primary outcome*); Appendicitis cases (*control outcome*)

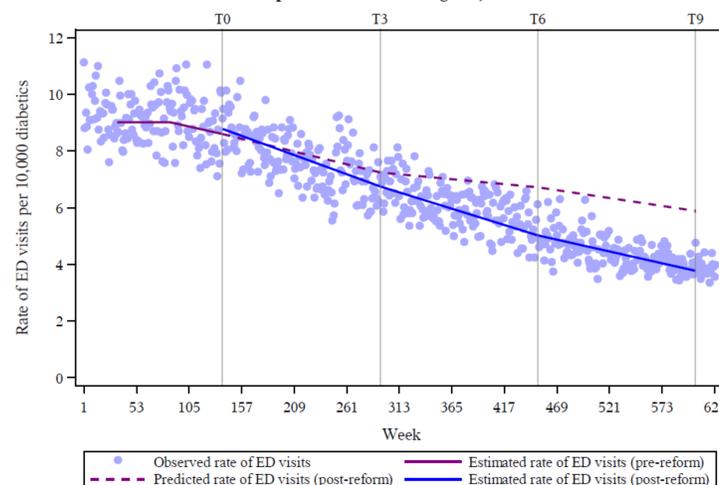
Statistical analysis:

- A time series was produced from daily ED records aggregated to the number of visits per week. This produced 626 weeks of observation between April 1, 2000 and March 31, 2012 (137 weeks pre-reform and 489 weeks post-reform).
- We fit a regression line to each segment of the series (before and after November 2002) using a negative-binomial distribution and the log of the mid-year diabetes population as the offset term.
- We contrasted the estimated rate of ED visits from the model with the extrapolated rate of ED visits, had the reform not occurred, according to the amount of time elapsed since the reform was introduced (T_3 , T_6 , T_9).

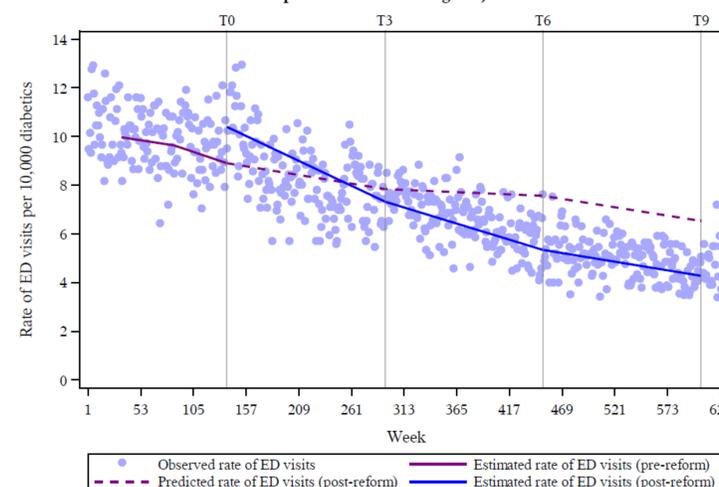
Results

Number of diabetics		
2000/01	275,728	
2011/12	533,438	
Total number of ED visits over follow-up period		
Acute complications	121,504	
Urban	38,898	
Rural	160,402	
Total	160,402	
Appendicitis	12,822	
Average number of visits to the ED per week		
	Pre-reform	Post-reform
Acute complications	205.2	190.9
Urban	63.6	61.7
Rural		
Appendicitis	19.7	20.7

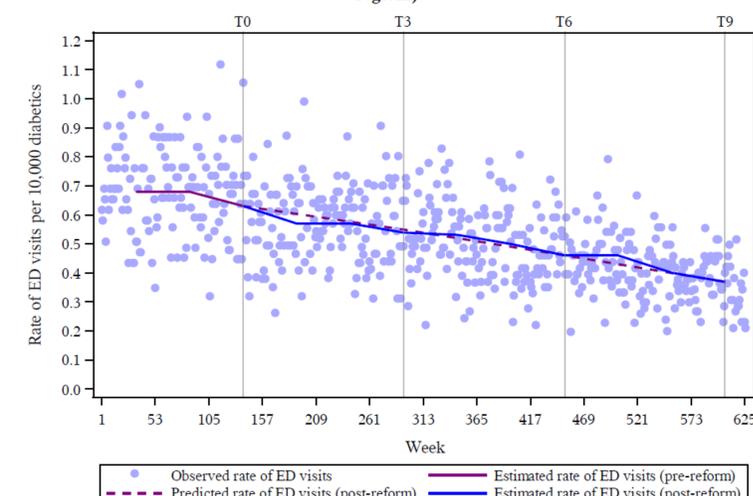
Rate of ED visits among diabetics in Quebec pre/post reform, 2000-2011 (short term complications in urban regions)



Rate of ED visits among diabetics in Quebec pre/post reform, 2000-2011 (short term complications in rural regions)



Rate of ED visits among diabetics in Quebec pre/post reform, 2000-2011 (all visits in rural regions)



Number of years since reform implementation	Rate of acute diabetes complications (per 10,000)		Rate of appendicitis (per 10,000)	
	Absolute change between the estimated and predicted rate post-reform (95% CI)	Percentage change between the estimated and predicted rate post-reform (95% CI)	Absolute change between the estimated and predicted rate post-reform (95% CI)	Percentage change between the estimated and predicted rate post-reform (95% CI)
	Urban			
3 years	-0.5 (-0.53, -0.46)	-6.9% (-6.93, -6.87)	-0.01 (-0.02, -0.004)	-2.8% (-2.81, -2.79)
6 years	-1.69 (-1.72, -1.66)	-25.2% (-25.23, -25.17)	0.00	0.0%
9 years	-2.12 (-2.14, -2.10)	-36.0% (-36.03, -35.97)	0.00	0.0%
	Rural			
3 years	-0.54 (-0.58, -0.49)	-6.8% (-6.84, -6.75)		
6 years	-2.23 (-2.27, -2.19)	-25.5% (-25.54, -25.46)		
9 years	-2.25 (-2.21, -2.29)	-34.4% (-34.44, -34.36)		

Discussion

Main findings and limitations:

- Although it is small, a reduction of 2.12 and 2.25 visits per 10,000 diabetics by the week of T_9 amounts to approximately 33,308 and 10,326 avoided visits to the ED over 9 years of reform implementation.
- A key limitation was the extent to which we could disentangle the effects of changes in the organization of primary care (FMG model) from the effects of other changes that targeted pathways of care to access emergency health services (specifically Network Clinics introduced at the same time as FMG practices were being established). The absence of change in the rate of ED visits for appendicitis lends support to our inferences that the FMG reform led to a decrease in ED visits.

Conclusion

At a health system level the effect of the FMG practice model on decreasing acute diabetes complications is discernible and plausible despite the heterogeneity of FMG practice implementation that is known to exist. The effectiveness of team based models in improving access to and quality of primary care suggests that scaling up these approaches has the potential for further reducing visits to the ED.