

# Do clinical guidelines affect healthcare quality and populational health : Quebec colorectal cancer screening program

SCSE Conference 2016

Presented by :  
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# INTRODUCTION (1)

## Context

Cancers figure among the leading causes of mortality in Quebec

The Quebec government introduced several strategies to fight against many kinds of cancer

Introduction of the screening strategy for colorectal cancer

The objective of this policy is to decrease cancer mortality, to improve health status and to reassure people who have negative tests

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## Problem in Quebec

Inappropriateness of a considerable number of colonoscopies (2008 National Public Health Institute of Quebec (INSPQ) report, 2010 Professional Order of Quebec Physicians' report)

The Quebec Health Ministry(MSSS) introduced in November 2010 the PQDCCR program in 8 pilot facilities

- propose clinical protocols
- ensure the quality and access to colonoscopy
- reduce waiting lists by eliminating inappropriate cases
- first funding for fixed costs

Additional funding based on colonoscopies volume began at 2012 april

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# DESCRIPTIVE ANALYSIS (1)

## Two database

- 1 / Med-Echo : Inpatient data for colorectal surgeries
- 2 / Mortality database

This sample covers a period of eight years (2006-2013)

## Covariables

Age, Gender  
Bed's number  
Funding dummy  
Program dummy  
Time trend

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# DESCRIPTIVE ANALYSIS (2)

All the patients will be either in the treatment group (participating hospitals) or the control group (non-participating institutions)

We observed 9 282 admissions in the treatment group and 29 010 admissions in the control group

The facilities in the two groups are comparable (average age, average gender, average resource use indicator, average mortality index and clinical severity)

However, the average length of stay is slightly higher in the control group while the treatment group institutions have more beds on average.

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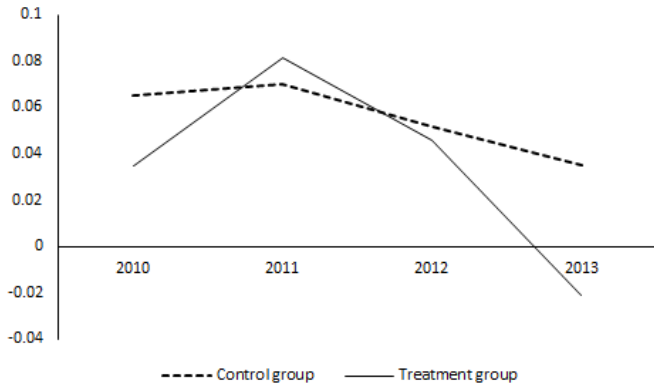
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# DESCRIPTIVE ANALYSIS (3)

Colonoscopies growth rates decreased since 2011 for the two groups.  
More marked in the treatment group than in the control group.

**FIGURE:** Colonoscopies volume evolution in the two groups



These ratios are annual growth rate for given year relatively to the prior year.

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# METHODOLOGY (1)

We use a multi-state transition model in continuous time to identify the causal effect of the reform on hospital length of stay, readmission and in-hospital mortality

We use a difference in difference approach where institutions that do not participate in the PQDCCR determine control group

Transition intensity

$$\alpha_{sr}(t, Z) = \lim_{\Delta t \rightarrow 0} \frac{P_{sr}(t < T < t + \Delta t | T > t, Z)}{\Delta t} \quad (1)$$

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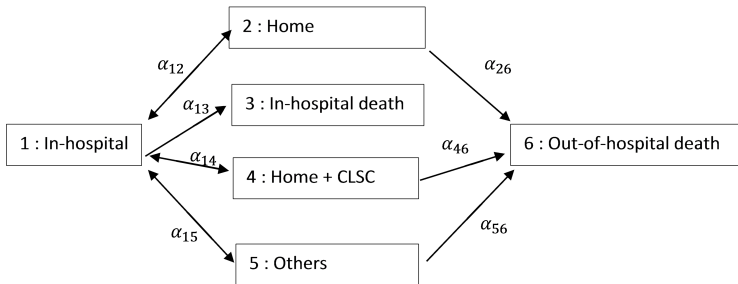
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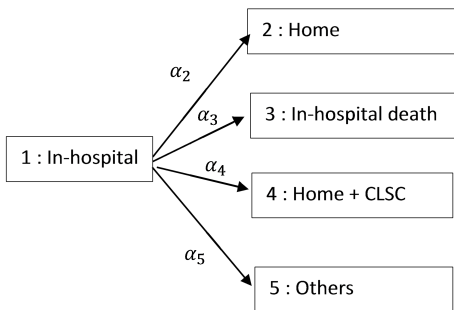
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FIGURE: Possible transitions in the model



## METHODOLOGY (3)

FIGURE: Possible competing risks at the discharge



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## Competing risks model results

	Competing risks model	Cox model
Age	-0.017*** (0.000)	-0.011*** (0.000)
Gender	-0.046*** (0.011)	-0.030*** (0.010)
Clinical severity	-0.776*** (0.009)	-0.850*** (0.008)
Treatment	0.105** (0.036)	0.079* (0.032)
Funding	0.035 (0.049)	0.037 (0.037)
N	38 292	38 292
ll	-331 884	-331 838

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## Difference in difference regression (1)

	Presence of surgery	Approach category
Age	-0.003** (0.001)	-0.001 (0.001)
Gender	-0.022 (0.022)	0.044** (0.016)
Clinical severity	0.048*** (0.014)	-0.242*** (0.011)
Treatment	-0.009 (0.053)	0.712*** (0.041)
Funding	-0.025 (0.078)	-0.170** (0.053)
N	22 834	28 497
ll	-8 883	-15 951

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

# Difference in difference regression (2)

TABLE: Hospitalization rate - Geographical territory analysis

Variable	Coefficient	Std. Err.
Intercept	-18.890**	2.844
Age	-0.023**	0.006
Gender	13.118***	1.971
Colonoscopies rate	0.062***	0.001
Treatment	-0.067	0.078
Funding	-0.083**	0.030
N	1293	
R <sup>2</sup>	0.793	
F (10,1282)	489.916	

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Colonoscopies rate is the rate of colonoscopies exams on a per capita basis.

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# Conclusion (1)

Clinical guidelines helped to reduce hospital length of stay on the treated facilities at the average, for any type of discharge except death

On the other side, additional funding did not contribute to this improvement on hospital length of stay. However, total reform effect is positive.

The program including financial incentives contributed to avoid the use of more invasive treatment by the use of laparoscopic surgery instead of laparotomy.

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Additional funding helped to decrease the weighted hospitalization rate for colorectal surgeries.

Our analysis shows that even when physician remuneration and hospital funding are independent, it is possible to modify physician behaviour and improve hospital performance :

discharge decision  
treatment choice  
admission decision

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Implementation of clinical guidelines and pay for performance mechanisms are relatively new concepts in the Quebec health network and we should give different stakeholders a further adaptation period to this new competitive reality. .

# THANKS !

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