

# Factors influencing electronic health record adoption by physicians: A multilevel analysis

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# Background

- Electronic health record (EHR) is key to better health care and patient outcomes
- Canada is lagging behind other industrialized countries on EHR implementation
- In 2013, EHR penetration was about 60%

## Background

- Decentralized health care system:
  - EHR → provincial jurisdiction
  - Laws and regulations differ between provinces
  - Universal medical care coverage
  - Primary care physicians work in private practice, fee for service basis



# Background

- EHR adoption limited by technical shortcomings, lack of user acceptance and lack of integration into healthcare practices and organizations
- Most previous studies focus on EHR adoption at the individual (physician) level

# Objective and Questions

To assess the specific contribution of organizational and individual factors on physician intention to use EHR

- Do healthcare organizations' characteristics influence physician intention to use EHR in the province of Quebec (Canada)?
- Which individual and organizational factors explain physician intention to use EHR?

## Methods

- Prospective cross-sectional study among physicians working in 49 primary care organizations in four regions of the province of Quebec between April 2010 and July 2011.
- Multilevel modeling based on an integrated theoretical framework that combined individual technology acceptance predictors and organizational characteristics



## Methods

- Individual-level questionnaire based on the Integrated Theoretical Model (Gagnon et al. 2014)
- Organization-level questionnaire adapted from Holahan et al. (2004)
- Both questionnaires were validated and showed good psychometric properties

## Results

- 31 organizations (with 5 physicians or more): mean = 9 physicians (5 to 17)
- Total of 278 individual physicians included
- 41% had previous EHR experience

# Characteristics of participants

<i>Variable</i>		<i>Frequency</i>	<i>%</i>
<b>Age group</b>	< 30	9	3.26
	30 - 39	45	16.3
	40 - 49	100	36.23
	50 - 59	93	33.7
	≥ 60	29	10.51
<b>Sex</b>	(Female = 1)	134	48.38
<b>Medical specialty</b>	(GP = 1)	263	94.95
<b>Supplementary diploma (Other than MD)</b>	(No = 1)	88	31.77
<b>Practice in hospital</b>	(Yes = 1)	153	55.43
<b>Prior electronic record experience</b>	(Yes = 1)	111	40.66
<b>Type of region</b>	Urban	145	52.54
	Semirural	65	23.55
	Rural	63	22.83

# Results

- Multilevel regression model
- Model 1: empty multilevel Gaussian regression model
- Healthcare organizations as a random factor
- No predictor variable at any level
- $ICC = 0.02$ ;  $p = 0.29$

## Model 2: individual level predictors of physician intention to use EHR

<i>Variable</i>	<i>Standardized Parameter Estimate</i>	<i>Parameter Estimate</i>	<i>SD</i>	<i>t value</i>	<i>p value</i>
Intercept	0.00	-2.25	0.40	-5.68	<.0001
CSE	0.18	0.24	0.05	4.39	<.0001
PEoU	0.24	0.29	0.05	5.53	<.0001
PI	0.15	0.20	0.06	3.52	0.0005
PN	0.26	0.33	0.07	4.59	<.0001
SN	0.12	0.16	0.07	2.21	0.0280
PU	0.16	0.21	0.07	2.82	0.0051
CSE :Computer self-efficacy	PEoU : Perceived ease of use	PI :Personal identity			
PN : Professional norm	SN : Social norm	PU : Perceived usefulness			

## Results

- Total variance explained = 64%
- Main predictors of physician intention:
  - Professional norm ( $\beta = 0.26$ )
  - Perceived ease of use ( $\beta = 0.24$ )
  - Computer self-efficacy ( $\beta = 0.18$ )
  - Perceived usefulness ( $\beta = 0.16$ )
- No effect of organizational characteristics (type, region, climate, receptivity for change, innovation-value fit ) on individual intention



## Conclusion

- Organizational characteristics do not significantly influence primary care physician intention to use EHR
- Intention to use EHR is mostly influenced by physicians' perceived ease of use, usefulness, computer self-efficacy and congruence with professional norms.

## Conclusion

- However, a large amount of variance in physician intention to use EHR remains unexplained...
- Future research should explore factors at the macro level such as government policies and incentives



**Merci !**

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