

Impact of guideline dissemination strategies among Network chiropractors:

Interrupted time series with segmented regression analysis



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Background

- High prevalence of neck and back pain results in enormous social, psychological, economic burden
 - Total costs in US estimated at over \$100 billion annually and is rapidly increasing
- Most seeking help consult 1° care professionals including chiropractors

(Martin 08, Hogg-Johnson 08, Côté 01, Barnes 02, Coulter 05, Ivanova 11, Shekelle 1995, Coulter 2002, 2005)

- Despite available evidence for managing neck & back pain, wide variations in services provided by chiropractors
- Evidence of overuse & misuse of imaging services (Houben 2006, Ammendolia 2002, 2007, Chou 2009, Ivanova 2011)

Providing unnecessary tests or procedures
with associated risks & side effects

Spine x-rays unnecessary if no red flags:

- Rarely reveal source of patient complaint
- Inefficient diagnosis can lead to inappropriate treatment
- Unnecessary ionizing radiation exposure
- Increase waiting time
- Added costs
- Poor utilization of human resources

Rationale

- CPGs useful to improve process of care and where significant practice variations exist
- Printed educational materials (PEM) results in small to modest improvements in appropriate care such as ordering spine X-rays (Giguère 2012)
- However, little is known about its impact among North American chiropractors

Objectives

To evaluate the impact of web-based dissemination of an imaging guideline in reducing use of spine x-rays among chiropractors enlisted with ASH, a large American Provider Network in the US

Methods

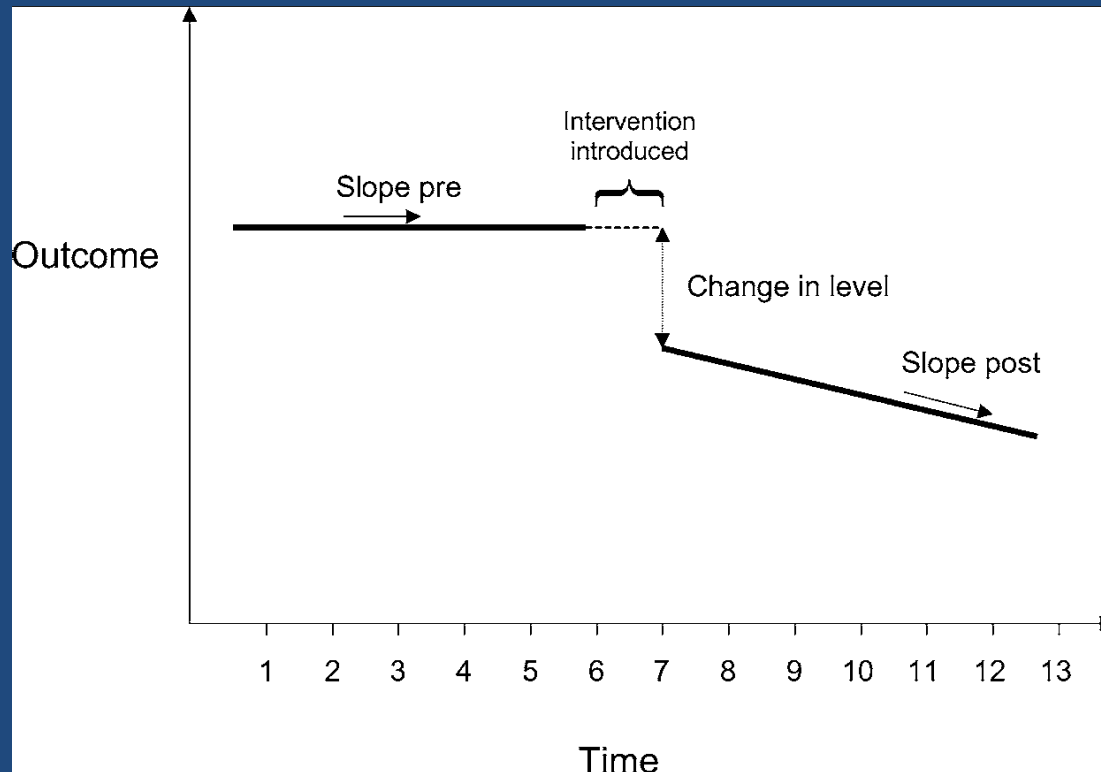
- Design: Quasi-experimental using segmented regression analysis of interrupted time series
- Population: ASH provider Network chiropractors
- Intervention: Open access CPG (April 2008)
 - **JMPT** (January 2008)
 - **NGC™ and ASH Websites** (March and May 2008)

Methods (2)

- Two ASH Quality Improvement (QI) initiatives targeted at high x-ray user
 - Policy change across the network (Dec 06)
 - Educational intervention in Georgia (Sept 07)
- Data sources
 - Data extracted between 2006-2010 from ASH administrative claims database for continuously enrolled patients

Primary outcome

- 1) An immediate change in **level** (*mean number of spine x-rays/1000 new patient exams per month*)
- 2) any differences between pre and post-intervention **slopes**
- 3) the estimation of intervention **effect** across the PN



Ramsay et al.
Tech Ass Health
Care. 2003

Data analysis and management

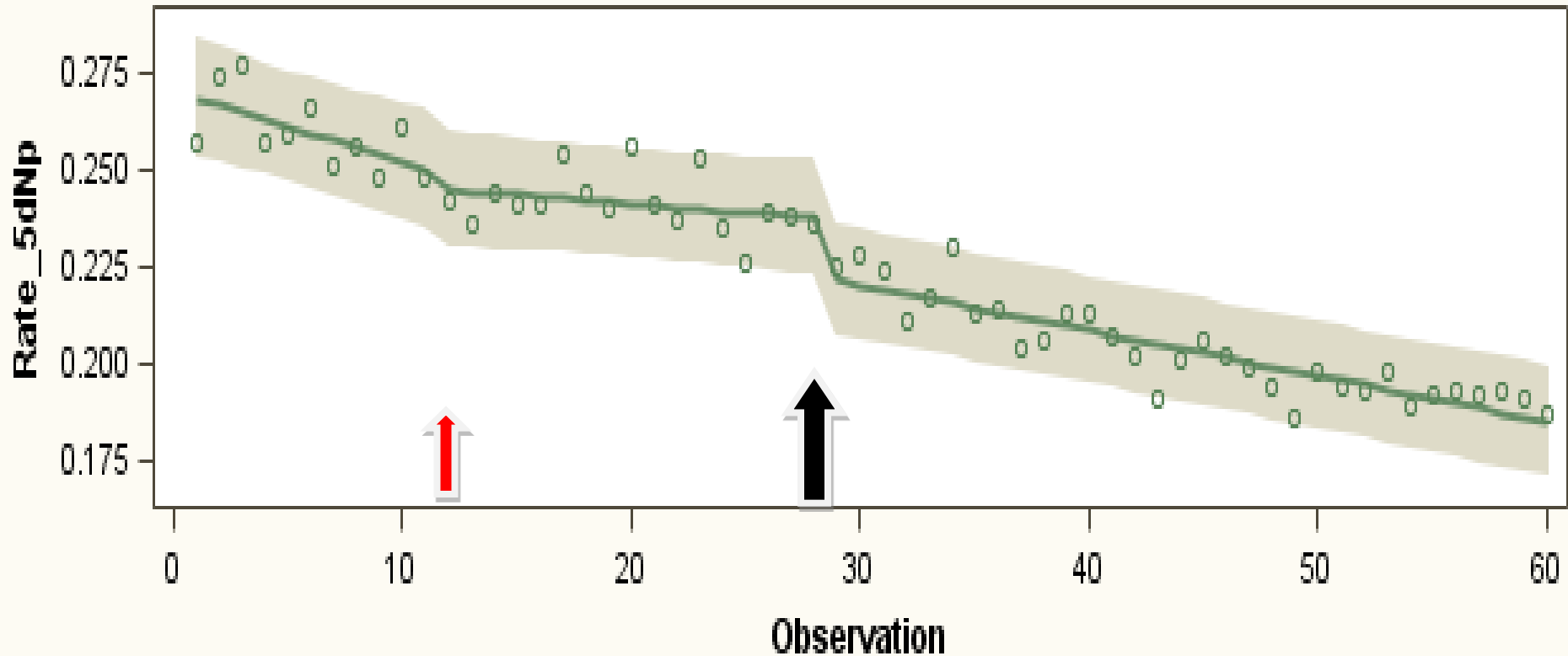
- No evidence of autocorrelation (dw=1.95, p=0.99)
- Conservative approach (autoregressive errors)

$$Y_t = \beta_0 + (\beta_1 * \text{Time}_t) + (\beta_2 * \text{Intervention}_t) + (\beta_3 * \text{Time}_t \text{ after Intervention}_t) + v_t \text{ (error term)}$$

- Sensitivity analysis: Separate time series by adding two QI strategies as a change point, along with primary intervention

Monthly use of spine x-ray **across PN** before and after guidelines dissemination, controlling for ASH QI strategy

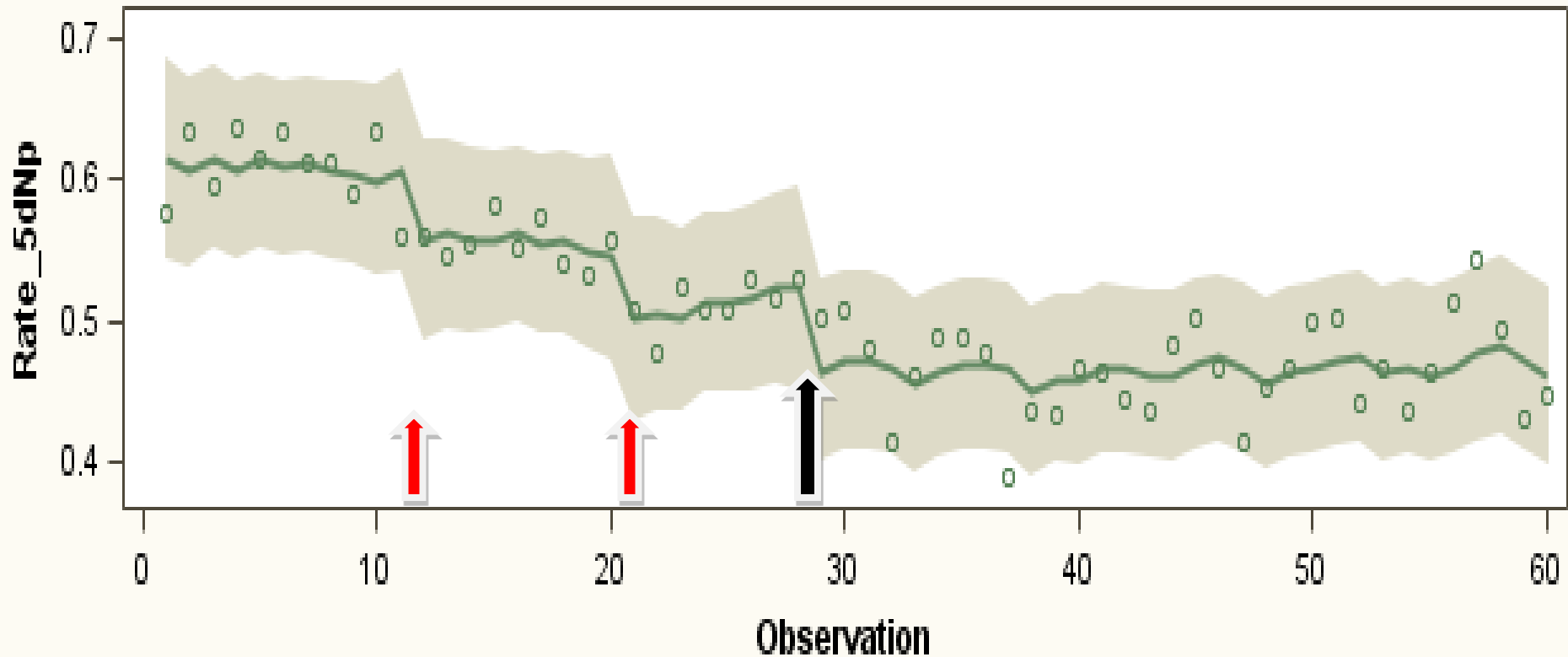
Fit Diagnostics for Rate_5dNp



Observations 60 MSE 0.000046 DDL du modèle 6

Monthly use of spine x-ray in Georgia before and after guidelines dissemination controlling for two QI strategies

Fit Diagnostics for Rate_5dNp



Observations 60 MSE 0.000848 DDL du modèle 8

Guidelines dissemination	Coeff	95% CI	<i>p</i>
a. Full model			
Intercept <i>B</i> ₀	0.2645	(0.2586, 0.2701)	<.0001
Baseline trend <i>B</i> ₁	-0.0011	(-0.0015, -0.0008)	<.0001
Level change after guidelines release <i>B</i> ₂	-0.0104	(-0.0182, -0.0026)	0.0114
Trend change after guidelines release <i>B</i> ₃	-0.00004	(-0.0005, 0.0004)	0.8536
b. Parsimonious model			
Intercept <i>B</i> ₀	0.2649	(0.2606, 0.2692)	<.0001
Baseline trend <i>B</i> ₁	-0.0012	(-0.0014, -0.0009)	<.0001
Level change after guidelines release <i>B</i> ₂	-0.0103	(-0.0179, -0.0026)	0.0109

Results

- Utilization rate decreased steadily over five years
- Significant level change (-0.01; CI=-0.01,-0.002; $p=0.01$), but no change in trend
- 5.26% relative decrease (10/1000 absolute change) after guideline dissemination
- Controlling for two educational strategies did not change the results

Discussion

- First study to document with a robust methodology a decrease in use of spine x-rays after dissemination of PEM among chiropractors in a PN
- Results consistent with recent reviews

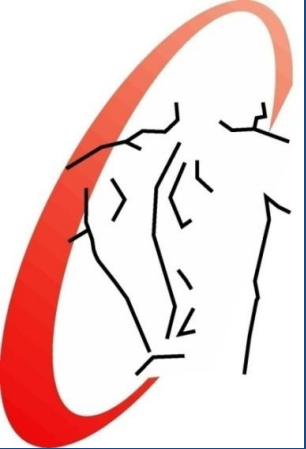
(Giguère 12, Farmer 08)

Limitations

1. Determinants of health care utilisation not available for analysis
2. Appropriateness cannot be addressed
3. Unclear if MRIs ordered instead
4. History not plausible
 - Other CPGs were: a) in Finnish; b) posted on a UK website for GPs; and c) a chiropractic guideline promoted the routine use of spine x-rays, a behavior in the opposite direction.

Conclusion

- This web-based dissemination strategy potentially had a significant population health and economic impact across the network
- Further research needed to find more efficient guideline dissemination strategies
 - Should aim to identify barriers to change and target high users



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