

Evaluating OHS prevention programs

An example of a voluntary audit-based prevention program in British Columbia

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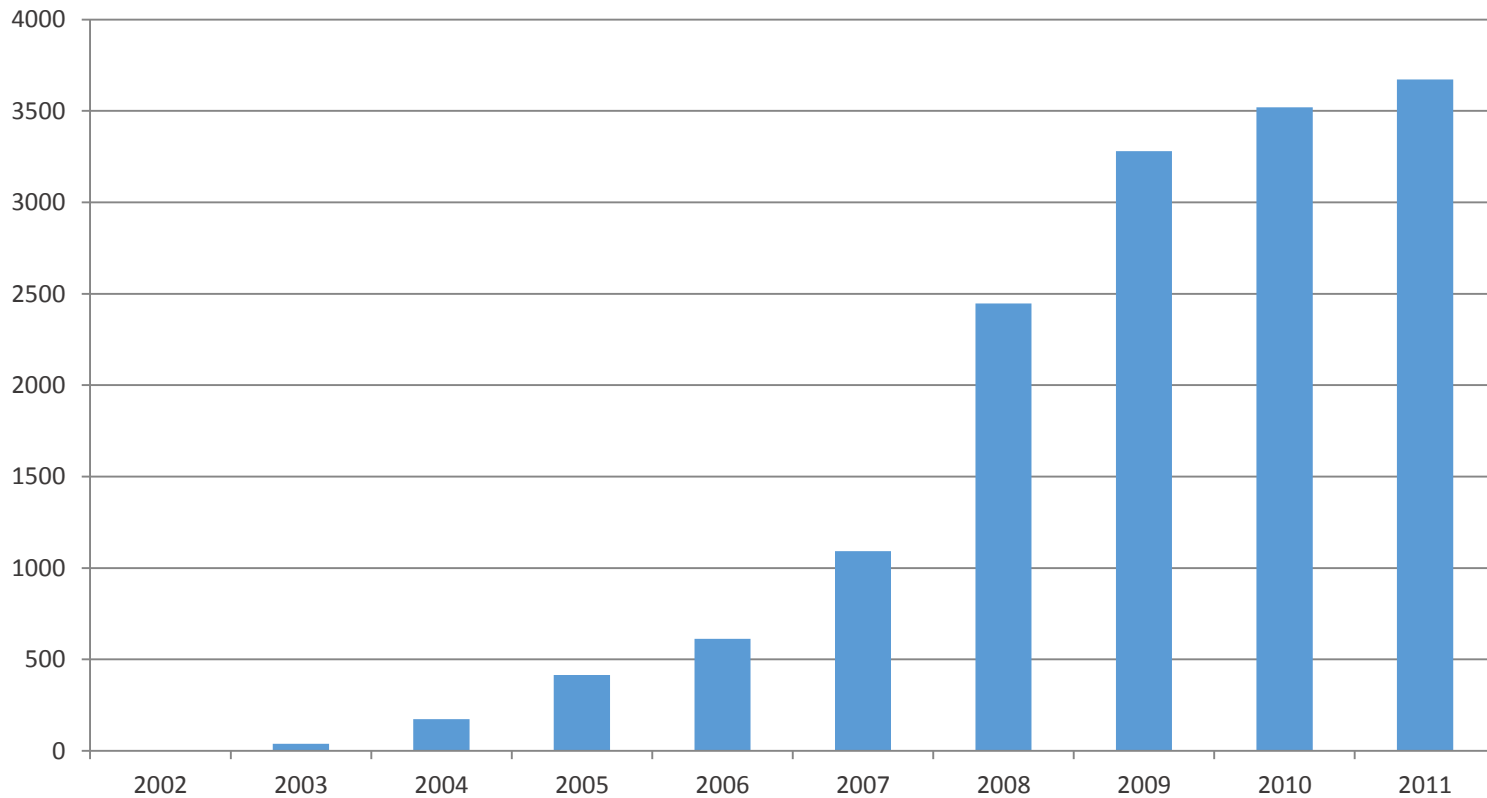
Certificate of Recognition (COR) audit program

- Purpose
 - Decrease work injury rates and help injured workers make early, safe return to meaningful work
 - Encourage employers to elevate health and safety issues to a level consistent with other essential aspects of conducting business
- Occupational Health and Safety COR
 - 10% rebate on premiums
- Injury Management/Return to Work COR
 - 10% rebate on premiums
- Additional financial incentives proposed through experience rating system and base assessment rate

COR Certifying Partners

- Certifying Partners are organizations that guide employers toward earning a COR
 - Facilitate participation and provide resources
 - Maintain records of employer steps towards COR achievement
 - Ensure availability of auditors needed to verify compliance with program requirements
- Nine certifying partners established in a variety of BC industries

OHS COR program expansion - # of BC employers



COR program audit

	Element	Parentage of total audit	Verification method
1	Management Leadership and Commitment	10 to 15	documentation, interviews, observation
2	Safe Work Procedures and Written Instructions	10 to 15	documentation, interviews
3	Training and Instruction of Workers	10 to 15	documentation, interviews
4	Hazard Identification and Control	10 to 15	documentation, interviews, observation
5	Inspection of Premises, Equipment, Workplaces, and Work Practices	10 to 15	documentation, interviews, observation
6	Investigation of Accidents	10 to 15	documentation, interviews, observation
7	Program Administration	10 to 15	documentation, interviews
8	Joint Health and Safety Committee	10 to 15	documentation, interviews

COR program audit

Greater than 20 employees – large employers (COR)		Auditor
1 st year	Qualifying Audit or re-certifying audit	External
2 nd year	Maintenance Audit	Internal or External
3 rd Year	Maintenance Audit	Internal or External
Less than 20 employees – small employers (SECOR)		
1 st year	Qualifying Audit or re-certifying audit	Internal or External
2 nd year	Maintenance Audit	Internal or External
3 rd year	Maintenance Audit	Internal or External

Research question

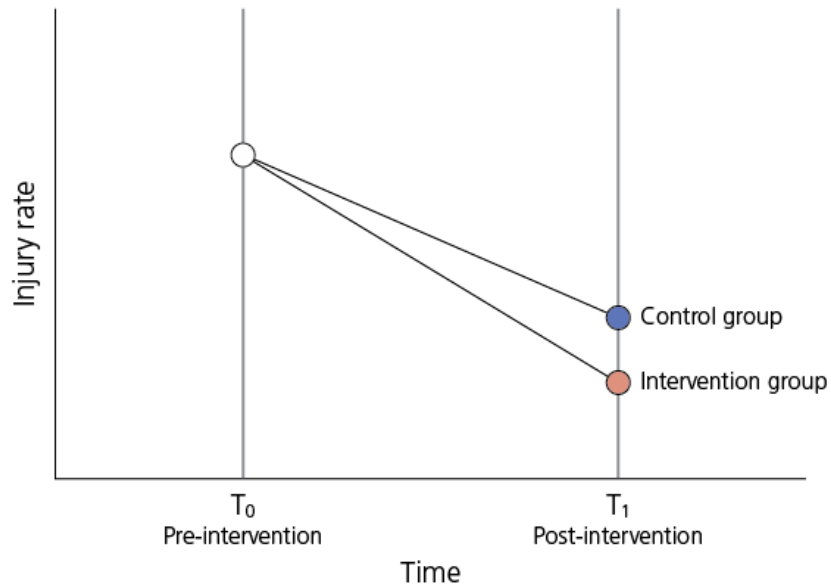
Is COR certification associated with lower firm-level injury rates?

Evaluations of OH&S management systems (OHSMS)

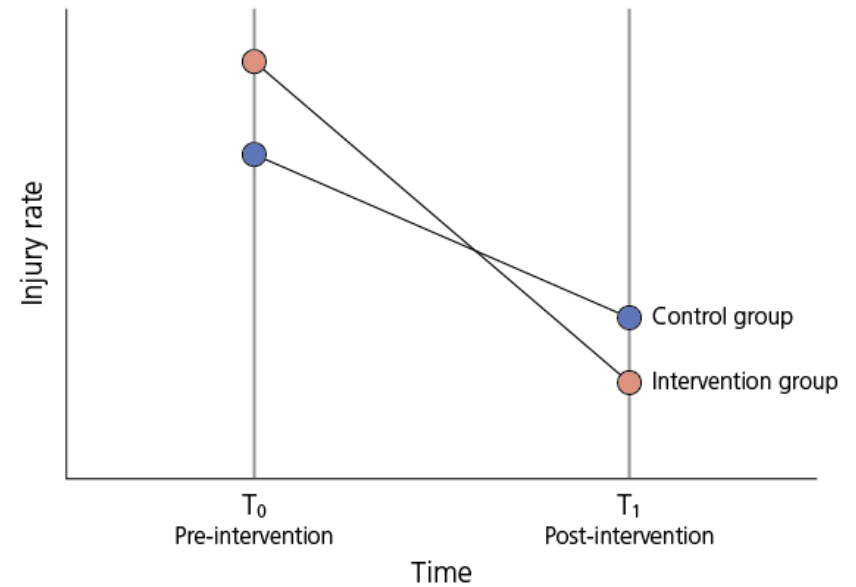
- Lewchuk et al. (1996) examined the effect of initial Canadian OHSMS legislation on Ontario lost time injury rates. Injury rates seen to decline for 3 years after the passing of new legislation with a greater magnitude in the decrease each year.
- Bunn et al. (2001) evaluate a self-developed OHS management system of a North American automobile manufacturing company. In the worksite under study, a 24% decrease in illness/injury frequency and a 34% decrease in lost-time case rate over 3 years was observed. Numerous co-occurring interventions noted.
- Simon et al. (2005) in the evaluation of the United States Voluntary Protection Program observed an increase in injury rates 4 years prior to OH&S management systems implementation, followed by a steady decline until the certification year after which further improvements in injury were not observed.
- Mendeloff et al. (2012) in an evaluation of the mandatory California injury and illness prevention program. The impact of the program was determined to be a real, but small, reduction in injuries. No clear impact of the program was observed on the state fatality rate.

Approaches to program evaluation

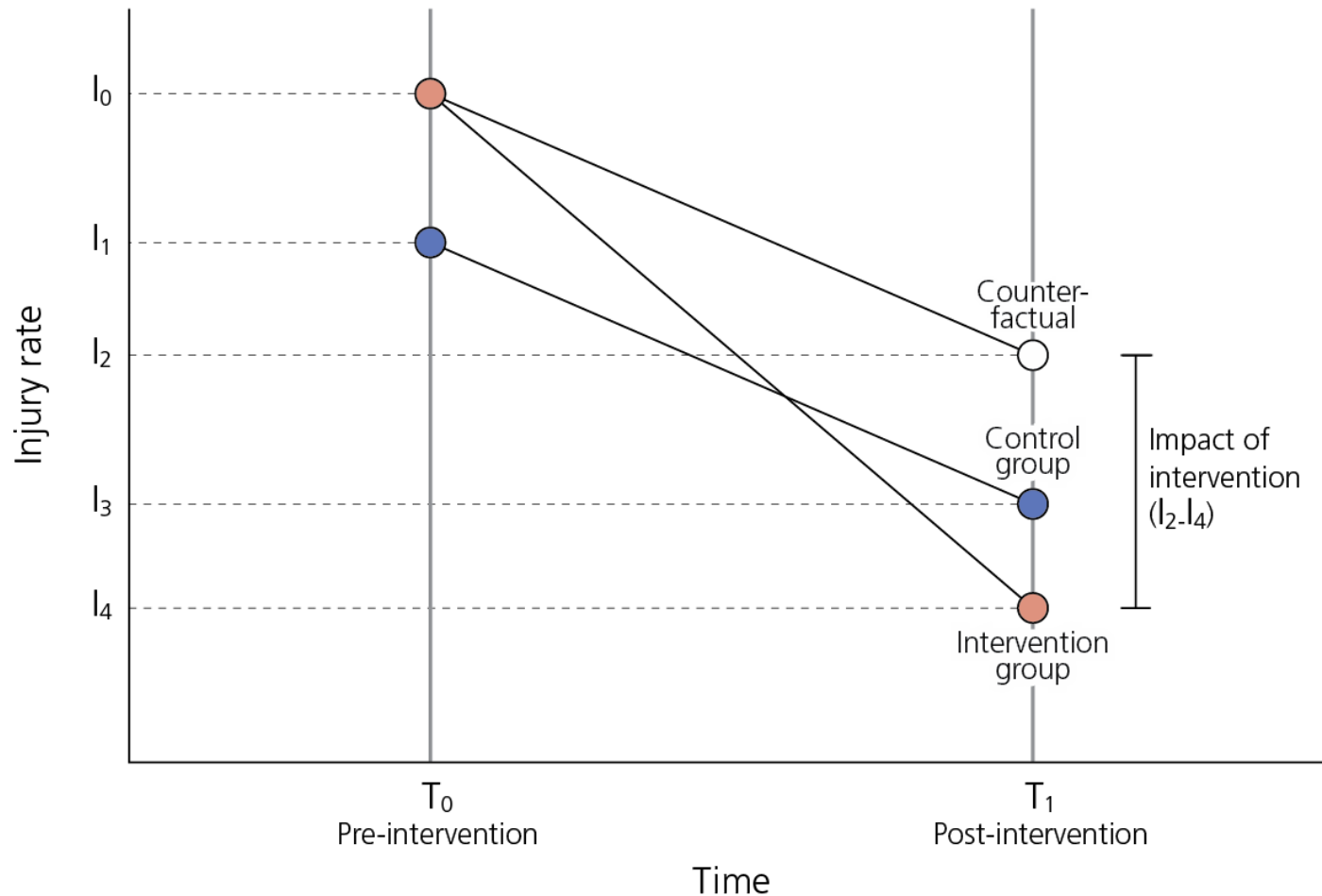
Randomization



Observational



Difference-in-difference evaluation methodology



(Adapted from Khandker 2010 p. 74)

Study cohort

Table 1: Study cohort by sector

Sector	COR Firm	Non-COR Firm	Total
Primary Resources	1,650	9,709	11,359
Manufacturing	247	10,784	11,031
Construction	1,130	49,569	50,699
Transportation and Warehousing	902	26,254	27,156
Trade	56	23,810	23,866
Public Sector	15	618	633
Service Sector	1,016	84,290	85,306
Total	5,016	205,034	210,050

Table 2: Number of COR firms

Year	Number of COR Firms
2003	30
2004	157
2005	365
2006	593
2007	1,164
2008	2,416
2009	3,429
2010	4,064
2011	4,295
2012	3,943
Total	20,456

Methods

- All active firms (1998 to 2012)
- CUs covered by COR program
- Firms with at least three years of assessable data
- Firms with positive payroll included in a given year
- Firms with only one year of COR participation excluded

- **Intervention** group – all firms who became COR certified between 2003 and 2010;
- **Control** group – all firms never in COR and meeting above requirements

Methods – statistical model

- Intervention variables
 - COR indicator (yes or no for participation)
 - Controls for differences in baseline risk
 - Indicator of the years of participation in COR
- Control variables
 - Year, Firm size, Sector (4 digit CU), employer tenure in CU, Rate group base rate
 - Balances differences in injury risk between COR firms and controls

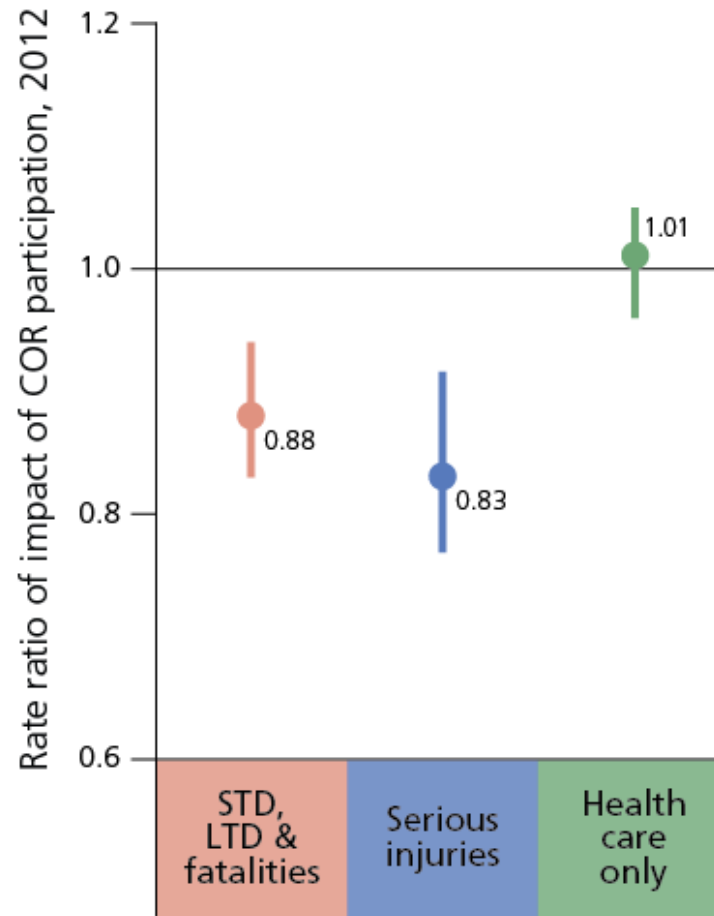
Methods – statistical model

- GEE Poisson Regression

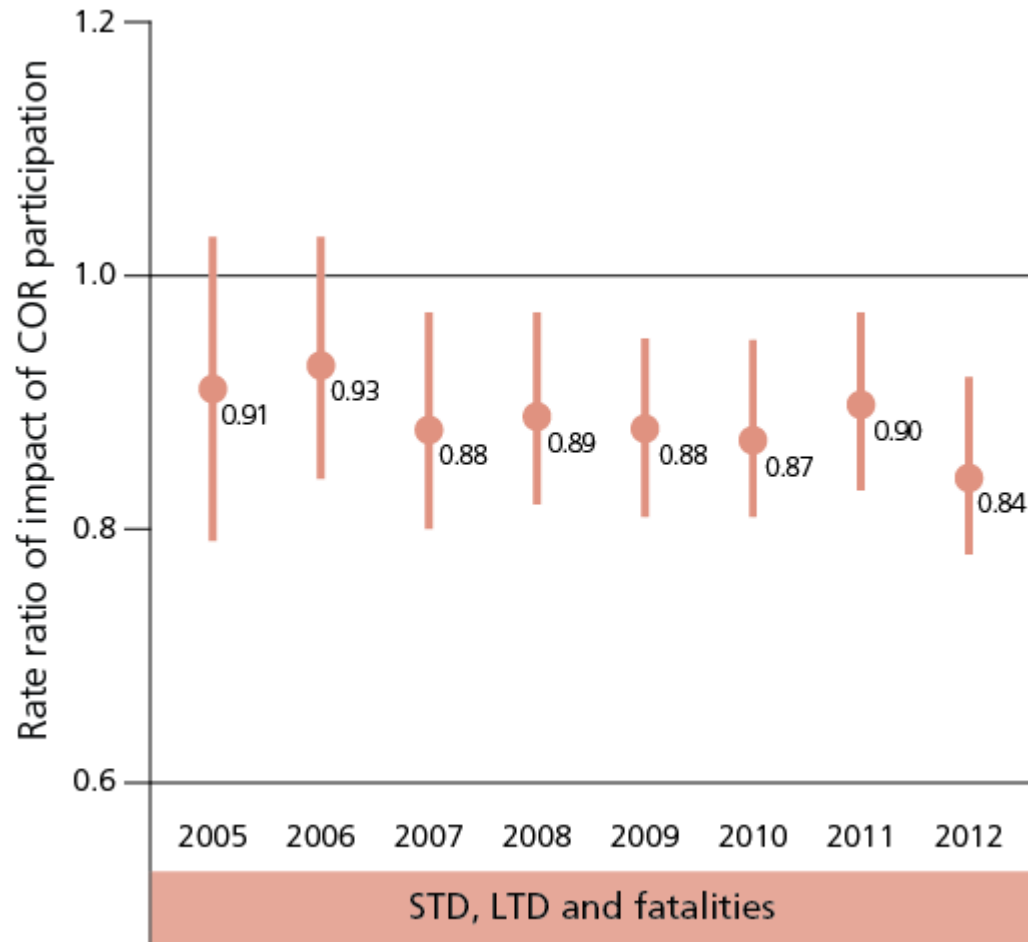
$$y_{it} = \alpha + \beta INT_i + \gamma tit + \delta INT \cdot tit + \lambda_j Z_{jit} + \epsilon_{it}$$

- **The Incidence Rate Ratio or IRR for the intervention effect can be interpreted as the change in relative risk of injury rate for certified firms compared to their estimated risk if they were not certified**
 - Values below '1' indicate a decrease in risk
- Model accounts for exposure-time (FTE at firm-CU-year), and firm-level correlation and zero injury counts (firm-level unstructured correlation matrix)
- Model can be extended to estimate the intervention impact in each year

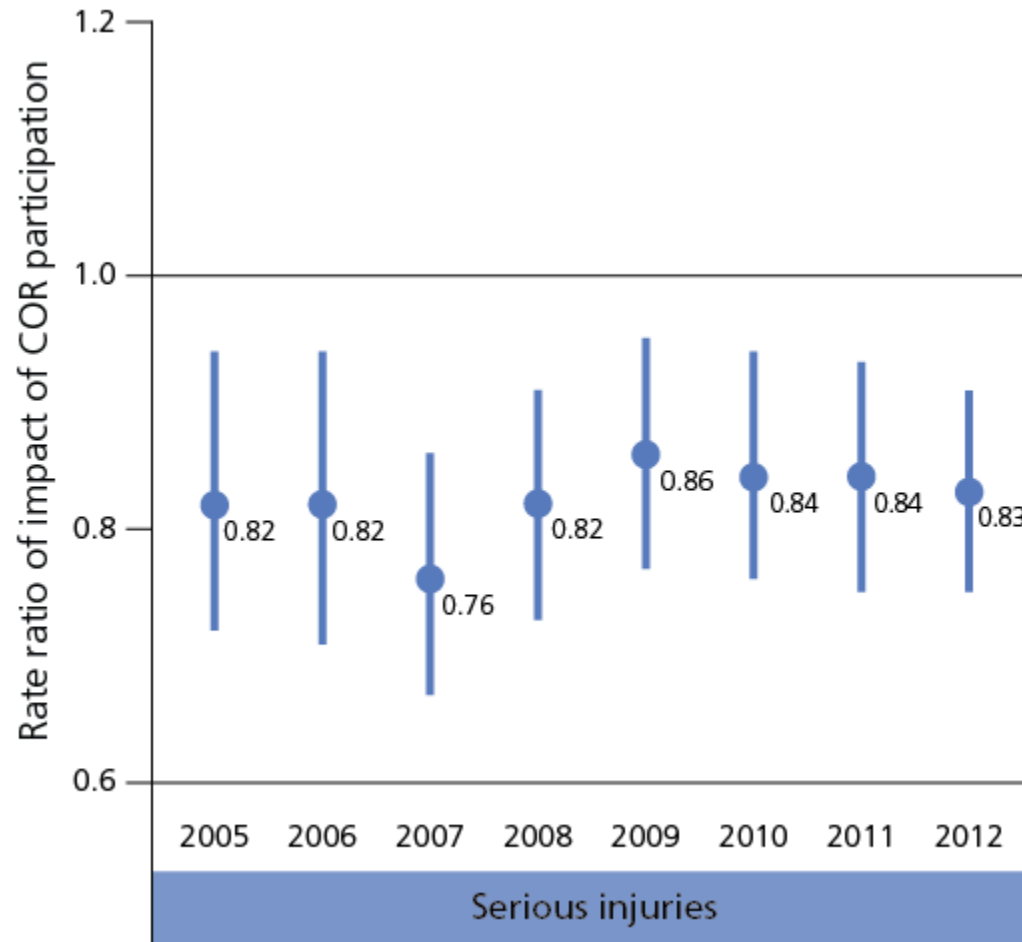
Effect of COR participation – full cohort



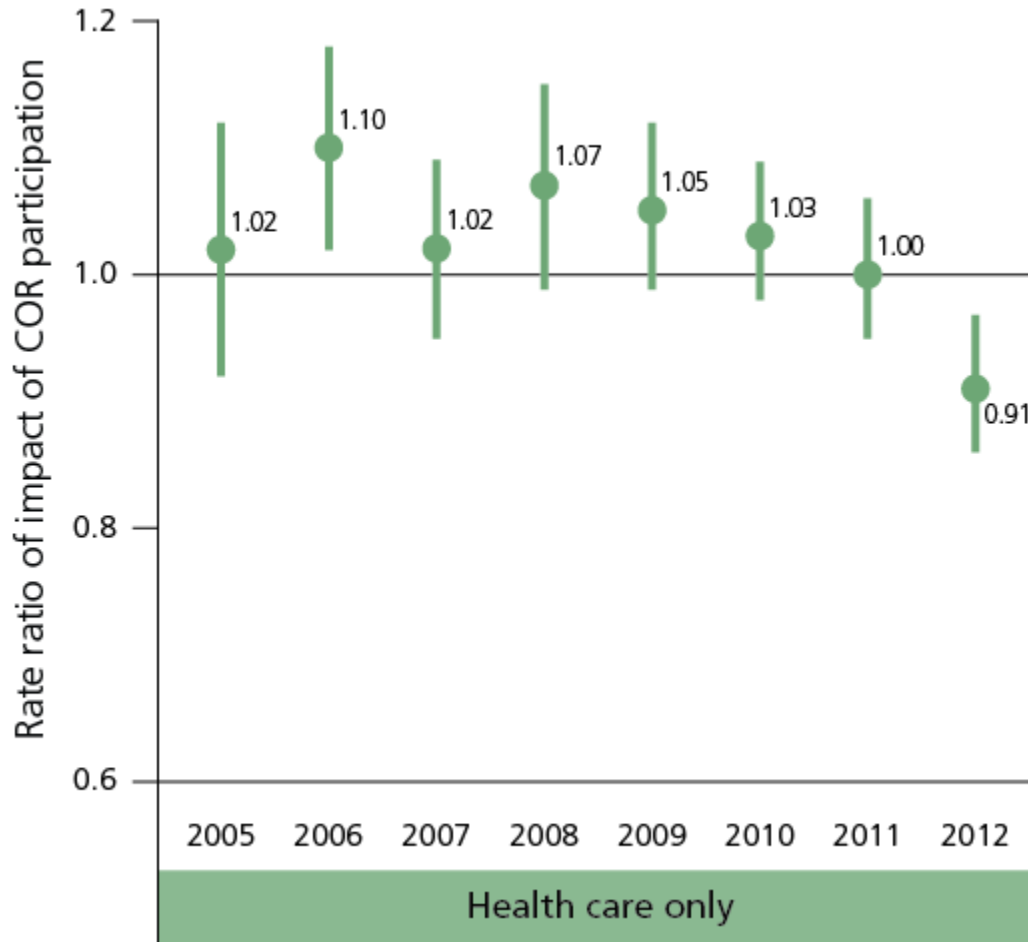
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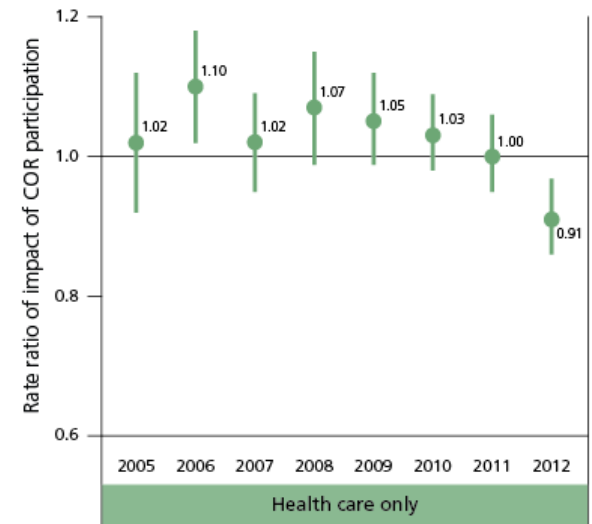
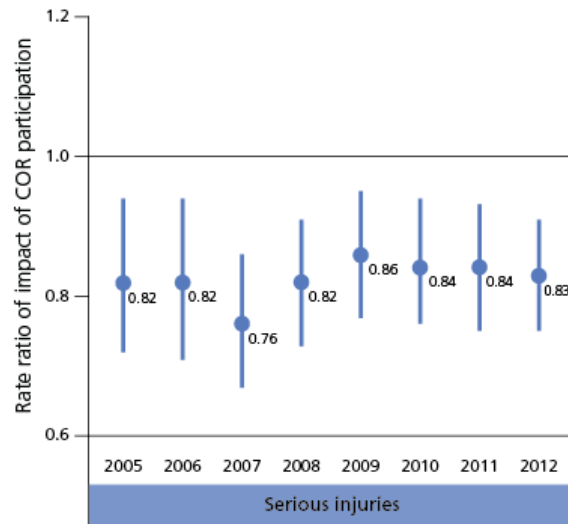
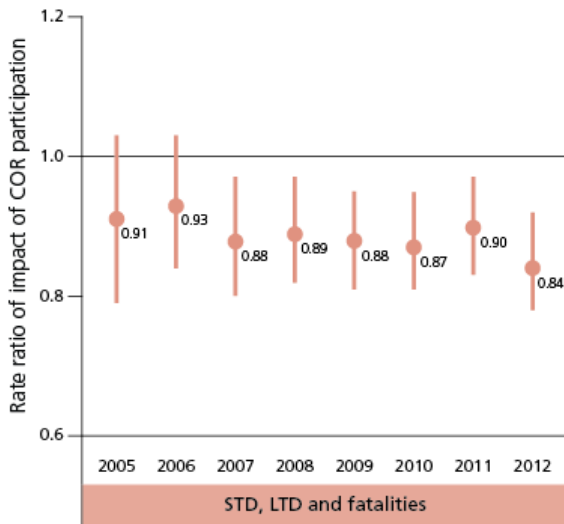
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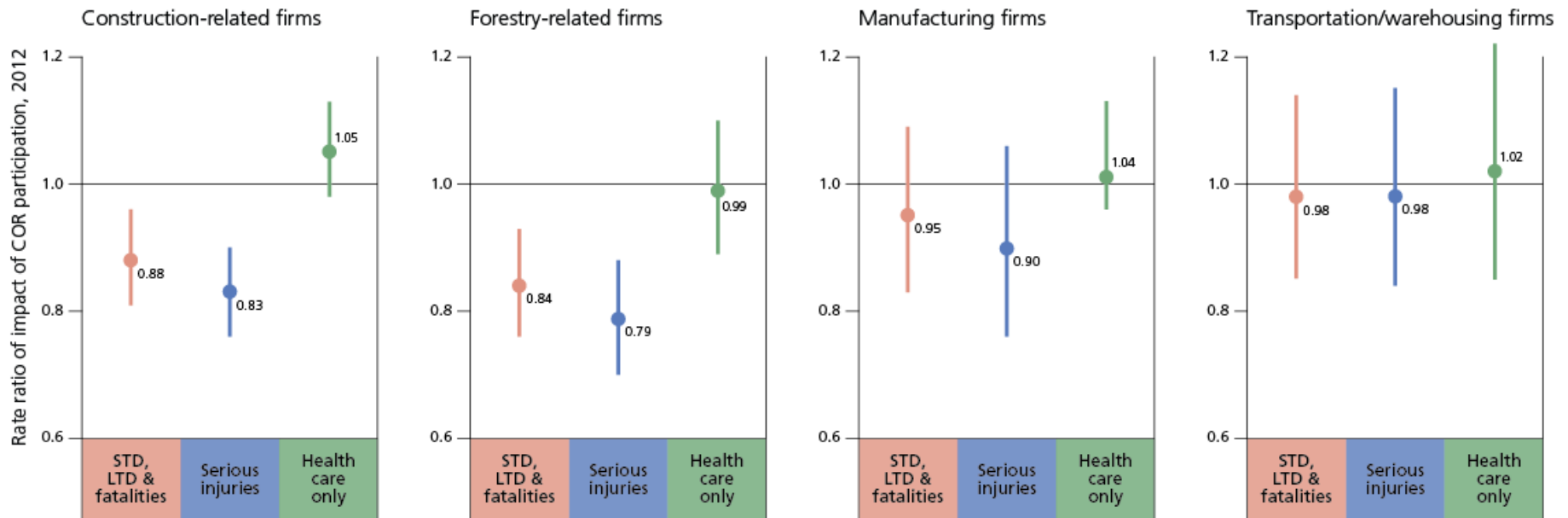
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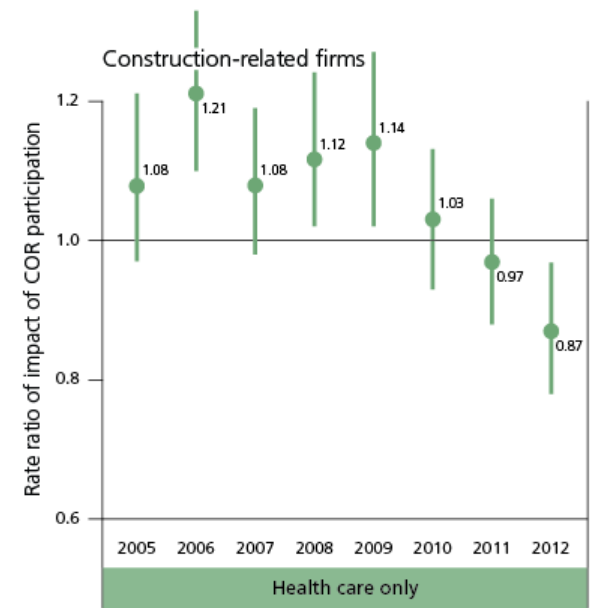
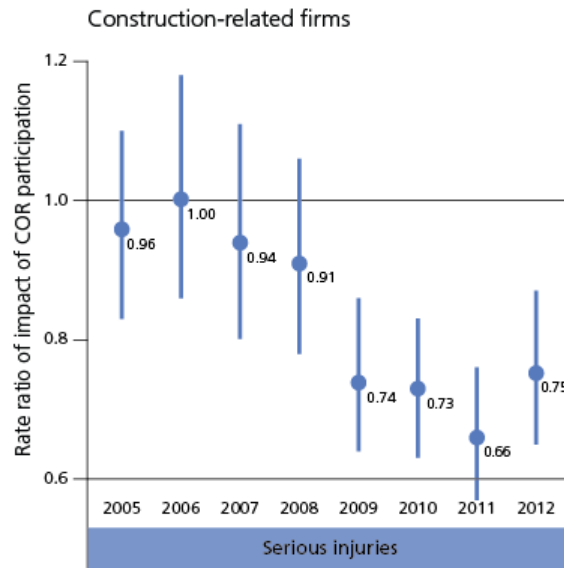
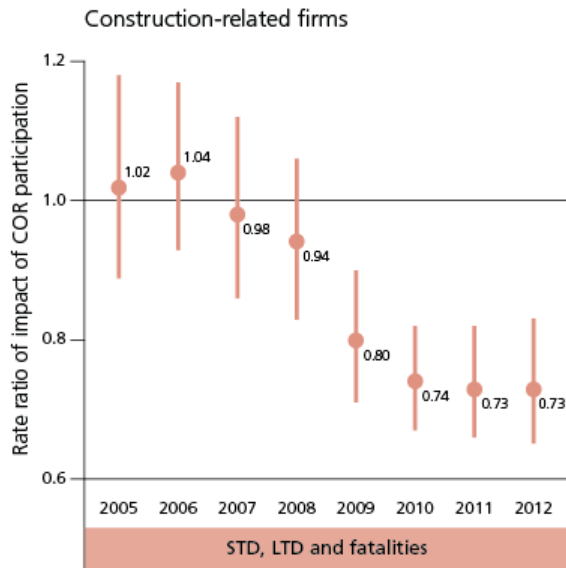
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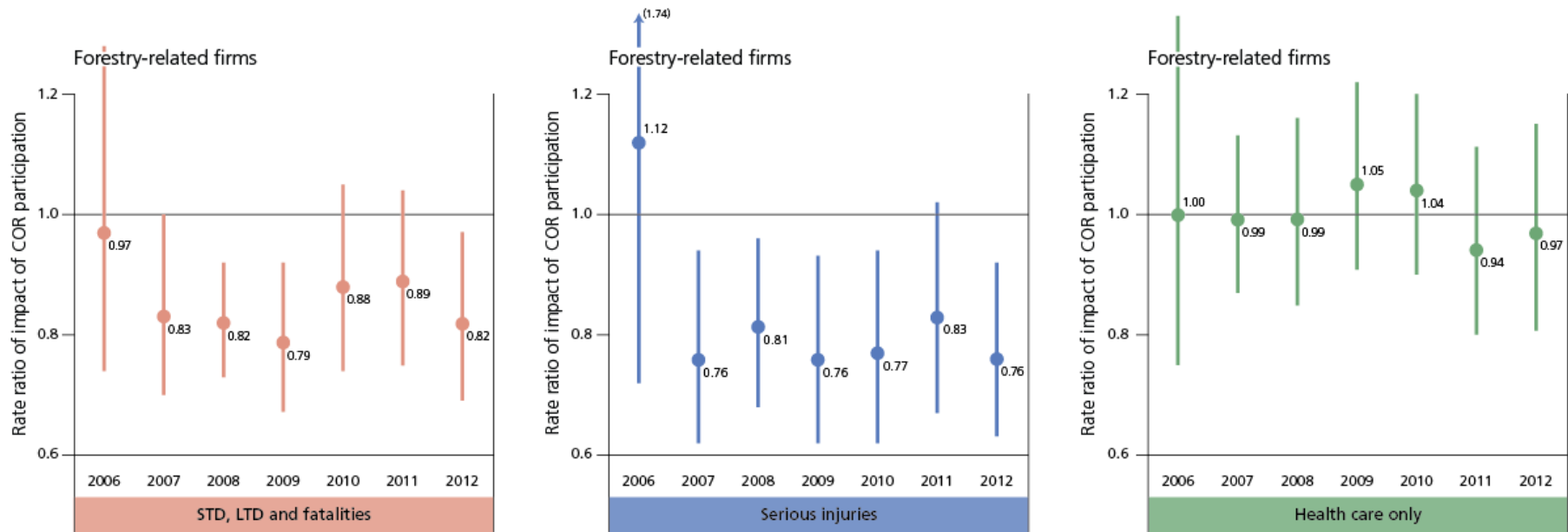
Sector specific results



Sector specific results – Construction-related firms



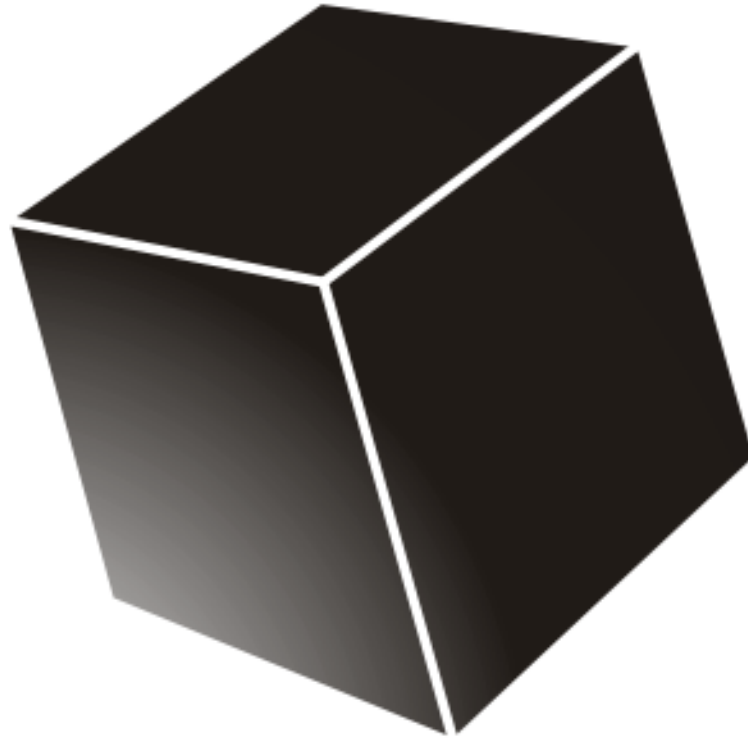
Sector specific results – Forestry-related firms



Conclusions

- COR participation associated with a lower injury rate
- COR appears to be identifying good performers
- COR may be associated with other factors driving the injury rate reduction

Future directions



Partnership for **Work,** **Health** and **Safety**

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