

Systematic literature review on the effects of occupational safety and health (OSH) interventions at the workplace ¹

by Johan Hviid Andersen, MD, PhD,² Per Malmros, MSc, Niels Erik Ebbelhoej, MD, PhD, Esben Meulengracht Flachs, PhD, Elizabeth Bengtsen, MSc, Jens Peter Bonde, MD, PhD

1. *Supplementary material*
2. *Department of Occupational Medicine, Danish Ramazzini Centre, Regional Hospital West Jutland – University Clinic, Gl. Landevej 61, 7400 Herning, Denmark. [E-mail: joande@rm.dk]*

Appendix 1: Quality assessment tool

Overall study quality

Question 1: Does the study specify a theoretically correct relationship between the policy feature (explanatory variable), and the outcome variable (dependent variable)?

Question 2: Are the characteristics of the study population properly well-defined, measured and described?

Question 3: Was the statistical methodology appropriate for the research question and study design?

Question 4: Does the study establish an empirically correct relationship between the outcome and independent variables?

Question 5: Was there adjustment made for important covariates?

Question 6: Are the results interpreted correctly?

Policy lever relevance

Question 7: How strongly would you rate the measurement validity of this study?

Question 8: How strongly would you rate the statistical validity of this study?

Question 9: How strongly would you rate the internal validity of this study?

Question 10: How strongly would you rate the external validity of this study?

Appendix 2: Supplemental tables S1-S3

Table S1. Modified PICO Search, inclusion of at least one search term from each of the four domains are fulfilled

Regulatory Focus	Setting	Policy Levers - OSH regulatory levers	Context (conditions + outcomes)	
Occupational accidents	Workplace Worker(s)	Fine(s) Prosecution	Statistical Analysis Numerical Data	Improved working conditions Occupational accidents,
Occupational Diseases	Worksite, Work site	Labor inspections	Before/after measurements	injuries, fatalities, diseases, disorders
Occupational exposures	Enterprise employee	Improvement notices	Accidents reporting	Frequency/incidence rates
Occupational Health	Employers	Order	Injuries reporting (Review(s))	Absence
Occupational injuries	Self-employed	Mandatory	Key performance indicators	Effect
Occupational safety	Violation(s), Breaches	Consultancy	OSH monitoring systems	Impact
OSH	Branch(s)	Deviation reports	OSH surveillance systems	Costs
OHS	Trade(s)	Inspection Systems, reactive, proactive inspections	Insurance claims Prevention	Employer(worker) behavior
Working Environment		Regulatory and Policy levers		Hazards
Enforcement capacity (number of) inspectors		OHS-service		Return to work (RTW)
Working Environment authority (inspectorate)		Smiley(ies)		Workplace Health and Safety
OSH Campaigns		Guidance, guidelines		
OSH administration		Adapted inspections		
Regulation		OSH-management systems		
Legislation		Safety management system		
Rules		OHSAS 18001		
		OHSMS BS 8800		
		Audit		
		Information		
		Advice		
		Accreditation		
		Enforcement		
		Health and safety training		
		Investigations		
		Targeted inspections		
		Sanction(s)		
		Financial and/or economic incentives		

Table S2. Included studies categorized in five domains, (i) Legislation, (ii) Inspection, (iii) Training, (iv) Campaign, and (v) Device.

Intervention Category	Country Ref.	Setting and target group	Study Design	Outcome	Key Findings	Quality
Legislation						
Arocena, 2009	SPAIN 44	Manufacturing industry. The effect of OHS regulation on serious injuries from 1988 -2004 in advanced manufacturing sector versus traditional manufacturing sector	Pre-post study of OHS legislation	Injuries	A 14.2 % reduction of serious injuries in advance manufacturing sector and no change in traditional manufacturing sector	Medium
Bradbury, 2006	US 31	State versus federal OSH enforcement of OSHA programs are analyzed and measured by occupational mortality	Time-series design from 1981-1995	Fatalities	State OSHA programs are associated with between 27 and 35% fewer deaths than federally OSHA states.	Medium
Bulzacchelli, 2007	US 32	Manufacturing industry. The number of Machinery-related fatal occupational injuries from 1980 through 2001 after introducing the standard on lockout/tagout regulation in 1990, were used as a proxy for effect of the standard.	Interrupted time-series design with multiple comparison groups	Fatalities	The average annual crude rate of machinery-related fatalities declined by 4.59% per year from 1990 to 2001, but this decline disappeared in adjusted analyses.	Medium
Casteel, 2009	US 33	Emergency departments and psychiatric units of trauma and general acute care hospitals in California (n=116) and New Jersey (n=50), counties with at least 250,000 residents	9-year pre-post study after introduction of The Hospital Safety and Security Act in California in 1995	Violence -assault rates	Assault rates among emergency department employees decreased 48% in California post-enactment, and rates decreased 37 % (NS) in psychiatric units in California	Medium

OSH interventions at the workplace

Finger, 2013	CAN 45	This study examines Self-regulation by comparison of 228 RC (Responsible care – codes of conduct on prevention and pollution control)- participating firms that own 1,037 plants; and 1,735 non-RC firms that own 2,293 plants	Panel study of accidents from 1988 - 2001	Injuries	Participation in responsible care program reduces the likelihood of accidents by 2.99 accidents per 100 plants in a given year, or by 69.3%	Medium
Foley, 2009	US 37	Ergonomic regulation in Washington state in 2000 were analyzed by 3 employer surveys in approximately 5,000 plants.	Panel study	Physical exposure	Reduction in reported workplace exposures in high hazard workplaces from 1998 to 2003 (regulation repealed). No reductions in WMSDs	Medium
Jagger, 2010	US 38	Data from 87 hospitals in the United States from 1993 through 2006, comparing percutan injury rates in surgical and non-surgical settings before and after passage of Needlestick Safety and Prevention Act of 2000	Interrupted time-series with no control group	Needlestick injuries	After the legislation, injury rates in nonsurgical settings dropped 31.6%, but increased 6.5% in surgical settings	Medium
Kötz, 1993	GER 46	Manufacturing industry. A model for the costs of accidents and effect of rebate on insurance on the number of accidents in Members of the Sugar Trade Association is tested in 80 firms with 12,498 employees in 1986.	Time series from 1955 - 1980	Number of accidents per 1000 workers per year	The number of reported accidents per 1000 workers decreased by 18.8 on the introduction of the contribution adjustment procedure in 1966, and decreased further by 15.0 (1970) and 13.5 (1974), when the procedure was tightened	Medium
LaMontagne, 2003	US 39	Exposure monitoring by mail and telephone survey of compliance with the OSHA regulation EtO standard. 2,265 Hospitals across US were monitored.	Time-series from 1984 - 2001	Chemical exposure	Percentages of hospitals exceeding exposure limits decreased from 21% in 1998 to 0.9 % in 2001 (Work shift samples)	Medium

OSH interventions at the workplace

Lipscomb, 2003	US 47	16,265 carpenters. Evaluation of Washington State Vertical Fall Arrest Standard among carpenters in 1991. Changes in the rate of falls and measures of severity.	Time-series from 1989 - 1998	Injuries/falls	20% reduction in the rate of falls from elevations comparing rates before and after the 1991 standard change	Medium
May, 2002	US 40	This study examines the change in the incidence of carpal tunnel syndrome (CTS) among companies following the implantation of an OSHA Local emphasis Program (LEP) for ergonomics. Cases were followed for 4 year post intervention 1992-96.	Panel study	CTS	The annual incidence of CTS was reduced by 90 % in the LEP group, while the State rate was reduced by 49 %	Medium
Menendez, 2014	US 41	Homicide reports from 20 of the largest cities (>200,000) in the United States were collected.. Target was taxicab drivers having cameras installed, partitions installed, and neither cameras nor partitions installed.	Ecological study of time-series of homicide from 1996 - 2010	Homicide	Homicide rate reduced with between 74 % to 94% in cities with cameras installed versus no cameras	High
Monforton, 2010	US 34	Mine Safety and Health Administration Legislation in 2000. Quarterly counts of non-fatal injuries and and employment hours. Employees working at 7998 US mine sites	Time-series design from 1995-2006	Injuries	Permanently disabling injuries risk declined by 40.1 % from the pre- to post-intervention periods	Medium
Stocks, 2013	UK 43	The effect on respiratory diseases of introducing workplace exposure limits enacted in the UK in 2005.	Interrupted time series design from 1996-2010	1) work-related short latency respiratory disease (SLRD) 2) incidence of SLRD attributed to glutaraldehyde and latex	A 30 % reduction in reports of SLRD. A 80 % reduction in SLRD attributed to glutaraldehyde in healthcare workers and a 63 % reduction in SRLD attributed to latex	High

OSH interventions at the workplace

Suruda, 2002	US 35	The impact of OSHA Trench and Excavation Standard on Fatal Injury in the Construction industry enacted in 1990. 47 states across US. 522 fatalities.	Time-series 1984 -1995	Fatalities	There was a 50 % decrease in fatalities from 1984-89 to 1990-95	Medium
Turner, 2012	UK 42	The effect of mandatory advice in 1998 and legislation in 2002 to reduce exposure to 'latex and rubber glove allergens'. 13,658 case- reports.	Pre- and postintervention	Contact Urticaria (CU) Allergic Contact Dermatitis (ACD) and irritant contact dermatitis (ICD)	A 24 % reduction in CU , a 33 % reduction in ACD and a 22 % reduction in ICD post intervention	High
Yassin, 2004	US 36	The effectiveness of introduction of OSHA's construction industry's scaffold standard in 1996. A total of 6,502 non-fatal injuries with lost work days.	Pre -and postintervention from 1992-2001	Fatal and non-fatal injuries	The post-standard period fatal injuries rates declined by 5.8%, nonfatal injury rates involving lost workdays declined by 33.0%, and nonfatal injury rates with 31 or more lost workdays declined by 29.3%	Medium
Inspection						
Agnesi, 2016	ITAL 64	795 industrial settings that were subject to OSH interventions from 2003-05 and 4186 reference firms, which were all manufacturing industries with >10 employees. Comparison of injury rates before and after.	Pre-and post-intervention time-series from 2001-2007	Injuries with absence from work for ≥3 days	Inspection after injury reduced all injuries by 24% and severe injuries by 36%	High
Baggs, 2003	US 48	Washington State employers; target were employers who had (1) no OSHA State Plan (WISHA) activity, (2) enforcement, (3) consultation, and (4) both types of visits. 8,229 accounts included.	Longitudinal study 1997-2000	Workers compensation claim rates	Claims rates for employers with WISHA enforcement activity declined 22.5% in fixed site industry SIC codes compared to 7% among employers with no WISHA activity. No effect of consultations	High

OSH interventions at the workplace

Bjorkdahl, 2008	SWEDEN 66	Noise regulation campaign in 2005. 1,314 companies were inspected and 1,109 were matched controls were sent questionnaire to evaluate if inspected workplaces took actions against noise.	Matched and partly randomised study	Noise awareness and compliance	Concerned plans of action against noise were seven times more common in inspected than in uninspected workplaces. Measuring noise exposure was five times as common and noise-reducing measures more than twice as common in inspected workplaces.	Medium
Boden, 1985	US 49	This study determines the influence of federal mine safety inspections on underground coal mine accidents. The determinants of accident rates are analyzed for 535 coal mines during the period 1973-75.	Simulation study	Accidents	Estimates based on these data when applied to the authors model indicate that increasing inspections by 25 per cent would have produced a 13 percent decline in fatal accidents and an 18 percent decline in disabling accidents	Medium
Burstyn, 2010	CAN 68	The regulatory environment of Alberta, Canada; comparison autonomy supportive tactics with coercive tactics in inspections. Target were 39 OHS inspectors with 17,960 first inspection episodes and 29,451 compliance orders issued as a result of these inspection episodes from 2003-06.	Panel study	Compliance	Autonomy-supportive inspectors issued 22 % fewer severe compliance orders and achieved compliance after fewer visits	Medium
Chen, 2008	US 50	The compliance review (CR) is a federal program monitoring motor carrier safety performance and regulatory compliance. This study sought to assess the impact of CRs on reviewed trucking companies in reducing truck crashes.	Time-series analysis of truck-crash from one year to the next from 1996-2003	Highway truck-crash injuries	Reviewed companies experienced a 39–15% reduction in number of crashes in the year the CR was performed. The reduction was sustained 7 years after CR	High

OSH interventions at the workplace

Farina, 2016	ITAL 65	Manufacturing companies with more than 10 employees. Survival analysis were made between companies where 331 had partial and 241 comprehensive inspections from 2003-05.	Retrospective cohort study	Injuries	Risk of injury was 26 % reduced in companies which had a comprehensive inspection compared to those which had a partial inspection in firms with 10-30 employees, but no reduction in larger firms.	High
Foley, 2012	US 37	This study examines changes in workers compensation claims rates for Washington employers having either an inspection, with or without citation, or a voluntary consultation activity. 8,752 firms in Washington State.	Panel study	Change in claims incidence rates (CIRs) for non-musculoskeletal and musculoskeletal claims	Inspections were associated with a 4% decline in time-loss claims rates relative to uninspected workplaces. The effect strengthens when MSD claims are excluded. Citations for non-compliance are associated with a 20% decline in non-MSD CIRs relative to uninspected workplaces	High
Gray, 1991a	US 52	This study examines the impact of OSHA health inspections on compliance with agency regulations in the manufacturing sector. A total of 35,426 inspections of 12,492 plants from 1972-1983	Panel study	Number of compliance violations	The average plant experienced a 50 % reduction in citations and a 42 % reduction in overexposures. The first inspection had the strongest impact	High
Gray, 1991b	US 70	This study examines the impact of OSHA health inspections on compliance with agency regulations in the manufacturing sector. Based on 299,295 inspections across the US.	Panel study	Number of compliance violations	The effect of OSHA inspections during this period was to reduce the level of citations on average by 3.1-3.5, or approximately half of the first inspection average of 6.3 citations	High

OSH interventions at the workplace

Gray, 1993	US 53	This study examines change in lost time injuries and lost workdays in 6,842 manufacturing plants with 18, 188 inspections from 1979-85.	Panel study	Injuries	Inspections imposing penalties induce a 22% decline in injuries in the inspected plant during the following three years, and reduced lost workdays by 20 %	High
Gray, 2005	US 54	This study examines the impact of OSHA inspections on injuries in manufacturing plants from 1979-98. Number of observations were 27,368 in 1979-85, 32765 in 1987-91 and 25,603 in 1992-98	Panel study	Lost workday injuries	OSHA inspections imposing a penalty reduced lost-workday injuries by about 19% in 1979-85, but that this effect fell to 11% in 1987-91, and to a statistically insignificant 1% in 1992-98. No explanation for the decline of the impact of penalty inspections on injuries	High
Haviland, 2010	US 55	Single-establishment manufacturing firms, with 20 to 250 employees, operating in Pennsylvania. Inspections with citations/penalties from 1998-2005. A total of 5,720 firms and 28,374 firm-years.	Panel study	Injuries	A 20% decrease in injuries related to OSHA standards over the two years that followed the citation of Personal Protective Equipment (PPE) standard	High
Haviland, 2012	US 56	Single-establishment manufacturing firms with more than 10 employees, operating in Pennsylvania. Inspection with penalties from 1998-2005. Lost time rates in a total of 8,645 firms and 44,821 firm-years	Panel study	Injuries	Inspections with penalties reduced injuries by an average of 19–24% annually in the 2 years following the inspection. These effects were not found for workplaces with fewer than 20 or more than 250 employees or for inspections without penalties	High

OSH interventions at the workplace

Hogg-Johnson, 2012	CAN 69	Manufacturing workplaces, Ontario, Canada. Intervention: inspection for one-year 2006-07, Three arms; 600 in consultation, 619 inspection and 934 as referents. Study period 1999-2008	Randomised controlled study	Injuries	Consultation and enforcement programmes as implemented in this study were not sufficient to reduce work injury outcomes over a 21 month follow-up period (Consultation versus no intervention)	Medium
Kemmlert, 1996	SWEDEN 67	Work places with reports on occupational musculoskeletal injury collected at three labour Inspectorate offices, N=195. Inspections for 97 and 98 served as controls	Randomised controlled study	Secondary prevention: Reduced workload and employment status	Inspections with or without warning and orders for reduced workload had no effect versus no intervention	Medium
Ko, 2010	US 57	OSHA inspections in the US to identify the effects of repeated inspections and the time between inspections on noncompliance. The sample included 549,398 inspections conducted from 1972 through 2006 in manufacturing plants in the 29 states where federal OSHA enforces the law	Panel study	Number of compliance violations	The number of total violations cited fell by 28%–48% from the first to the second inspection	Medium
Levine, 2012	US 58	US, California 1996-2006. How inspections affected injury rates and other outcomes. Employers from 409 randomly inspected establishments with high injury rates and 409 matched-control establishments.	Controlled before-after study	Injuries	Compared with controls, randomly inspected employers experienced a 9.4% decline in injury rates and a 26% reduction in injury cost.	High

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Mendeloff, 2005	US 59	This study examines whether some injury types are more affected by inspections than others, or by citations of particular OSHA standards. For the period from 1992 to 1998 the dataset has 50,276 observations from 16,036 establishments	Panel study	Injuries	Injuries prevented by penalty inspections at manufacturing establishments with fewer than 250 workers from 1992–98 were not limited to those related to OSHA standards, e.g. exertion injuries declined by 10.4 %. An inspection citing a violation of the personal protective equipment (PPE) reduced eye abrasion injuries with 24.4 % in the four years following inspection	High
Nelson, 1997	US 60	Construction employers (N=784) that were cited for violating the standard over the 1991–1992 period and a control group (N=8,301) that had not been inspected and cited for violating the standard. Fall injury rates are compared before and after.	Controlled before-after study	Injuries	The enforcement group was 2.3 times as likely to experience a reduction in injury claim rates (before to after inspection) as control employers after adjustment for employer size and type of business	Medium
Ruser, 1991	US 61	This study examines the effect an OSHA inspection had on an establishment's injury rate following the inspection from 1979-85. 4,114 observations for establishments that were inspected by either federal or state OSHA compliance officers	Panel study	Injuries	No evidence for overall reduced injury rates in inspected companies. Effekt in establishments with fewer than 100 employees	Medium
Smitha, 2001	US 62	Effect of mandatory safety regulations on severity injury rates. Number of OSHA inspections per year among 3,286 injury cases from 42 states from 1992 -1997	Time-series	Injury severity case rate	Injury severity case rate increased by 2 -3 % per year for number of inspections per 1000 workers. Safety committees reduced injury	Medium

OSH interventions at the workplace

rates by approximately 10
% per year

Weil, 2001	US 20	Enforcement, compliance and standards as determinants of OSHA performance. Any type of inspection by OSHA including complaint, accident or fatality in construction industry from 1987-93, N= 2060 companies	Panel study	Violation of safety standards	OSHA inspections with penalty increased compliance by about 6 % from the first to the second inspection and were modest beyond the initial inspection. Complaint inspection increased compliance by 18 % and accident investigation by 24 %	High
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Training

Anger, 2009	US 71	Vineyard workers from Oregon completed a test of their baseline WPS knowledge, computer-based training on WPS, a post-test immediately after training and a re-test 5 months later. N= 61 workers.	Before and after comparison	Knowledge	Training increased the knowledge to 85% on the post-test with the same questions. Re-test performance (78%) at 5 months revealed a return towards but not back to the pre-test levels	Medium
Arnold, 2016	US 72	Checklists and algorithms to improve qualitative exposure judgment accuracy among hygienists (n = 39) and novice industrial hygienists (n = 8)	Before and after comparison	Exposure judgment skills	Judgments aided by the Checklist significantly improved judgment accuracy, producing ~ 60% judgments categorically accurate	High

OSH interventions at the workplace

Dong, 2004	US 73	Insurance records, union training records and compensation were analyzed. More than 8000 construction laborers in Washington State were studied for the effect of safety and health training on work-related injuries in 1993-94.	Cross-sectional study	Claims	Workers receiving training during the study period were 12 % less likely to file compensation claims, and among workers 16 to 24 years old training was associated with a 42 % reduction in claims	High
Parker, 2009	US 74	Randomized trial with two groups: management only (N=20) and management-employee (N= 20) to improve machine-related safety in small metal-fabrication. All businesses had a report outlining deficiencies and prioritizing their remediation. In addition, the management-employee group received four one hour interactive training sessions from a peer educator.	Randomized controlled trial	Safety practices	More than 40% of devices required for adequate guarding were missing or inadequate, and 35% of required safety programs and practices were absent at baseline. Both measures improved significantly during the course of the intervention. No significant differences in changes occurred between the two intervention groups	Medium
Sam, 2008	INDIA 77	Two villages of Udupi district of South India; target were 74 pesticide handlers. The study evaluated occurrence of poisoning and effectiveness of educational interventions among pesticide handlers in areas having high occurrence of occupational poisoning.	Pre- and post-intervention	Knowledge attitude and practice (KAP)-score	The average baseline KAP score improved after education among men and women.	Medium
Schoenfisch, 2017	US 75	This study examines the effect of OSHA's Outreach Training program for construction among 17,106 union carpenters in Washington State. Training data from the 432 carpenters who linked to the study cohort	Retrospective cohort study	Injuries	OSHA Outreach Training resulted in a 13% non-significant reduction in injury claims rates overall. The protective effect was 24 % for carpenters in their apprenticeship years	Medium

OSH interventions at the workplace

Stokols, 2001	US 76	A 2-year prospective study from 1993-94 evaluated the effectiveness of a managerial training program to enhance corporate compliance with statewide worksite safety and health regulations. 48 participated in the training sessions during the first year of the study. These firms were compared with 46 control companies that did not receive the training	Intervention study with control group.	Awareness and compliance	Knowledge of the state of California enacted Senate Bill (SB) 198 to establish, implement, and maintain a worksite injury and illness prevention program increased among trained participants	Medium
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Campaign

Gadomski, 2006	US 79	This study examines whether active dissemination of the North American Guidelines for Children's Agricultural Tasks (NAGCAT) reduced childhood agricultural injuries in New York State. Intervention group N= 416, Controls, N=429	Randomized controlled trial	Injury/child	Among 0-19 year olds there were a 48 % significant reduction. Among 7- to 19-year-olds, a 52% reduction in NAGCAT-preventable injury incidence densities was seen in the intervention group compared with the control group	High
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OSH interventions at the workplace

Mancini, 2005	ITAL 78	This study targeted all 237 metal-ware factories in the district of Imola, Italy from 1988-2003. Based on preliminary inspections, the main intervention included distribution to all factories of specific educational brochures and multiple broadcasting on the subject. This was followed by a four year "post-intervention reinforcement" period of unannounced official inspections	Interrupted time-series with two comparison sectors (construction and wood/ceramics).	Eye injury	23.4 % decline in "post-intervention reinforcement", 37.4 % decline in "late post-intervention", and 42.4 % decline in the "very late post-intervention" period	High
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Device

Collins, 2004	US 81	This study was a pre- post intervention trial of a "best practices" musculoskeletal injury prevention program designed to safely lift physically dependent nursing home residents. A dynamic cohort of all nursing staff (n = 1728) in six nursing homes from 1995-2000	Pre-post intervention study and cost benefit analysis	Injury incidence rates, workers' compensation costs, lost work day injury rates.	A 61 % reduction in workers' compensation claims, a 46 % reduction in Occupational Safety and Health Administration (OSHA) 200 logs and a 35 % reduction in first reports of employee injury. The initial investment was recovered in less than three years	High
Evanoff, 2003	US 80	This study examined injury and lost workday rates before and after the introduction of mechanical lifts in acute care hospitals and long-term care (LTC) facilities, and surveyed workers regarding lift use	Pre- and post-intervention 1996-2000	Musculoskeletal injuries	The post-intervention period showed a 18 % decreased rate of musculoskeletal injuries, a 44 % decrease in lost workday injuries, and total lost days due to injury decreased by 58 %	High

OSH interventions at the workplace

Li, 2004	US 82	This pre- post intervention study evaluated the effectiveness of mechanical patient lifts in reducing musculoskeletal symptoms, injuries, lost workday injuries, and workers' compensation costs in workers at a community hospital	Pre- and postintervention	Injury incidence rates, workers' compensation costs, lost work day injury rates	Injury rates decreased with 50 % and adjusted lost day injury rates decreased by 65 %	Medium
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Table S3. Gray literature of studies from the domains (i) Legislation and (ii) Inspection

Intervention Category	Title (English)	Danish	Country Ref	Setting and target group	Study Design	Outcome	Key Findings	Quality
Legislation								
S.L.Brødsgaard, P. Mortensen, Miljøkemi 2001	Nedsættelse af grænseværdien for lattergas-effekt på eksponeringsforhold på udvalgte danske sygehuse (The effect of a decrease of the TLV of laughing gas on the actual exposures are measured at Danish hospitals 1986-2000)		DK 15	Measurements of the exposure of laughing gas 1986-2000 in Danish hospitals	Statistical analysis of the measurements of exposures before and after the decrease of the TLV in 1994.	Exposures before and after 1994.	Measurements of laughing gas in Danish hospitals documented an effect of a decrease in the TLV. The exposure was measured from 1986 – 2000 and the TLV was reduced in 1994. The exposures of laughing gas decreased after the reduction of the TLV, but the use of anaesthetic gases and the equipment used, changed in the period, so the conclusion was not clear.	Medium
S.L.Brødsgaard, P. Mortensen, Miljøkemi 2001	Eksponering for anæstetisgasser på udvalgte danske sygehuse 1986-2000. (Exposure of anaesthetic gases in selected hospitals in 1986-2000)		DK 17	As a follow up on the previous investigation, an analysis was made in order to estimate the total chemical working environment for the staff at the anaesthetic units.	Statistical analysis of the measurements of exposures before and after the decrease of the TLV in 1994.	Exposures before and after 1994.	A reduction about 50% of the total exposure for anaesthetic gases for the nurses was found, but some of the individual gases showed an increasing pattern, so the problem is not completely solved.	Medium
Politica 48 (3) 2016, 320-339	Reguleringspolitik og virksomhedshomogenitet-en konfigurationskomparativ analyse af arbejdsmiljøreformen i 2010.(The policy of regulation and the homogeneity of enterprises)		DK 18	Analysis of 14 case-enterprises and their implementation of the revised working environment act from 2010.	60 case-enterprises are visited and analysed	Compliance with the working environment act from 2010.	The implementation of the revised working environment act from 2010, is analyzed in 14 large and medium sized enterprises, with a QCA-analysis. Employee involvement and use of professional staff seems to be important in the implementation of new regulation.	Low

XI nordic ergonomic society annual conference, 2014	The impact of occupational health and safety policy interventions tailored to small enterprises in Denmark	DK 19	Analysis of prevention packages in 221 enterprises, from construction and auto-repair.	Survey of the participants before and after the program	Compliance with prevention packages	82% experienced improvement of the physical working environment, and 61 found the packages a positive investment. In construction the figures were 73% and 40 %	Low
Weil, 1999	The Impact of OSHA Enforcement on Regulatory Compliance in the U.S. Construction Industry	US 20	This study examines the relation of enforcement activity on compliance in two segments of the industry: construction contractors in the U.S., consisting of 2060 very large-scale companies operating at a national level; and for 3900 mid-sized contractors operating primarily at a regional level	Regional and national statistics	Penalties related to number of inspections and enforcements	Enforcements lead to few penalties, more at first than subsequent visits.	High
Jamieson, 2010	OHS Prosecutions: Do they deter other companies from offending?	AUS 21	Companies selected from branches with many prosecutions	Semistructured interviews	Companies awareness og prosecutions	Large companies more aware than small	Low
Biddle, 2008	Does a safety and health management system contribute to a safer work environment?	US 22	91 companies rated their own commitment to OHS strategies and reported OIL claim rates before and after impleentation of an occupational management system	Occupational injuries and illness measured before and after implementation of OHS management policies in 91 companies	OIL claim rates	An overall decrease in OIL claims of 18% from rates 2,28 to 1,88 was related to leadership and accountability	Low
Kim, 1991	The political economy of OSHA regulations: A pooled time series analysis	US 16	Industry and State level statistical data on number of inspections	Aggregate cross-sectional time series	Injury rates	OSHA enforcement activities lead to mixed results, but mainly the probability of inspection increases frequency of injuries.	Medium

Inspection

Deloitte, 2011	Dialog med virksomheder, (Dialogue with enterprises)	DK 23	53 enterprises reporting more than 100 accidents in 2008 were invited to a dialogue with the DWEA	Cooperation about prevention measures to reduce the number of reported accidents by 20% i 2010 compared with 2008.	Reduction in reported accidents	The objective was not met. There was a large difference for the results between the public and the private enterprises. The recorded reduction was recorded before the dialogue meetings. A 17% increase in public enterprises and 26% decrease in private	Low
Arbejdstilsynet sags nr. 20155000212, 2016	Evaluering af tilsyn med midlertidige og skiftende arbejdssteder (Evaluation of inspections at temporary and changing workplaces)	DK 24	Risk based inspections at temporary and changing workplaces, DWEA (Danish Working Environment Authority) informs the workplaces about the inspection in order better to find the actual workplaces (RT-MSA)	Inspections in construction-, cleaning- and transportation branches. The reactions from the DWEA were recorded	DWEA reactions pr. visited enterprise	It is examined if a preliminary contact to the enterprises helps the inspectors to find the workplaces at temporary and changing workplaces. The average number of reactions, rulings (decisions) and guidance were higher in 2016 than in 2015 in all three branches.	Medium
Grontmij/Carl Bro, 2010	Evaluering af Arbejdstilsynets dialogmøder med bygherrer (Evaluation of DWEA meetings with building owners)	DK 25	38 dialogue meetings with building owners were held in 2009/2010 , and it is evaluated if the meetings have improved the safety at the construction sites.	Comparison of the working environment at construction sites with or without dialogue meetings with the building owner	The number of reactions given by the DWEA at the two groups	There was no significant difference between the two groups (44% in the group with meetings and 56% in the group without meeting had at least one reaction)	Low

Arbejdstilsynet, ISBN-nr. 87-7534-5668, 2005	Status over effektevaluering i Arbejdstilsynet 2003-2004 (Status report from impact measurements in the DWEA in 2003 and 2004)	DK 26	Results from 8 impact measurements starting in 2003 and 2004	Problems found by the inspectors in prioritized areas, registration of the compliance by the enterprises, and an estimation of the number of employees affected by the changes.	Reduction of exposed employees	8 evaluations of the impact of the inspections and reactions were conducted in 8 branches with focus on the prioritized exposures. The impact of the inspections was measured in the percentage of compliance by the enterprises to the reactions given by the DWEA and the number of the employees affected by the improvement. 75-96% of the demands by the DWEA were met by the enterprises and reductions of the exposures were estimated to affect 85-98% of the employees.	Medium
Arbejdstilsynet j.nr. 20165000782, 2017	Analysis of the impact of the DWEA inspections due to high level of incidence of accidents.	DK 27	250 enterprises were selected reporting 3 accidents in 2012 (one serious), more than 35 employees and an incidence of accidents above the average than the branch. The control group consisted of 493 companies.	Inspections were conducted in 2013 and the recorded in accidents for the enterprises and for the control group were recorded.	The goal was 10% reduction in the number of recorded accidents	The reduction was 13.7% for accidents and 14.4% for the serious accidents. The reduction in the control group did not deviate significantly from this number, so it was concluded that the incidence inspections do not decrease the number of recorded accidents in the following years.	Medium
Arbejdstilsynet j.nr. 20155200012, 2016	Effekt af tilsynsformer og reaktioner på forekomsten af arbejdsulykker. (The effect of different kinds of inspections and reactions on the prevalence of accidents)	DK 29	Is it possible to show a decreasing risk of accidents after DWEA has issued an executive order or given guidance to avoid risk of accidents.	The effect of different kinds of inspections on the prevalence of accidents in 2008-2013 is investigated on a panel of 29169 enterprises with regression analysis.	Incidence of accidents with or without a previous accident	It is shown, that inspection after an accident reduces the prevalence of accidents the following years with 9% and with 13% for serious accidents with personal injury. Inspections in enterprises with no preceding accident had no effect on the prevalence of accidents the following years.	High

Arbejdstilsynet J.nr. 20175100085, 2016	Resultaterne af målretningen af det risikobaserede tilsyn, første halvår 2016 (Results from the targeted risk based inspections, from the first half of 2016)	DK 29	Reactions from the inspections before and after the risk based inspections	Timeseries before and after risk based inspectionss	Proportion of inspections leading to reactions	An increase from 15,2 to 22,9% were recorded.	Medium
Arbejdstilsynet Projektnr 060970, 2016	Evaluering af effekten af det risikobaserede tilsyn på mellemlangt sigt (Evaluation of risk based inspektion in medium time perspective)	DK 30	The activities performed by the enterprises after receiving an executive order.	Questionnaire of the executive order and 2 years after.	Compliance with the executive orders	Musculoskeletal-complaints 75%, Psychological complaints 52%, Accidents 85%. After 2 years the enterprises reports in 78%, 62% and 90% of the enterprises that they maintain the solutions	Low

Legends for Supplemental figures S1 to S9

Figure S1. PRISMA flow chart of included studies from scientific papers

Figure S2. Flow chart of gray literature studies from OSH UPDATE, snowballing and the Danish WEA (Working Environment Authority) homepage.

Figure S3. Funnel plots of legislation and injuries. Standard Error by Odds Ratio.

Figure S4. Funnel plots of inspection and injuries. Standard Error by Odds Ratio.

Figure S5. Funnel plots of inspection and compliance. Standard Error by Odds Ratio.

Figure S6. Funnel plots of inspection and workers compensation claims. Standard Error by Odds Ratio.

Figure S7. Funnel plots of training. Standard Error by Odds Ratio.

Figure S8. Funnel plots of campaigns. Standard Error by Odds Ratio.

Figure S9. Funnel plots of technical devices. Standard Error by Odds Ratio.

Figure S1

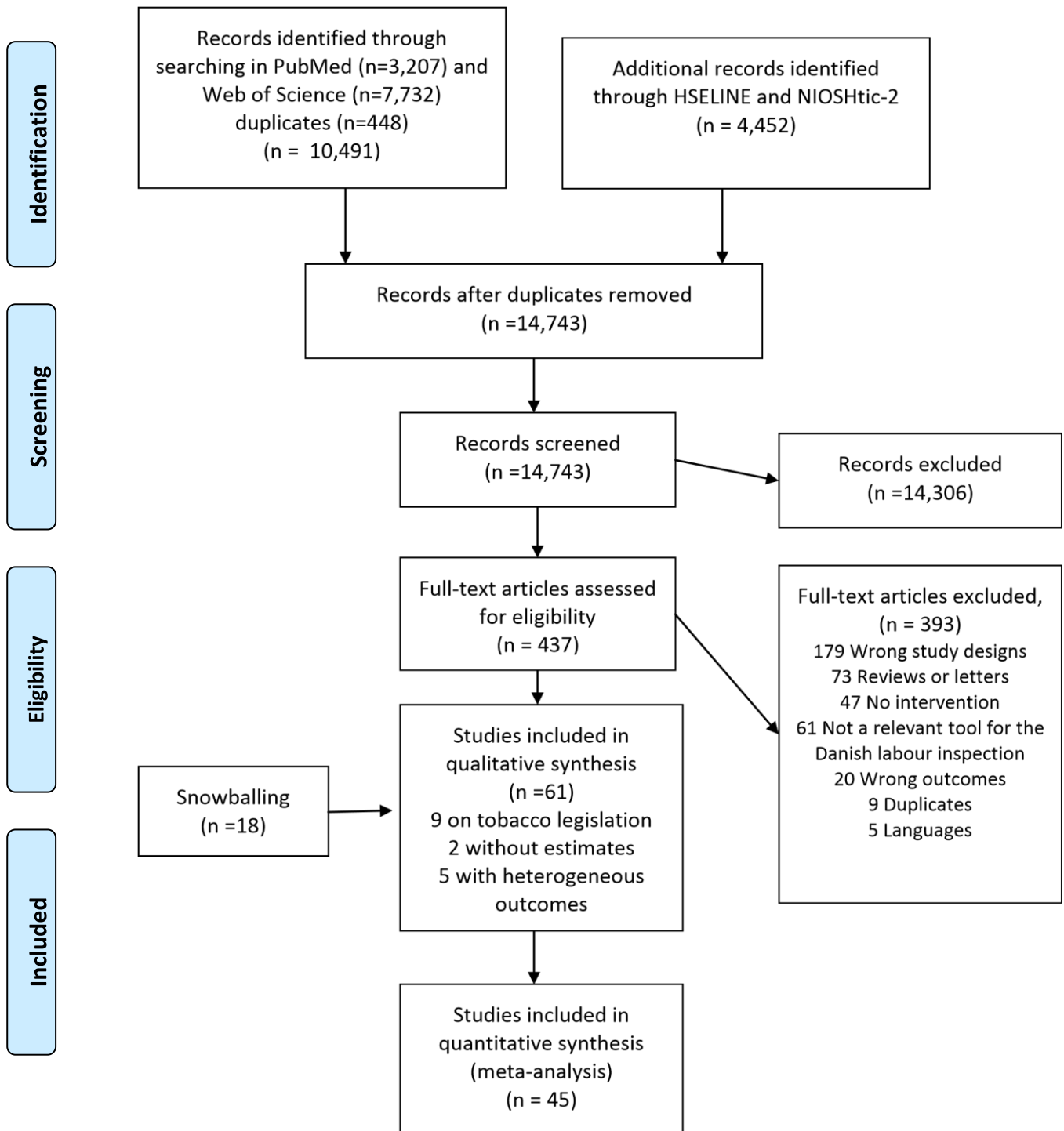


Figure S2

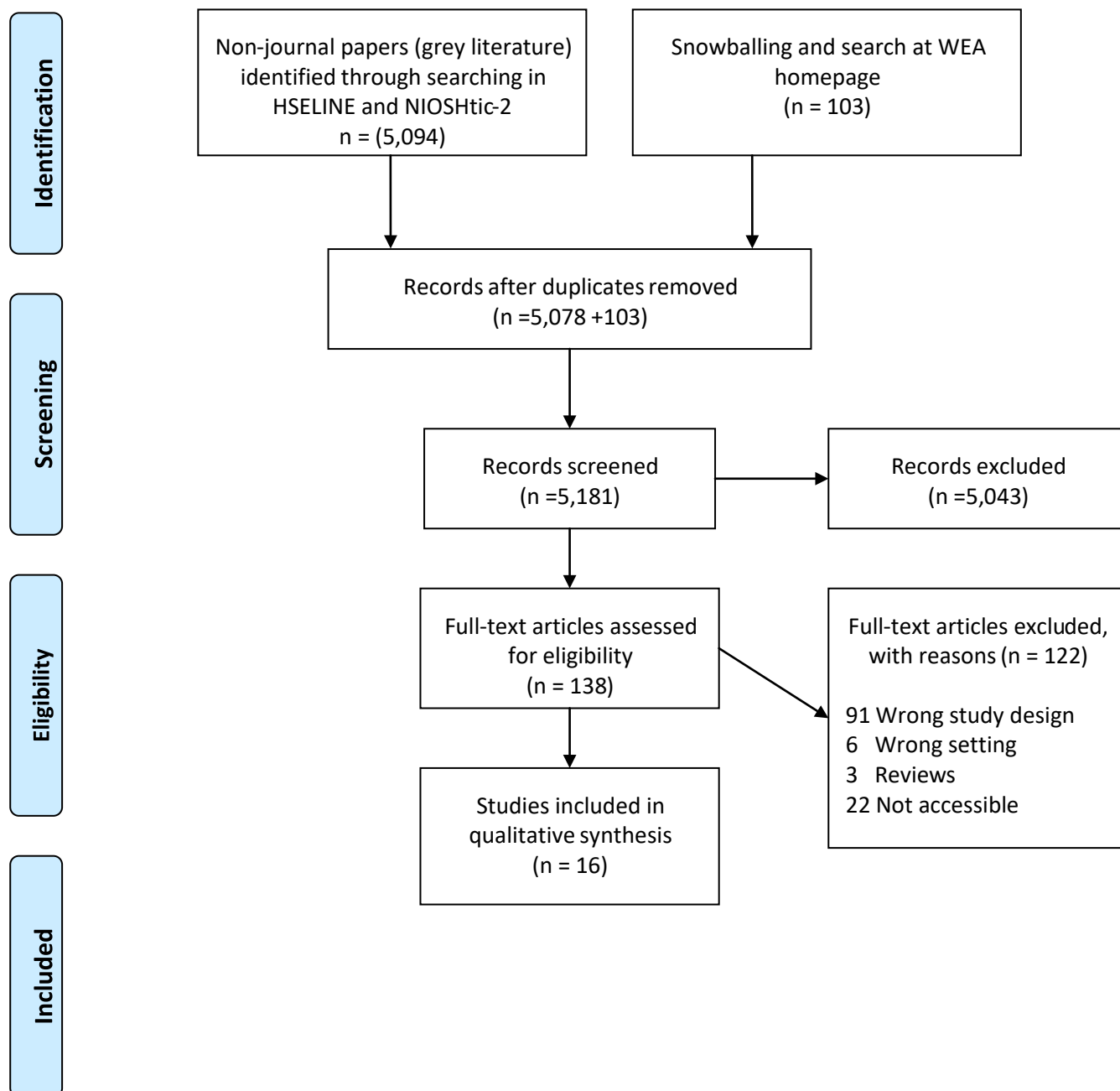
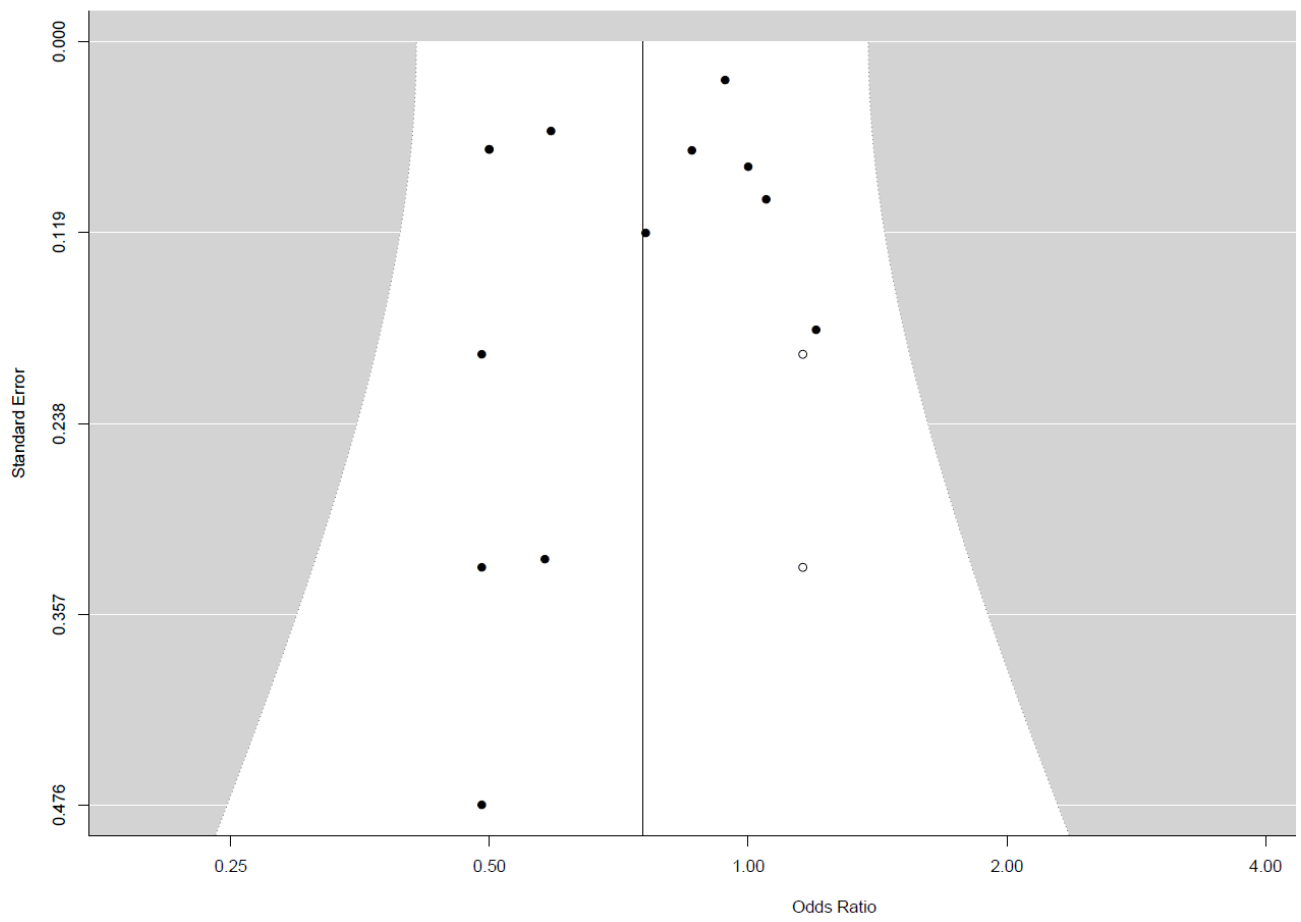


Figure S3



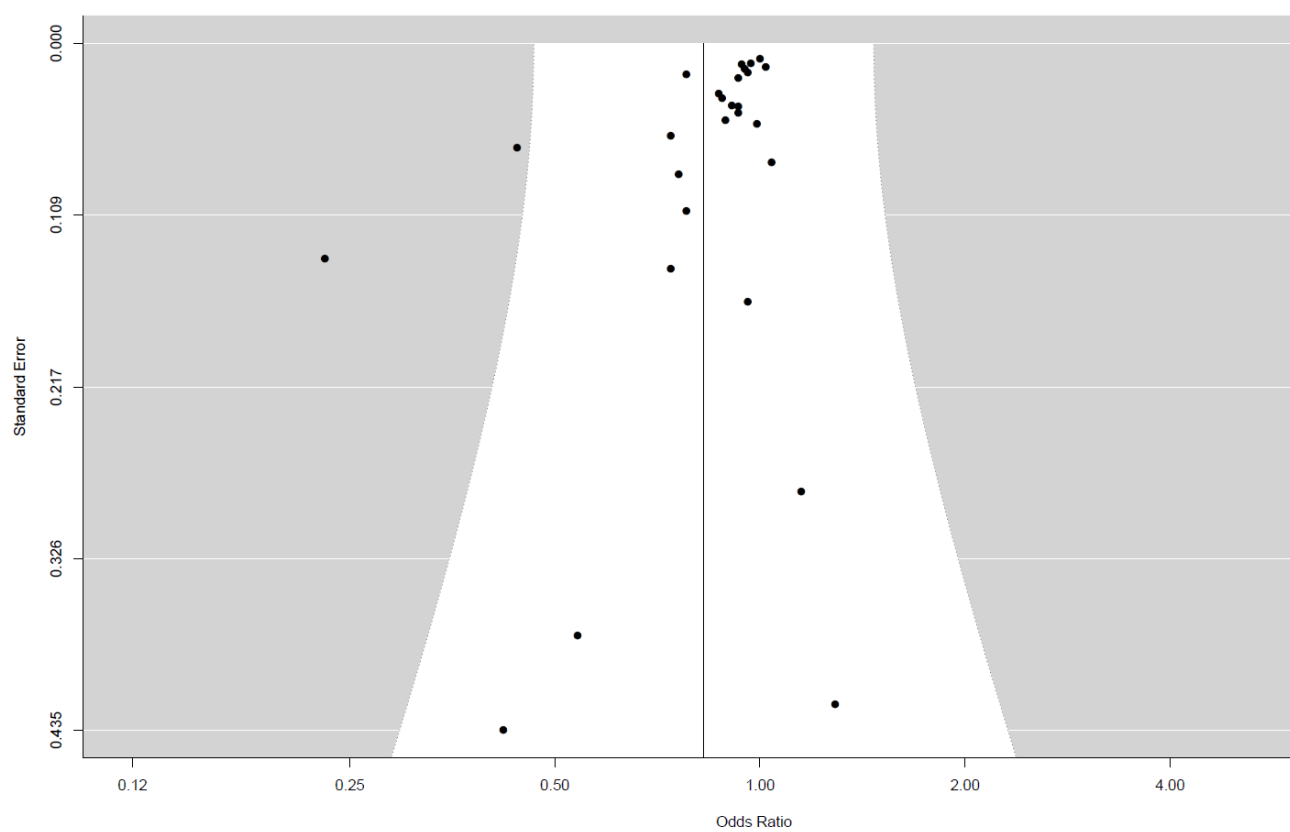


Figure S4

Figure S5

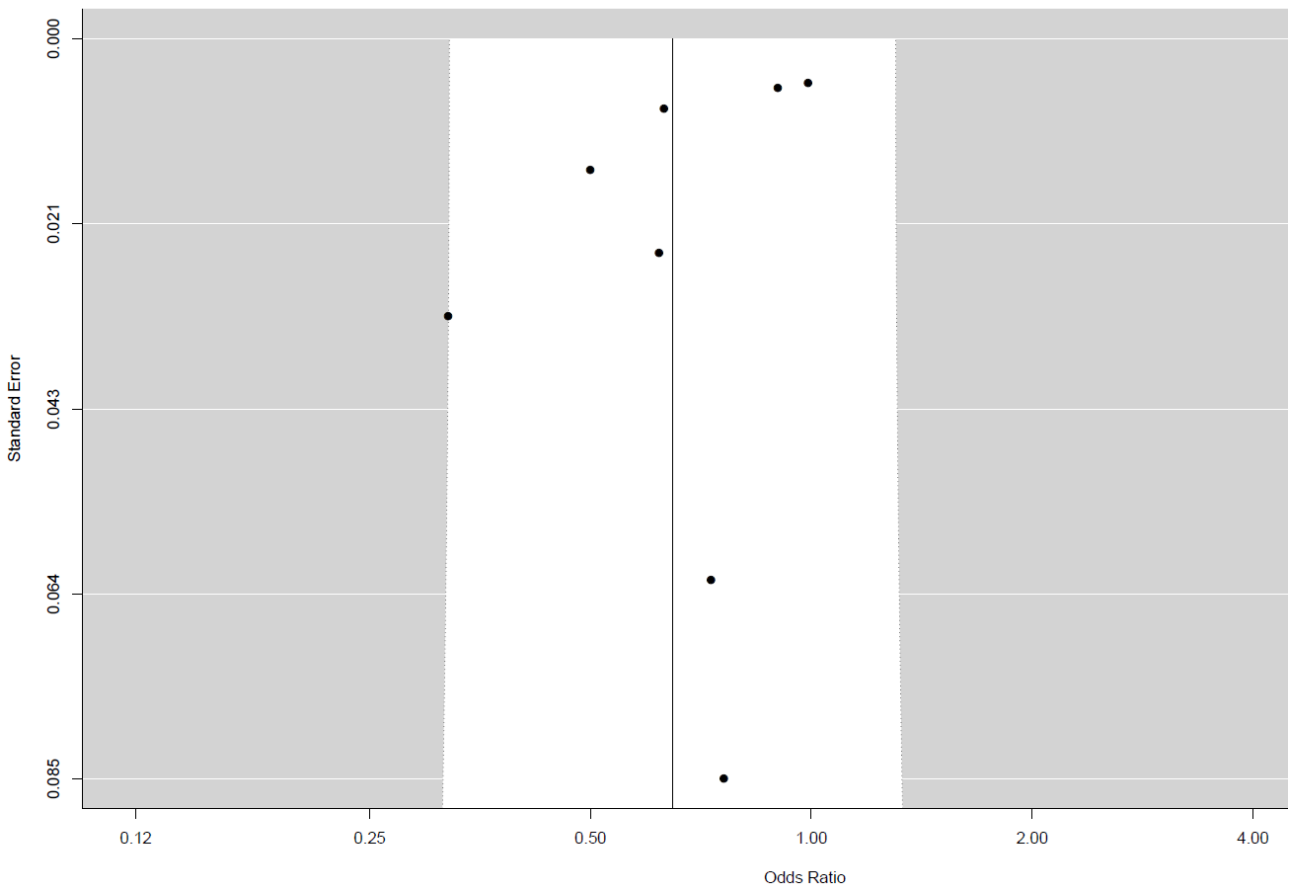


Figure S6

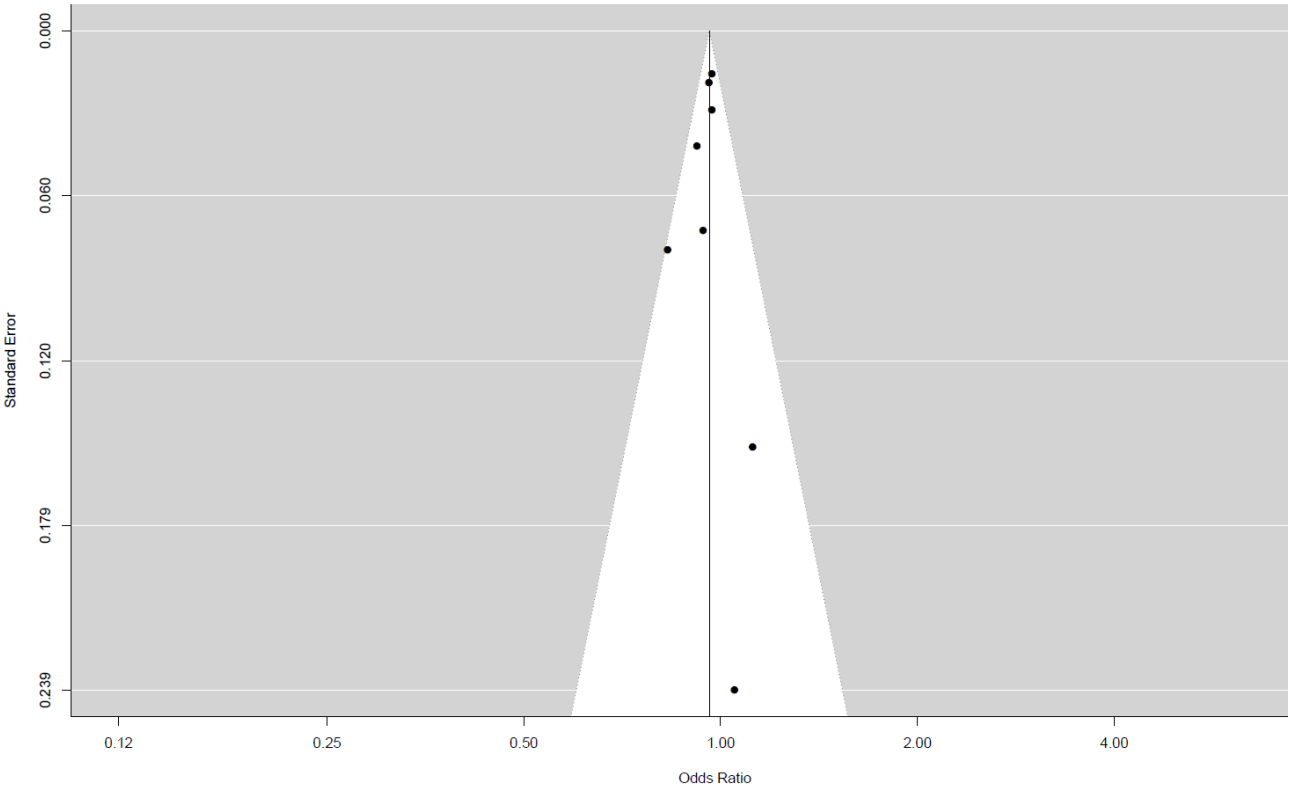


Figure S7

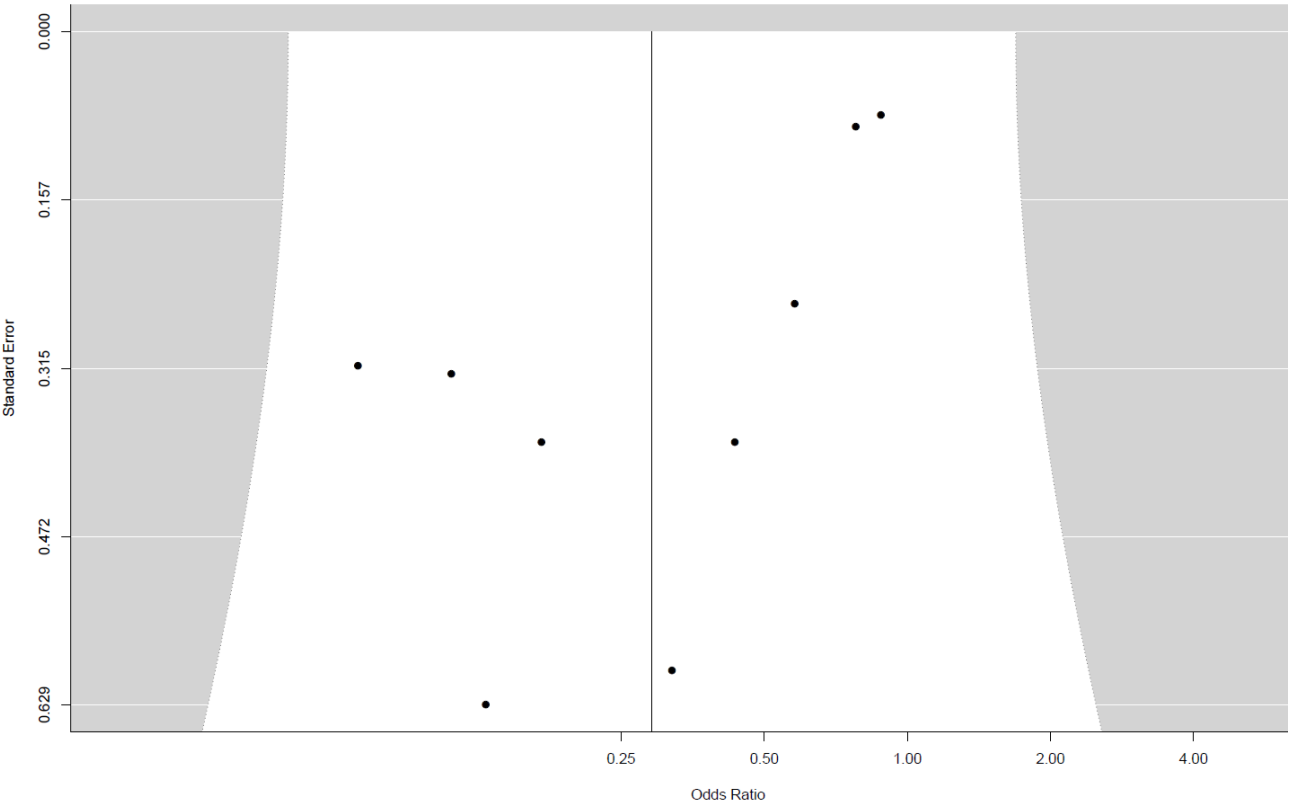


Figure S8

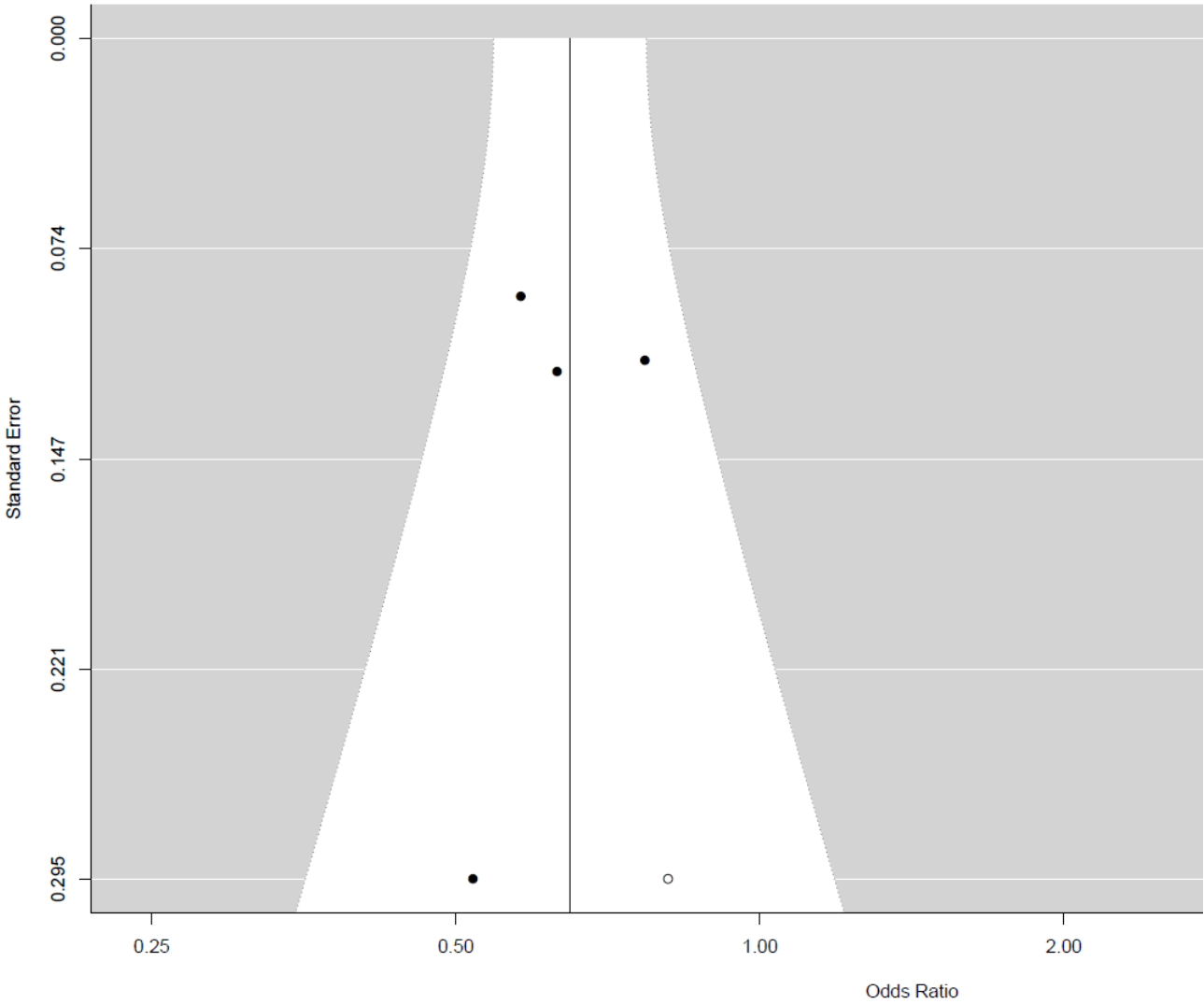
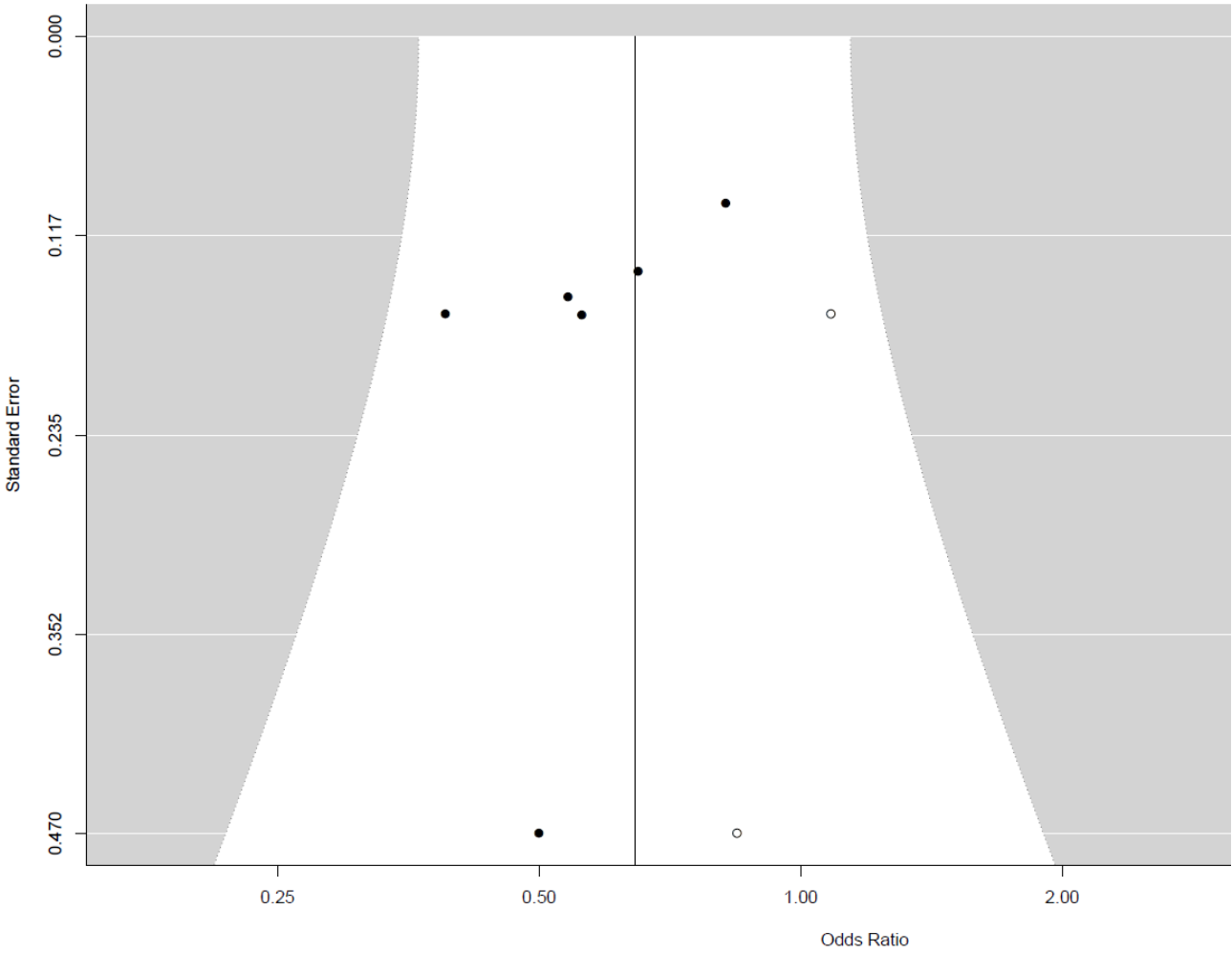


Figure S9



Appendix 3: Search strategies

Search strategy in PubMed

30th January 2017

History

Regulatory focus AND setting AND policy levers AND context (conditions & outcomes)

Search	Query	Items found
#70	Search (#56 AND #69) Regulatory focus AND setting AND policy levers AND context (conditions & outcomes)	3207
#69	Search (#57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65 OR #66 OR #1 OR #10 OR #67 OR 68) context (conditions & outcomes)	2819224
#68	Search "occupational disorders"[Title/Abstract]	102
#67	Search "occupational diseases"[MeSH Terms]	121062
#10	Search "occupational injuries"[MeSH Terms]	1665
#1	Search "accidents, occupational"[MeSH Terms]	16545
#66	Search "accident prevention"[MeSH Terms]	70732
#65	Search insurance claim*[Title/Abstract]	2052
#64	Search OSH surveillance system*[Title/Abstract]	5
#63	Search OSH monitoring system*[Title/Abstract]	1

Search	Query	Items found
#62	Search "key performance indicators"[Title/Abstract]	359
#61	Search (injuries[Title/Abstract]) AND report*[Title/Abstract]	36768
#60	Search (accident*[Title/Abstract]) AND report*[Title/Abstract]	23499
#59	Search (("before and after study"[Title/Abstract])) OR ("before and after studies"[Title/Abstract])	1412
#58	Search "controlled before after studies"[MeSH Terms]	197
#57	Search ("statistics and numerical data"[MeSH Subheading])	2275204
#56	Search (#31 AND #55) Regulatory focus AND setting AND policy levers	4906
#55	Search (#32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54) Policy levers	368306
#54	Search ((financ*[Title/Abstract] OR econom*[Title/Abstract])) AND (safety[Title/Abstract] OR health[Title/Abstract])	123107
#53	Search (incentive*[Title/Abstract]) AND (safety[Title/Abstract] OR health[Title/Abstract])	9830
#52	Search (sanction*[Title/Abstract]) AND (safety[Title/Abstract] OR health[Title/Abstract])	1180
#51	Search (order*[Title/Abstract]) AND (safety[Title/Abstract] OR health[Title/Abstract])	88769
#50	Search ("health and safety training"[Title/Abstract])	89
#16	Search "enforcement"[Title/Abstract]	9826

Search	Query	Items found
#49	Search "accreditation"[MeSH Terms]	17366
#48	Search (audit*[Title/Abstract]) AND (safety[Title/Abstract] OR health[Title/Abstract])	12107
#47	Search ("OHSAS 18001") OR "OHSMS BS 8800"	25
#46	Search ("safety management system"[Title/Abstract]) OR "safety management systems"[Title/Abstract]	217
#45	Search ("osh management system"[Title/Abstract]) OR "osh management systems"[Title/Abstract]	8
#44	Search (guideline*[Title/Abstract]) AND safety[Title/Abstract]	15112
#43	Search "practice guidelines as topic"[MeSH Terms]	95362
#42	Search smiley*[Title/Abstract]	159
#41	Search "ohs services"[Title/Abstract]	9
#40	Search "regulatory levers"[Title/Abstract]	3
#39	Search "policy levers"[Title/Abstract]	75
#38	Search "deviation reports"[Title/Abstract]	10
#37	Search mandatory consultancy[Title/Abstract]	5
#36	Search "improvement notices"[Title/Abstract]	3
#35	Search inspectorate*[Title/Abstract]	458
#34	Search inspection*[Title/Abstract]	28105
#33	Search "prosecution"[Title/Abstract]	1491
#32	Search "fined"[Title]	66

Search	Query	Items found
#31	Search (#19 AND #30) Regulatory focus AND setting	65747
#30	Search (#20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29) Setting	228620
#29	Search offence*[Title/Abstract]	2291
#28	Search "breaches"[Title/Abstract]	1283
#27	Search "violation"[Title/Abstract]	7386
#26	Search "self employed"[Title/Abstract]	1041
#25	Search employee*[Title/Abstract]	37597
#24	Search "enterprise"[Title/Abstract]	5913
#23	Search (work site*[Title/Abstract]) OR worksite*[Title/Abstract]	4082
#22	Search worker*[Title/Abstract]	150065
#21	Search "work"[MeSH Terms]	25720
#20	Search "workplace"[MeSH Terms]	16917
#19	Search (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18) Regulatory focus	235021
#18	Search "government regulation"[MeSH Terms]	19272
#17	Search inspector*[Title/Abstract]	2189

Search	Query	Items found
#15	Search "law enforcement"[MeSH Terms]	3023
#14	Search ("occupational injury"[Title/Abstract]) OR "occupational injuries"[Title/Abstract]	2163
#13	Search "working environment"[Title/Abstract]	2837
#12	Search "OSH"[Title/Abstract]	383
#11	Search "OHS"[Title/Abstract]	1101
#9	Search "occupational safety"[Title/Abstract]	3848
#8	Search ("safety and health"[Title/Abstract])	4243
#7	Search ("health and safety"[Title/Abstract])	5837
#6	Search "occupational health"[MeSH Terms]	28860
#5	Search occupational diseases[Title/Abstract]	7061
#4	Search occupational exposure[MeSH Terms]	55219
#3	Search occupational diseases[MeSH Terms]	121062
#2	Search occupational accidents[Title/Abstract]	802
#1	Search "accidents, occupational"[MeSH Terms]]	16545

Search History: Web of Science Core Collection

20th January 2017

Search History: Web of Science Core Collection

68 6,248 #65 AND #42

Refined by: WEB OF SCIENCE CATEGORIES: (PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH) AND PUBLICATION YEARS: (2015 OR 2007 OR 2001 OR 2012 OR 2008 OR 2016 OR 2006 OR 2017 OR 2014 OR 2005 OR 2002 OR 2013 OR 2003 OR 2011 OR 2009 OR 2004 OR 2010 OR 2000)

67 7,732 #65 AND #42

Refined by: WEB OF SCIENCE CATEGORIES: (PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH) Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

66 16,665 #65 AND #42

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

65 17,029,299 #64 OR #63 OR #62 OR #61 OR #60 OR #58 OR #57 OR #56 OR #55 OR #54 OR #53 OR #52 OR #51 OR #50 OR #49 OR #48 OR #47 OR #46 OR #45 OR #44

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

64 5,980 TOPIC: ("return to work")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

63 193,407 TOPIC: (hazards)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

62 1,256 TS=(workplace NEAR Health) AND TS=(safety)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

61 5,026 TS=(worker NEAR behavior)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

60 444 TS=(employer NEAR behavior)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

59 315,469 TOPIC: (effect) OR TOPIC: (impact) OR TOPIC: (costs) OR TOPIC: (results) OR TOPIC: (conclusion*)

Refined by: WEB OF SCIENCE CATEGORIES: (PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

58 16,103,822 TOPIC: (effect) OR TOPIC: (impact) OR TOPIC: (costs) OR TOPIC: (results) OR TOPIC: (conclusion*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

57 585,642 TOPIC: (absence)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

56 379 TS=(frequent* NEAR incidence rates)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

55 34,918 TOPIC: (occupational) AND TOPIC: (accident* OR injur* OR fatalit* OR disease* OR disorder*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

54 70 TOPIC: ("improved working conditions")
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

53 1,366,796 TOPIC: (outcome)
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

52 493,688 TOPIC: (prevention)
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

51 0 TOPIC: ("OSH monitoring system*") OR TOPIC: ("OSH surveillance system*")
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

50 1,122 TOPIC: ("key performance indicator*")
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

49 4,220 TS=(insurance NEAR claims)
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

48 31,576 TS=(injur* NEAR report*)
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

47 4,334 TS=(accidents NEAR reporting)
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

46 177,737 TS=(before NEAR after) AND TS=(measure* OR investigat*)
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

45 5,880 TOPIC: ("numerical data")
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

44 229,240 TS=(statistic* NEAR analysis)
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

43 8,387 #41 AND #21
Refined by: WEB OF SCIENCE CATEGORIES: (PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH)
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

42 19,427 #41 AND #21
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

41 5,984,017 #40 OR #37 OR #34 OR #28 OR #27
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

40 11,524 #39 OR #38
Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

39 5,924 TS=(incentive* NEAR econom*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

38 5,990 TS=(incentive* NEAR financial)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

37 867,646 #36 OR #35

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

36 375,987 TOPIC: (sanction*) OR TOPIC: (fine*) OR TOPIC: (prosecution)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

35 495,279 TOPIC: (consultancy) OR TOPIC: (training) OR TOPIC: (smiley*) OR TOPIC: ("policy lever")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

34 4,947,323 #33 OR #32 OR #31 OR #30 OR #29 OR #26

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

33 9,686 TS=(enforcement NEAR law)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

32 4,824,140 TOPIC: (information) OR TOPIC: (notice*) OR TOPIC: (report*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

31 84,521 TOPIC: (dialogue) OR TOPIC: (dialog) OR TOPIC: (advice)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

30 593 TOPIC: (inspectorate)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

29 66,736 TOPIC: (inspection*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

28 474,112 #25 OR #24 OR #23 OR #22

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

27 5 TOPIC: ("OHS service") OR TOPIC: ("OHS consultancy")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

26 1,210 TS=(order NEAR executive)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

25 58,663 TOPIC: (accreditation) OR TOPIC: (audit) OR TOPIC: (audits)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

24 71 TOPIC: ("OHSAS 18001") OR TOPIC: ("OSHSMS BS 8800")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

23 7 TOPIC: ("OSH management system") OR TOPIC: ("OSH management systems")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

22 [422,222](#) TOPIC: (guideline*) OR TOPIC: (guidance)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

21 [44,078](#) #20 AND #19

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

20 [829,167](#) #18 OR #17 OR #16 OR #15 OR #14 OR #13

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

19 [186,042](#) #12 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

18 [464,245](#) TOPIC: (branch) OR TOPIC: (branches) OR TOPIC: (trade) OR TOPIC: (trades)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

17 [59,788](#) TOPIC: (violation*) OR TOPIC: (breaches)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

16 [22,984](#) TOPIC: (employer*) OR TOPIC: ("self-employed") OR TOPIC: ("self employed")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

15 [20,253](#) TITLE: (enterprise*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

14 259,112 TS=(worker*) OR TS=(employee*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

13 50,089 TOPIC: (workplace) OR TOPIC: (worksite*) OR TOPIC: ("work site")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

12 3 TOPIC: ("OSH campaigns") OR TOPIC: ("OSH administration")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

11 0 TITLE: ("OSH campaigns") OR TITLE: ("OSH administration")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

10 84,405 TOPIC: (authority) OR TOPIC: (inspectorate)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

9 3,280 TOPIC: (inspector) OR TOPIC: (inspectors)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

8 27,180 TOPIC: (enforcement)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

7 3,119 TOPIC: ("working environment")

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

6 669 TOPIC: (OSH)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

5 9,133 TOPIC: (occupational injuries) OR TOPIC: (occupational injury)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

4 38,590 TOPIC: (occupational health)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

3 36,885 TOPIC: (occupational exposure*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

2 19,749 TOPIC: (occupational disease*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

1 4,229 TOPIC: (occupational accident*)

Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2017

Search strategy in OSH UPDATE

21st March 2017

Regulatory focus

Step:	Hits:	Strategy:
☐ #1	10429	GW{occupational accident*}
☐ #2	37931	GW{occupational exposure}
☐ #3	79097	GW{occupational health}
☐ #4	2526	GW{occupational injuries}
☐ #5	62615	GW{occupational safety}
☐ #6	654	TW{OSH} OR TW{OHS}
☐ #7	30051	GW{inspector} OR GW{inspectors} OR GW{inspection} OR GW{inspectorate}
☐ #8	47885	GW{authority} OR GW{authorities}
☐ #9	66901	GW{regulation} OR GW{regulations}
☐ #10	68659	GW{legislation*} OR GW{rules}
☐ #11	10833	GW{working environment} OR DE{work environment}
☐ #12	305073	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11

Setting

☐ #13	59596	GW{workplace*}
☐ #14	4577	GW{worksite*} OR GW{work site*}
☐ #15	328	GW{work location*}
☐ #16	165999	GW{worker*}
☐ #17	7939	GW{enterprise*}
☐ #18	60449	GW{employee*}

☐	#19	30527	GW{employer*}
☐	#20	2338	GW{self-employed}
☐	#21	2719	GW{violation}OR GW{breaching}
☐	#22	4029	GW{trades}
☐	#23	240752	#13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22
☐	#24	119456	#12 AND #23
Policy/OSH regulatory levers			
☐	#25	13252	GW{fine*}
☐	#26	3037	GW{prosecution}
☐	#27	392	GW{improvement notice*}
☐	#28	392	GW{bans}
☐	#29	55250	GW{statistic*} OR DE{statistical analysis}
☐	#30	1	GW{regulatory lever*} OR GW{policy lever*}
☐	#31	3	GW{OHS service}
☐	#32	39	GW{smiley*}
☐	#33	40022	GW{guidance} OR GW{guideline*}
☐	#34	26521	GW{inspection} OR GW{inspections} OR GW{inspectorate*}
☒	#35	0	GW{"OHSAS 18001"} OR GW{"OHSMS BS 8800"}
☐	#36	4946	GW{audit} OR GW{accreditation}
☐	#37	3532	GW{enforcement} AND GW{law}
☐	#38	0	GW{"safety training"}
☐	#39	12274	GW{investigations}

☐	#40	864	GW{sanction*}
☐	#41	171	GW{economic incentives} OR GW{financial incentives}
☐	#42	136572	#25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41
☐	#43	33089	#24 AND #42
Conditions & outcomes			
☐	#44	55250	GW{statistic*} OR DE{statistical analysis}
☐	#45	42	GW{before-after}
☐	#46	30715	GW{accident*} AND GW{report*}
☐	#47	24044	GW{injur*} AND GW{report*}
☐	#48	46	GW{key performance indicators}
☐	#49	204	GW{insurance claims}
☐	#50	60169	TW{prevent*} OR AB{prevent*}
☐	#51	3744	TW{outcome} OR AB{outcome}
☐	#52	89	GW{improved working conditions}
☐	#53	10429	GW{occupational accident*}
☐	#54	2526	GW{"occupational injury"} OR GW{occupational injuries}
☐	#55	558	GW{occupational fatalities}
☐	#56	0	GW{"occupational diseases"}
☐	#57	0	GW{"occupational disorders"}
☐	#58	26743	GW{frequency} OR GW{incidence rate} OR GW{incidence rates}
☐	#59	12786	GW{absence}

- ☐ #60 26379 GW{impact}
- ☐ #61 17290 GW{costs}
- ☐ #62 98762 GW{hazards}
- ☐ #63 25668 GW{workplace} AND GW{health and safety}
- ☐ #64 0 GW{"return to work"}
- ☐ #65 12379 TW{conclusion*} OR AB{conclusion*}
- ☐ #66 280207 #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65
- ☐ #67 26938 #43 AND #66
- ☐ #68 294666 DC{OUHSEL} OR DC{OUNIOS} **HSELINE or NIOSHTIC-2**
- ☐ **#69 9892 #67 AND #68**

Saved locally as : *Regulatory levers BBH 1 AND 2 AND 3 AND 4*

- ☐ #70 427 DE{review}
- ☐ #71 12029 TW{review}
- ☐ #72 12348 #70 OR #71
- ☐ #73 71 **#69 AND #72 Review articles**
- ☐ #74 362643 DO{JOURNAL ARTICLE}
- ☐ #75 4798 **#69 AND #74 Journal articles**
- ☒ **#76 5094 #69 NOT #74 Non-journal articles**