



Assessing the effectiveness of incentives in occupational safety: why and how?

Elena Ragazzi (P), Lisa Sella, Arianna Radin

Alicante, Spain & Virtual event -
Urban Challenges and Sustainable Technological Revolution

ersq
2023
62nd Congress

28 Aug-01 Sept

Special session S21
Evaluation of safety and security policies
Organized by Organized by Laurent Carnis, Dominique Mignot
& Elena Ragazzi

OSH policies: Definition



Occupational safety and health (OSH) policy: a set of rules, actions and interventions targeting **firms** with the aim of **improving their workers' health and safety conditions** and consequently **reducing accidents and work-related diseases**

A perimeter that changed over time following:

- Initiatives after big disasters
- Growing role of international institutions
- Trade unions' fights
- Awareness of the importance of the right of workers

WHEN	DESCRIPTION	ACT	WHO
1901	Creation of IALL	Association of experts	Private initiative
1916	International meeting of trade unions	Programme of Leeds	France Uk, Italy and Belgium
1950	Definition of occupational health	1 st joint ILO/OMS OSH committee	ILO
1972; 1981; 1985	Establishment of the notion of "work environment"	Robens Report; ILO Convention 151, 155	ILO
1989	Establishment of a common European Union framework	European Framework Directive (Directive 89/391/EEC)	EEC (now EU)

OSH policies: Definition changed over time



The perimeter changed not only as far as the object of the policies but also for the target and the types of instruments.

DIMENSION	FROM	TO
Goal (Concept of safety and health)	Exclude injuries and illness	Cover all the physical and psychological aspects of wellbeing
Type of instrument	Prohibitions and regulations	Guidelines, minimum requirements, insurance, support for workers, training and information, economic incentives, risk management systems and standards
Target	Workers engaged in risky environments or jobs	All workers

Nowadays:

- General consent on the importance of OSH policies
- General presence of regulation (prevention and compensation)
- Overall trend showing a reduction of frequency of accidents and occupational diseases.

So:

Why to evaluate?

Evaluation of safety incentives: **WHY?**

Where OSH is still not enough

- TYPE OF ACCIDENT: The downwards trend is slower for severe accidents (deadly or with permanent consequences) (Sella, Ragazzi & Le 2023). This is especially true for some jobs (e.g. Work in limited space, Inail 2020) or industries (primary industries: mining, agriculture fishing; waste; transport)
- INDUSTRIES: in some industries there remains a high frequency of accidents, including not severe: manufacture, commerce (wholesale), human health, building. Linked to job tasks but also to concurring aspects (firm size, irregular work, culture) (Abdallah et al 2017; De Santo, A., Ragazzi, E., Sella L. 2023)
- GEOGRAPHICAL AREAS: high unemployment, irregular work, organized crime, low compliance to laws (Sella, Ragazzi 2023; Buckley et al., 2016),
- Small FIRM SIZE: due to lack of resources, irregular work competition pressure, culture and awareness (De Santo, A., Ragazzi, E., Sella L. 2023b; Walters & Wadsworth, 2016),
- Invest on the HUMAN FACTOR: literature on safety and security in all fields stresses the importance of awareness, skills, organisation, procedures (Ragazzi, et al 2023; Ragazzi et al. 2020)

Targeted, specialised, innovative policies are required, exploiting the full available policy mix. Targeted evaluation is needed as an instrument of evidence-based policy making

Occupational Safety and Health policies: options



Many policy options (that may be combined, if desired):

- **sermons**: information, noncompulsory guidelines, training, assistance and advice, leveraging personal and social responsibility.
- **sticks**: regulation (including minimum requirements, compulsory insurance, standards required to respond to public procurement) enforced through supervision and sanctions
- **carrots** (economic incentives for prevention)

Examples of the use of incentives in OSH are very scarce despite they might play a major role in fighting the friction points listed in the page before. On the contrary there is opposition on them, on the basis of their cost* and unproven effectiveness.

* Cost for the state, because also regulation has a cost, which is on the firms

For this reason, the Italian ISI calls, a unique example of extensive application of the incentives, are an interesting case study.

- **Incentives for** (productive) **investments** that imply (also) an **improvement in OSH**
No funding provided to comply with minimum law requirements
- Issued by **INAIL**, the national public body managing the compulsory OSH insurance
- **Yearly national calls**, with a budget shared **per region**
- Issued since 2010 (with the only exception of the call 2019, whose budget was used for covid). Up to now a total budget of 3 billions €
- Grants covering up to 65% of the expenses and up to 130,000 €
- Targeting **small and micro firms**
- Based on firm **self-applications** (click-day, random mechanism) *Eligibility is determined by a score based on priority criteria (on the firm and/or on the project)*
- Applications are funded, after a detailed check on the project, on a **first come – first served basis** until regional budget is exhausted
- Only a small share of applications are funded

The ISI calls: **an interesting case study**



1. The general objective (increase investments against accidents and occupational diseases) is articulated in **various specific measures** (e.g: purchase of new machinery, projects for the adoption of organizational and control models, project targeting specific sectors or the agriculture etc.).
2. Many of these objectives, along with the selection criteria, **respond to the frictions listed before**: small firms, high risk sectors, management systems, and even geographic areas, since the funds are allocated following the local needs.
3. The policy tool is represented by incentives for investments, so addressing properly the insufficient incentives present in imperfect markets.
4. The click-day mechanism generates a natural experiment: random assignment to treatment from a list of eligible candidates (minimum score requirement, self candidacy)
 1. Treated firms: those who were granted funding for the investment
 2. Control group: eligible applicants not selected by the click-day mechanism

Evaluation of safety incentives: **HOW?**

Evaluation challenges: Identification of a clear causal link



1. The effectiveness of the investment (e.g., the purchase of a machinery) is **conditioned** by other factors (e.g., the level of awareness and competence of the worker, the intensity and duration of exposure to risk). Ragazzi, E., Sella L., (2023)

2. There are many **confounders**, to be considered in a **specific** way, in order not to frustrate the readability of the effect.

3 For investments to improve health conditions it is very difficult to determine the cause-effect relationship, for:

- the association with other chronic degenerative diseases
- and with pathologies linked to the worker's lifestyle,
- the **latency** time between exposure to risk and manifestation of disease that can reach some decades)

Feasible just a rough assessment on levels of pre- and post-investment exposure (*output*) and then estimation of health effects (*outcome*) based on parameters deriving from previous clinical studies.

Evaluation challenges: **Output and outcome variables**



1. Output and outcome variables are represented by aleatory nondeterministic variables. Accidents and illnesses are **rare events, with very low frequency**. Outcome variables may show low or zero variance (and impact) unless **big samples** are available.
2. To better detect the causal link between the investment and the outcomes, it is necessary to use metrics on accident (or illness) frequency and severity restricted to cases that are connected with the risk addressed by the investment. This requires high quality and interconnectable databases which is not the case... Very difficult to interconnect the taxonomy of **type of investments** (e.g., change of slipping soil, training), the **risk** (e.g., falling, bad posture in carrying out hard works), and the **health event** (broken bone, osteoarticular damage)

There is a kind of **trade-off** for the evaluator:

- Big samples giving up specificity
- Specific evaluations with clear causal link, but with small sample



Investments and accidents: **may we retrieve a correspondence in Inail DATA-BASES?**



In this work we tried to address this challenge by focusing on those cases in which it is possible to distinguish the causal link starting from available administrative information. This implied:

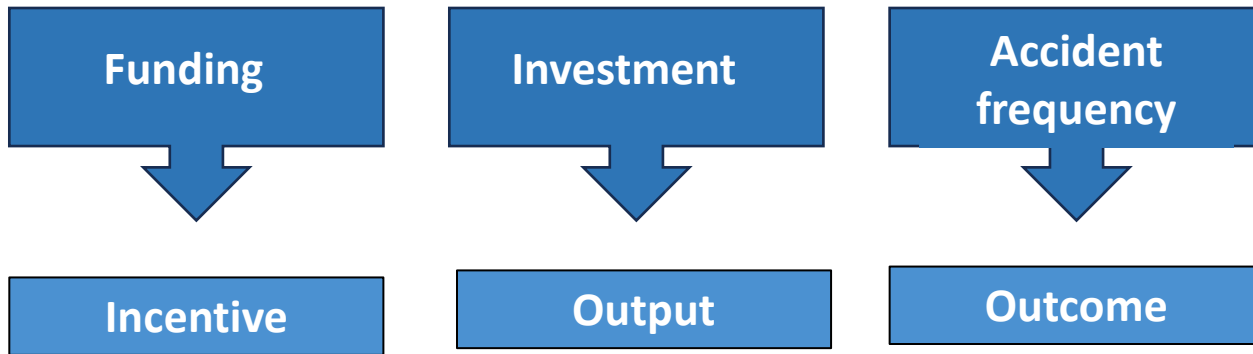
- A preliminary **prospection on the categories available on the 3 Inail DB** (ISI calls, Firms, and Accidents)
- An epistemological work to reconstruct the relationship between **investment, risk and accident**. These have wide intersections but are not superposable concepts
- To define a **procedure** to identify automatically, through the existing categories, the relevant projects and the corresponding accidents.

NB1: the cases in which it was not possible to observe a unique relation were dropped

NB2: this methodology implies a sharp reduction in the sample size

First step: Investment identification

We start from a taxonomy of investment types. This because our purpose is evaluation:



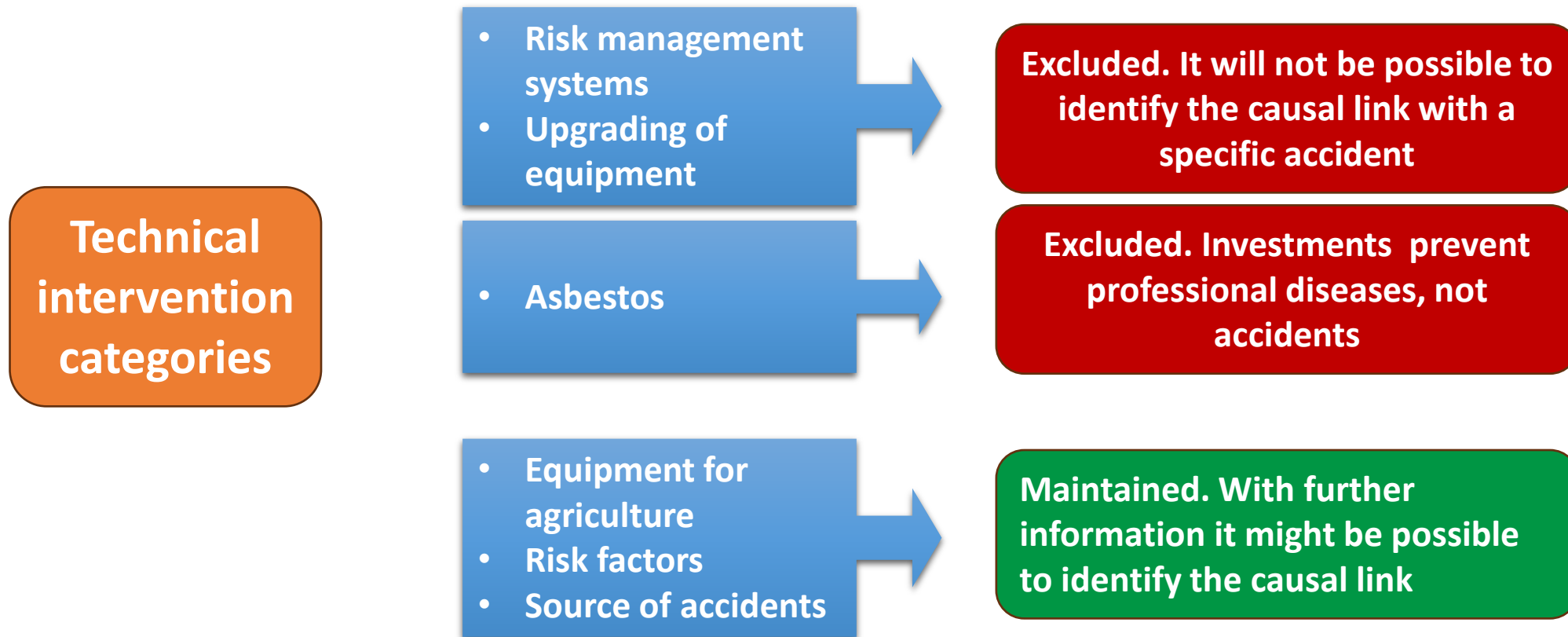
We start from investment, because it is our output, and the evaluation is intended to verify whether this output produces the desired outcome (accident reduction)

Records with no output (the firm did not complete the project) are excluded and go into **attrition**.

Investment targeting **specific categories of accidents**

The first step was working on macro categories: exclusion of investments in which it will certainly be impossible to detect the causal link or targeting professional diseases.

FIELD: Technical intervention

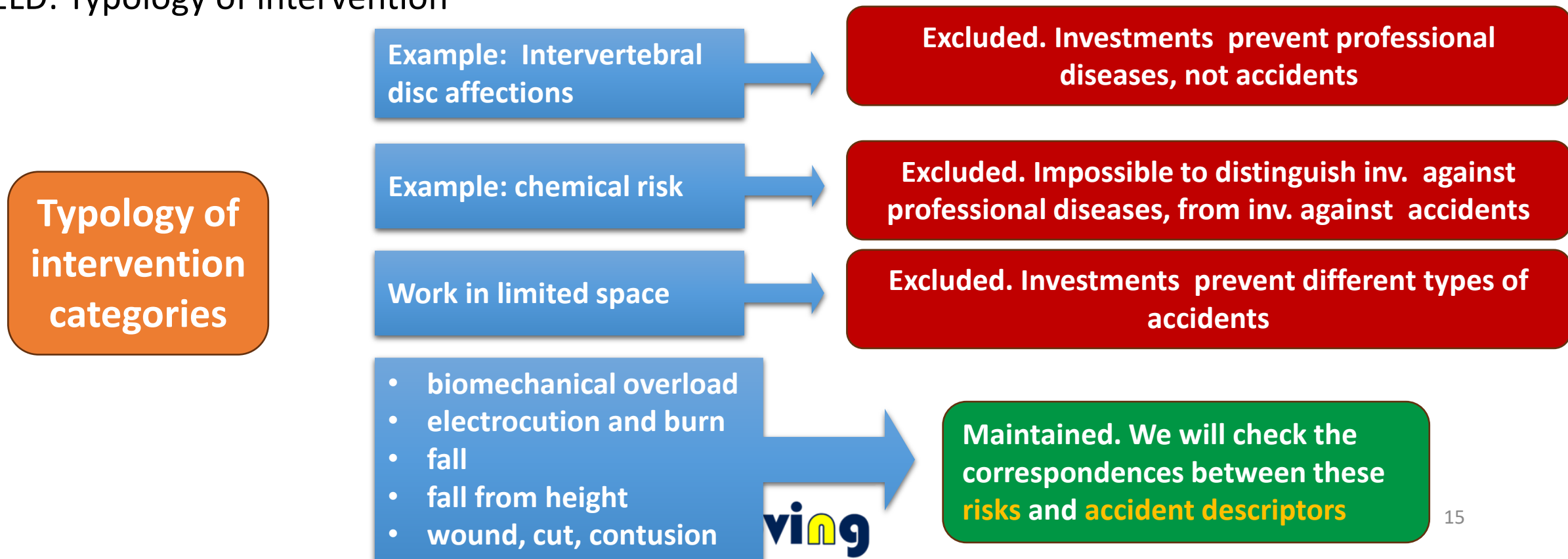


Investment targeting **specific categories of accidents**

The second step was working on investment description of filtered records.

1. We excluded categories that clearly targeted professional diseases
2. We excluded categories whose investments targeted both accidents and professional diseases
3. We identified 5 main groups of investments targeting similar categories of risk.

FIELD: Typology of intervention



Accident descriptors

The accident database collects information on all occupational accidents (even if the firm is not insured by Inail).

Information concern the worker, the location, and the accident.

Accidents are described by two types of variables:

- Inail descriptors (created by Inail for internal purposes)
- ESAW variables: a system of variables harmonized at the European level decomposing the description in 3 main areas, each including many variables:
 - Description of the situation before the accident (e.g. work environment, working process);
 - Deviation (what changed respect to the normal situation)
 - Contact (how, where and by what the worker was injured).
- No field proved sufficient to identify accidents caused by the 5 risks. Combinations of variables is be necessary.

Correspondence between investments and accidents

Investments against	Accidents: Primary condition		Accidents: Secondary condition	Quality of identification
Bio-mechanical overload	Inail Nature= overload injuries			Very good
Electrocution and burn	Nature ESAW = Burns and thermal scalds	OR	Deviation = electrical problem with direct contact	Poor
Fall	Deviation = <ul style="list-style-type: none"> • Slip, fall, collapse of material agent underneath (dragging the victim); OR • Slipping or tripping- with fall of the person 			Good
Fall from height	Deviation = <ul style="list-style-type: none"> • Fall from the high 			Optimal
Wound, cut, contusion	Inail Nature = Wound or contusion	And	Physical activity = <ul style="list-style-type: none"> • Work with hand tools • work with powered hand tools 	Poor

Descriptive statistics

Applicants	2011	2012	2013	2014	2015	2016	2017	2018	Tot.
Biomechanical overload	5915	4068	7452	6515	5949	2825	131	1679	36164
Electrocution and burn				1	442	316			769
Fall	74	103	116	26		54			565
Fall from high	2018	1428	2449	1907	576		118	103	9898
Wound, cut, contusion	3084	1904	2584	2197	1935	1613			15837
Tot.	11091	7503	12601	10646	8902	4808	249	1782	63233

Admitted and liquidated (treated)	2011	2012	2013	2014	2015	2016	2017	2018	Tot.
Biomechanical overload	475	360	655	527	348	105	19	166	2718
Electrocution and burn					14	37			52
Fall	1	6	2	1		14			27
Fall from high	151	136	220	131	17		1	3	715
Wound, cut, contusion	303	185	312	257	174	205			1557
Tot.	930	687	1189	916	553	361	20	169	5069

Descriptive statistics



Not selected (counterfactual)	2011	2012	2013	2014	2015	2016	2017	2018	Tot.
Biomechanical overload	3669	2257	4395	4709	4652	2166	66	835	22749
Electrocution and burn					298	132			430
Fall	42	48	58	7					155
Fall from high	1165	829	1344	1370	458		89	71	5326
Wound, cut, contusion	1894	1071	1505	1571	1486	1092			8619
Tot.	6770	4205	7302	7657	6894	3390	155	906	37279

We decided to explore «Biomechanical overload», which offered great sample size and good correspondence.

We run the same models, testing different outcome indicators (Sella *et al.* 2022), based on data by PAT (local unit data) calculated on:

- All accidents of the firms
- Overload injuries

We expected to find more significant results using overload injuries, or at least more robust results

Types of analysis

MODELS:

- Simple diff-in-diff (no relevant result)
- Diff-in-diff with covariates
- Kernell PSM

Outcome VARIABLES:

- Frequency index FI
- Severity index SI
- N. of accidents NA
- N. of severe accidents NS

SAMPLE:

- All firms
- Firms present in the DB for all the time series (*partially addresses the problem of attrition*) FULL

LAG:

For a specific year (Ex. 2014)

- Average pre- and post-
- Specific lag (ex+4, where the basis is the year of the call)

Combinations that proved significantly negative

	All accidents		Overload injuries	
Diff-in-diff with covariates	2012 average NA FULL	2013 delta +6 SI	2013 average NA FULL	2013 delta +6 NA
	2012, average NS	2013 delta +6 SI FULL	2015 average NA	2013 delta +6 NA FULL
	2012, average NS FULL	2015 delta +3 FI	2015 average NA FULL	2015 delta +3 NA
	2015, average NS FULL	2015 delta +3 FI FULL	2011 delta +6 NA	2015 delta +3 FI
	2011 delta +5 NA FULL	2015 delta +3 SI	2011 delta +6 NA FULL	
	2012 delta +4 SI	2015 delta +3 SI FULL	2011 delta +6 FI	19 significant
	2012 delta +4 SI FULL	2015 delta +3 NS	2011 delta +6 FI FULL	
	2012 delta +4 NS	2015 delta +3 NS FULL	2012 delta +4 FI	Attrition less important
	2012 delta +4 NS FULL	2015 delta +3 SI	2012 delta +4 FI FULL	
	2012 delta +6 NA FULL		2012 delta +4 NA	
	2012 delta +6 NS FULL	25 significant	2012 delta+4 NA FULL	
	2012 delta +6 SI		2012 delta +5 NA	
	2012 delta +6 NS		2012 delta +5 NA FULL	
	2012 delta +7 NS		2012 delta+6 NA	
	2012 delta +7 NS FULL		2013 delta +4 NA FULL	
	2013 delta +6 FI			

Combinations that proved significantly negative

	All accidents	Overload injuries
Kernell PSM	2012 average NS FULL 2015 average SI 2015 average SI FULL 2012 delta+4 NA 2012 delta+4 NS 2012 delta+4 NS FULL 2012 delta +5 NS FULL 2012 delta +6 NS 2015 delta +3 FI 2015 delta+3 SI 2015 delta+3 NS FULL 11	2011 delta+3 NA 2011 delta+3 NA FULL 2012 delta+5 NA 2012 delta+6 NA FULL 2013 delta+4 FI 2013 delta+4 FI FULL 2013 delta+6 FI 2013 delta+6 FI FULL 2013 delta+6 NA 2014 delta+4 FI 2015 delta+3 FI 2015 delta+3 NA 12

Conclusions

- Results are rather discomfoting.
- By restricting the analysis, we hoped to find significant impacts. Or at least robust result.
- On the other hand, impact is detected in a small share of models
- The significant models do not appear to show regularities (by indicator, by lag, ... or by model)
- looks like a karstic river coming and disappearing unexpectedly under a dry surface.
- Restricting the analysis to overload injuries does not give back a better assessment, and the detected impacts are completely different by the ones observed using all types of accidents.
- We will try to repeat the exercise with fall from the high (smaller sample but better readability of the causal link), to check whether the problem could rely in the outcome definition (border between discal diseased and overload injuries not so clearcut!)

ANY SUGGESTION WILL BE MORE THAN WELCOME!

SEGUICI



@CnrIrcres



@cnr_ircres



@cnrircres7711

Thanks for your attention

Presenter: Elena Ragazzi elena.ragazzi@ircres.cnr.it

Partners of the project

FUNDING: RESEARCH COLLABORATION PROJECTS (BRIC) 2019 BY INAIL



INTERNAL INAIL SUPERVISING: DEPARTMENT OF MEDICINE, EPIDEMIOLOGY, OCCUPATIONAL AND ENVIRONMENTAL HYGIENE (S. SIGNORINI & C. COLAGIACOMO)



SCIENTIFIC COORDINATOR: E. RAGAZZI

PARTNER 1: CNR-IRCRES (L. SELLA)

PARTNER 2: DEPARTMENT OF LAW AND ECONOMIC STUDIES, "LA SAPIENZA" UNIVERSITY ROME (A. CASTALDO)

DIPARTIMENTO DI STUDI
GIURIDICI ED ECONOMICI



VIP moving

**Valutazione degli Incentivi
alla Prevenzione. Modelli
Valutativi sull'Impatto
Generato dai bandi ISI**

Angelo Castaldo, Elena Ragazzi e Lisa Sella (a cura di) (2023). *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*. Giappichelli, Torino

Just issued (in Italian). **We have some free copies** (paper or e-book). If you are interested write to elena.ragazzi@ircres.cnr.it

The second volume is expected for the end of the year.

<https://www.giappichelli.it/e-possibile-incentivare-la-sicurezza-sui-luoghi-di-lavoro-9791221101294>

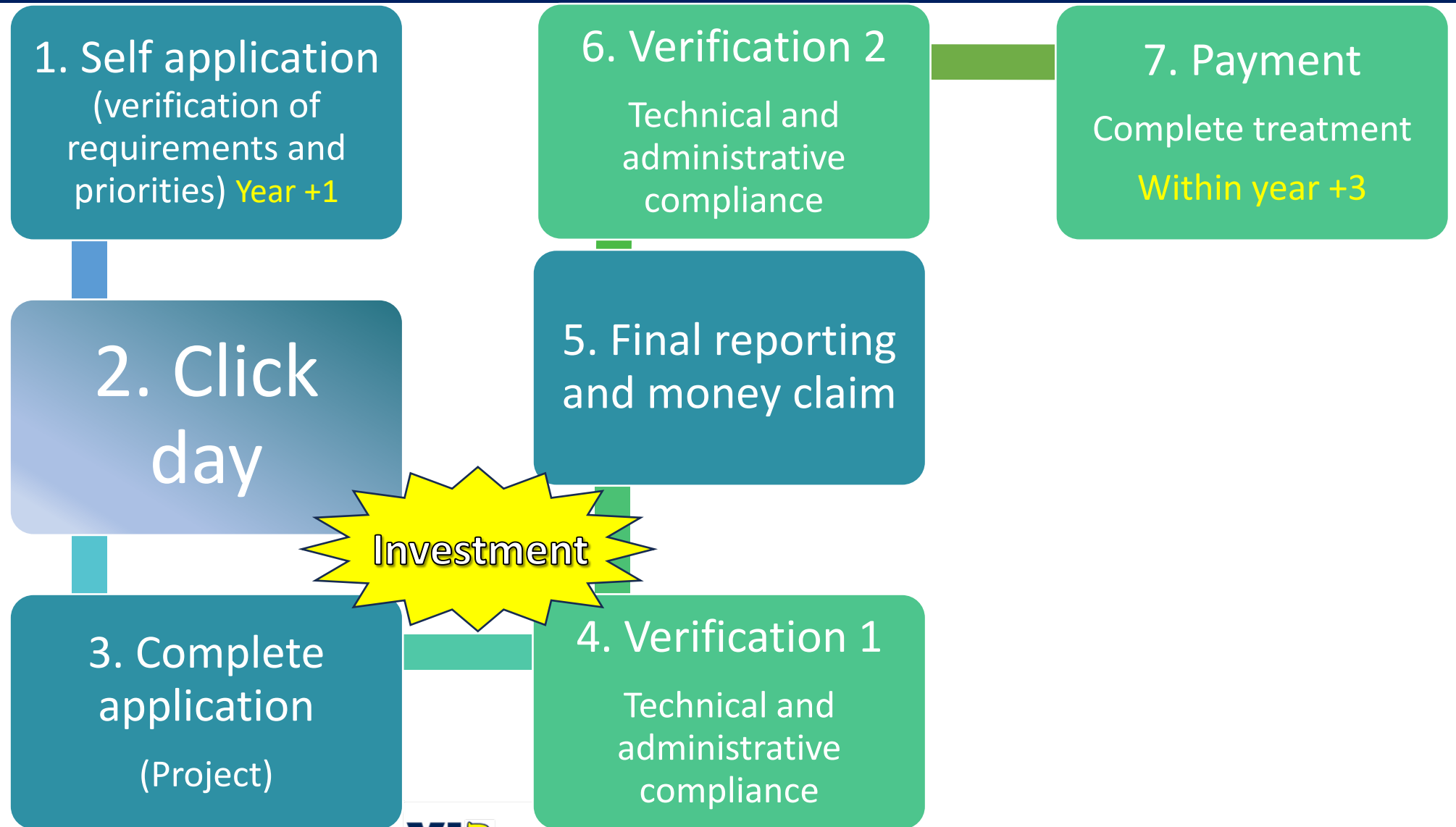


Occupational safety and health (OSH) is at the center of the attention of citizens, researchers and policy makers. Even though the number of injuries has been on a downward trend for long, there are still significant differences between countries and regions; types of firms and sectors. There are therefore contexts on which public action must focus attention with incisive interventions. The ISI call, promoted by Inail, are the only example in Europe in which the instrument of economic incentives offered to companies investing in OSH above the legal minimums has been adopted. From this perspective many questions arise: Is the initiative potentially capable of affecting OSH levels, also considering the context in which it operates? Is it aimed at a need that companies would not be able to satisfy independently? Is it appropriate to recalibrate the policy mix by adding to the indirect intervention tools (sticks and sermons) tools (carrots) aimed at leveraging the social responsibility of SMEs? The book presents the results of the BRIC INAIL 2019 project "Evaluation of Incentives for Prevention. Evaluation Models on the Impact Generated by ISI Calls ". See an upcoming second volume for evidence on impact.

Appendix

The ISI process

CALL
(year 0)



Investment

A taxonomy of firms applying to the ISI calls



Label	Definition	Explanations and evaluation points of interest	Notes
Non Eligible	Firms that do not score high enough to be admitted to the Click-Day	Could be used to describe the features of non-eligible companies showing interest into the call. Interesting to explore potential effects of the enlargement of the target of the policy	We just have fragmented information. In the DB, they cannot be distinguished by No shows
No shows	Firms that – having scored higher than the threshold – are given the possibility to participate at the Click-Day but do not attend it.	Could be used to describe the features of eligible companies not showing interest into the call (decision to apply). This decision could be due to the role played by consultants (pushing the firm to apply even if not really interested)	We just have fragmented information. In the DB, they cannot be distinguished by No shows
Not selected	Eligible firms that attend the Click-Day but apply too late and are excluded from the process.	Considering the very short time (minutes) in which the funds are exhausted, selection can be considered random. This group is the best candidate as control group .	CAUTION: Not selected firms may apply in future calls and be funded at that point.

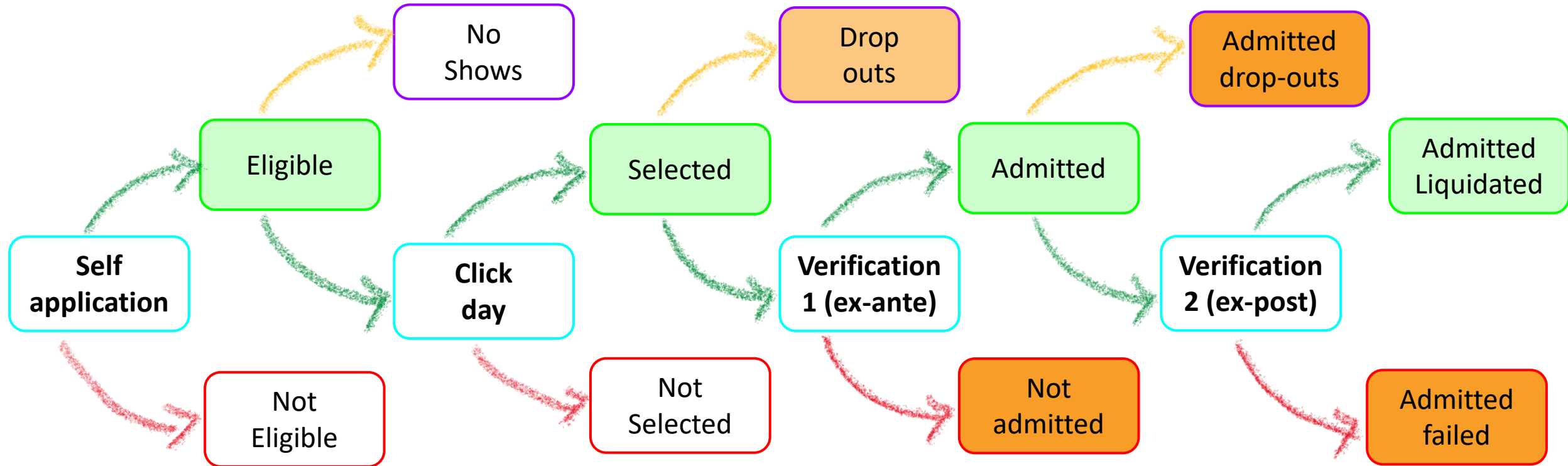
A taxonomy of firms applying to the ISI calls continued

Label	Definition	Explanations and evaluation points of interest	Notes
Drop-outs	Selected firms that fail to provide the required documents relating to the project (Drop-outs at verification phase 1).	This decision could be due to the role played by consultants (pushing the firm to apply even if not really interested). Could be used to describe the features of eligible companies not showing interest into the call (decision to apply).	They are not yet been granted the incentive, so technically this category does not represent an interruption of treatment. Nevertheless, it is interesting to explore why once you win the lottery, you give up!
Not admitted	Selected firms whose projects are rejected for technical or administrative reasons (rejected at Verification phase 2).	They prepared a bad application, because of low motivation, insufficient safety culture, or low-quality managers or consultants.	This group is interesting for process evaluation, to improve the policy implementation and reduce attrition.
Admitted under investigation	Firms whose file is still under verification.	No interest	Small residual and transitory category.

A taxonomy of firms applying to the ISI calls continued

Label	Definition	Explanations and evaluation points of interest	Notes
Admitted drop-outs	Selected firms that have successfully passed the Click-Day and the first verification step but fail to present the follow-up documents on the project (Drop-outs at verification phase 2).	We don't know anything about the reasons of this behaviour. HP.: bankruptcy or financial crisis, M&A, change in activity...	We expect to observe lower rating and lower survival for this group
Admitted failed	The project is rejected after the ex-post verification (rejected at Verification phase 2).	The firm did not implement the project according to the application and to the requirements. Very small subsample.	We have some information on the reasons for the rejection.
Admitted and liquidated	Firms successfully implementing the project and receiving the full amount of the incentive.	These companies are our treated group .	

Verification phases and attrition



passed

not passed

Self exclusion
VIP moving

The verification phases

- **Self application**: the company fills a form; the platform automatically calculates the eligibility; this depends on the features of the firms and of the project; the criteria reflect the policy-maker priorities
- **Click-day**: aleatory selection of the participants
- After the click-day: just for the selected: **Verification 1** (on the project; technical and administrative)
- After the investment is completed: **Verification 2** (on the investment, technical and administrative)

This complex process (introduced in 2011) was designed to

- ensure a wide participation of micro-firms (very easy and quick application, the project has to be prepared only when the firm has been selected)
- Reduce the burden over the administration: only selected firms pass the verification phase

Every verification phase leaves some firms behind.

The mechanism of assignment to the treatment based on the click-day allows to assimilate the exercise to an experimental evaluation design. It compares the companies that have applied but have not obtained the grant, with those that have been funded.

However, the self-selection into the experiment does not allow us to assume that companies that apply to be treated (similar to volunteers in a social or health experiment) are representative of the universe of target companies.

In such conditions it is therefore necessary to assess the extent to which the results obtained in the impact assessment can be extended to the entire audience of recipients (**external validity of the evaluation**).

Which variables explain the choice to apply?

Which variables explain the choice to apply?

This will be a future research extension.

- We will explore the features of no-shows: companies that have the ticket for the click-day, so are eligible, but do not participate, or are selected but they do not send the documents. They might represent eligible companies not interested in the call
- We will use a survey on nonparticipant firms
- We will work on the cultural attitude towards OSH. The socio-cultural variables able to explain different OSH performances, may also be used to understand the decision to apply

Specific ISI challenges: **Attrition and alternative treatment**



Since a substantial share (40% on average) of the sample of companies that were successful at the click day does not obtain the payment, there are problems of attrition and interruption of treatment.

It is essential to investigate the causes of dispersion (less and less attributable to the difficulties of the process), as they could represent a bias in the observed impact. The risk of bias is high in the following cases:

- Firms going bankrupt or closed.
- Firms that have obtained alternative incentives to carry out the investment
- Crime and corruption

We carried out a comparison of funded versus “lost” firms profiles, using survival data, rating, efficiency and productive. This is available on another paper. Please ask if interested.

References

Abdalla, S., Apramian, S. S., Cantley, L. F., & Cullen, M. R. (2017). Occupation and Risk for Injuries. In C. N. Mock, R. Nugent, O. Kobusingye, & K. R. Smith (Eds.), *Injury Prevention and Environmental Health* (3rd ed.). The International Bank for Reconstruction and Development / The World Bank.

<http://www.ncbi.nlm.nih.gov/books/NBK525209/>

Accorinti M., Gagliardi F., Ragazzi E., Salberini G. (2018), L'interesse del Senato della Repubblica per la pratica valutativa: alcune riflessioni di metodo relativamente agli aiuti per la sicurezza sui luoghi del lavoro. *RIV Rivista Italiana di valutazione*, VOL. XXII, N.70, pp. 07-29 DOI: 10.3280/RIV2018-070002

Andersen JH, Malmros P, Ebbelhoej NE, Flachs EM, Bengtsen E, Bonde JP. (2019) Systematic literature review on the effects of occupational safety and health (OSH) interventions at the workplace. *Scand J Work Environ Health*, 45(2):103-113. doi: 10.5271/sjweh.3775.

Buckley, M., Zendel, A., Biggar, J., Frederiksen, L., & Wells, J. (2016). Migrant Work & Employment in the Construction Sector. ILO. https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---migrant/documents/publication/wcms_538487.pdf

Cagliano R., Trucco P., Di Nunzio D., Bellomo S., Buresti G., Boccuni F., Calleri S., Frasccheri C., Lupi M. (2017) *IMPACT-RLS: Indagine sui modelli partecipativi aziendali e territoriali per la salute e sicurezza sul lavoro. Il ruolo dei rappresentanti dei lavoratori per la sicurezza e le interazioni con gli attori della prevenzione*. Roma: INAIL.

Calcagnini, G., & Perugini, F. (2019). Social capital and well-being in the Italian provinces. *Socio-Economic Planning Sciences*, 68, 100668. <https://doi.org/10.1016/j.seps.2018.11.005>

Cartocci, R., & Vanelli, V. (2015). Una mappa del capitale sociale e della cultura civica in Italia. In *L'Italia e le sue regioni* (pp. 17–36). <https://cris.unibo.it/handle/11585/530630#.YR0v1dMzY-R>

Castaldo, A, Ragazzi E., Sella L. (eds) (2023). *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*. Giappichelli, Torino

Colagiacomo, C., Radin, A., Ragazzi, E., Le T.N. (2023), "Analisi diacronica delle iniziative ISI" in *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*.

Giappichelli, Torino

Colagiacomo C., Ragazzi E., Sella L., Signorini S. (2018) “Gli incentivi per la salute e sicurezza sul lavoro: riflessione sugli approcci metodologici e sulle criticità dell'analisi valutativa” in *RIV Rivista Italiana di valutazione*, N.71-72, pp. 102-120 DOI: 10.3280/RIV2018-071006 (accepted 9/11/2019)

Community strategy 2007-2012 on health and safety at work. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52007DC0062&qid=1626962674033>

De Santo, A., Ragazzi, E., Sella L. (2023), “Le determinanti del rischio occupazionale” in *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*. Giappichelli, Torino

De Santo, A., Ragazzi, E., Sella L. (2023b). “Promuovere la salute e sicurezza sui luoghi di lavoro: Stato o mercato?” in *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*.

Giappichelli, Torino

Elsler D, Treutlein D, Rydlewska I, Frusteri L, Krüger H, Veerman T, Eeckelaert L, Roskams N, Van Den Broek K, Taylor TN. (2010) A review of case studies evaluating economic incentives to promote occupational safety and health. *Scand J Work Environ Health*. 36(4):289–298.

European Agency for Safety and Health at Work – EU-OSHA (2010). Economic incentives to improve occupational safety and health: a review from the European perspective. <https://osha.europa.eu/en/publications/economic-incentives-improve-occupational-safety-and-health-review-european-perspective>

European Agency for Safety and Health at Work – EU-OSHA (2013). Priorities for occupational safety and health research in Europe: 2013-2020. <https://osha.europa.eu/en/publications/priorities-occupational-safety-and-health-research-europe-2013-2020>

European Agency for Safety and Health at Work – EU-OSHA (2017). Safety and health in micro and small enterprises in the EU: From policy to practice. <https://osha.europa.eu/en/tools-and-publications/publications/safety-and-health-micro-and-small-enterprises-eu-policy-practice/view>

European Agency for Safety and Health at Work – EU-OSHA (2017). Safety and Health in micro and small enterprises in the EU: from policy to practice. Description of good examples. Testo disponibile al sito <https://osha.europa.eu/en/tools-and-publications/publications/safety-and-health-micro-and-small-enterprises-eu-policy-practice/view>

European commission (2007): Improving quality and productivity at work:

European Commission (2017), Commission staff working document: Ex-post evaluation of the European Union occupational safety and health Directives (REFIT evaluation). Testo disponibile al sito: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017SC0010&from=EN>

Hasle, P., & Limborg, H. (2006). A Review of the Literature on Preventive Occupational Health and Safety Activities in Small Enterprises. *Industrial Health*, 44, 6–12. <https://doi.org/10.2486/indhealth.44.6>

Hotz V., Goerge R., Balzekas J., Margolin F. (1999). Administrative data for policy-relevant research: assessment of current utility and recommendations for development. Report of the Advisory Panel on Research Uses of Administrative Data. Joint Center for Poverty Research of the Northwestern University/University of Chicago, available at: http://public.econ.duke.edu/~vjh3/working_papers/adm_data.pdf

ILO. (2001). The construction industry in the twenty-first century: Its image, employment prospects and skill requirements [Report]. http://www.ilo.org/global/publications/ilo-bookstore/order-online/books/WCMS_PUBL_9221126226_EN/lang--en/index.htm

ILO. (2005). A global alliance against forced labour—Global Report on Forced Labour 2005 [Report].

http://www.ilo.org/global/publications/ilo-bookstore/order-online/books/WCMS_081882/lang--en/index.htm

ILO. (2020). Improving Safety and Health in Micro-, Small and Medium-Sized Enterprises: An overview of initiatives and delivery mechanisms [Publication]. International Labour Organization. http://www.ilo.org/global/topics/safety-and-health-at-work/resources-library/publications/WCMS_740304/lang--en/index.htm

Inail (2020) Ambienti confinati e/o sospetti di inquinamento e assimilabili. Aspetti legislativi e caratterizzazione. Fact sheet Inail <https://www.inail.it/cs/internet/docs/alg-pubbl-ambienti-confinati-aspetti-legislativi-caratteriz.pdf>

Langastro, A., Ragazzi, E., Sella, L., Benati I. (2023), "Monitoraggio e valutazione dei Bandi ISI: una tassonomia delle imprese" in *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*. Giappichelli, Torino

Ragazzi E., Sella L. «Données administratives et évaluation des politiques régionales: Quels enjeux ? », REVUE D'ÉCONOMIE RÉGIONALE ET URBAINE N° 2/2018, pp. 509-532, Armand Colin. Disponible sur : <http://www.revues.armand-colin.com/eco-sc-politique/revue-deconomie-regionale-urbaine/revue-deconomie-regionale-urbaine-ndeg-22018/donnees-administratives-evaluation-politiques>

Ragazzi, E. (ed.), Stefanini, A., Benintendi, D., Finardi, U., Holstein D.K. (2020). Evaluating the prudence of cybersecurity investments: Guidelines for Energy Regulators, NARUC, Washington DC <http://www.ircres.cnr.it/images/naruc/2020NARUCguidelinesfinal.pdf>

Ragazzi, E. ed (2020) L'efficacia degli incentivi agli investimenti in sicurezza (Quaderni IRCrES, Temi e problemi di sostenibilità sociale, economica, ambientale 5/2). Moncalieri, TO: CNR-IRCrES <http://www.ircres.cnr.it/index.php/it/produzione-scientifica/pubblicazioni?id=275>

Ragazzi, E., Colagiaco, C., De Santo, A., Radin A. (2023), "Analisi di Monitoraggio dei Bandi ISI: focus sulle iniziative ISI per l'asse modelli organizzativi". in *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*. Giappichelli, Torino.

Ragazzi, E., De Santo, A., Sella, L. (2023). “La salute e sicurezza sui luoghi di lavoro: definizioni e confini”, in È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail. Giappichelli, Torino

Ragazzi, E., Sella L., (2023) “Analisi delle policy: nessi causali, variabili e indicatori del problema valutativo”, in È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail. Giappichelli, Torino

Robson, L., Clarke, J. A., Cullen, K., Bielecky, A., Severin, C., Bigelow, P. L., Irvin, E., Culyer, A., & Mahood, Q. (2007). The effectiveness of occupational health and safety management system interventions: A systematic review. *Safety Science*, 45(3), 329–353. <https://doi.org/10.1016/j.ssci.2006.07.003>

Robson, L., Clarke, J., Cullen, K., Bielecky, A., Severin, C., Bigelow, P. L., Irvin, E., Culyer, A., & Mahood, Q. (2005). The Effectiveness of Occupational Health and Safety Management Systems: A Systematic Review. Full Report. Institute for Work & Health. <https://docplayer.net/8503314-The-effectiveness-of-occupational-health-and-safety-management-systems-a-systematic-review-full-report.html>

Schelvis RMC, Oude Hengel KM, Burdorf A, Blatter BM, Strijk JE, van der Beek AJ. (2015) Evaluation of occupational health interventions using a randomized controlled trial: challenges and alternative research designs. *Scand J Work Environ Health*, 41(5).491-503 – online first. doi:10.5271/sjweh.3505

Sella, L. & Ragazzi, E., Langastro, A., Le, T.N. (2022) «Occupational Safety and Health (OSH) incentives: Is an impact evaluation possible?». In *2022 AISRE conference*, Milan.

Sella, L., Ragazzi, E., Le, T.N. (2023), “Il contesto degli infortuni in Italia. Esiste un bias territoriale?” in *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*. Giappichelli, Torino

Sella, L., Ragazzi, E. (2023), “Spiegare l'eterogeneità territoriale del rischio occupazionale attraverso il capitale sociale” in *È possibile incentivare la sicurezza sui luoghi di lavoro? Concezione, contesto e implementazione dei Bandi ISI Inail*. Giappichelli, Torino

Treutlein D. (2016). External economic incentives for prevention. OSHwiki.

https://oshwiki.eu/wiki/External_economic_incentives_for_prevention

Walters, D., & Wadsworth, E. (2016). Contexts and arrangements for occupational safety and health in micro and small enterprises in the EU – SESAME project—Safety and health at work—EU-OSHA (European Risk Observatory). European Agency for Safety and Health at Work. <https://osha.europa.eu/en/publications/contexts-and-arrangements-occupational-safety-and-health-micro-and-small-enterprises-eu/view>