

## What is the evidence on targeted or remote compliance assistance and enforcement strategies to assist employers in conforming to new and existing health, safety, and work requirements under COVID-19?

For both businesses and regulatory bodies, the COVID-19 pandemic has increased the complexity of following, enforcing, and providing assistance around new and existing health, safety, and work regulations.<sup>2</sup> As regulatory agencies consider how to best support employers and workers during this time, the evidence on existing compliance assistance and enforcement strategies, and the features that make them effective, could inform agencies' approaches and help them meet their enforcement goals. Further it may support the health and safety goals of agencies, businesses, and workers in regulated firms, during a time when in-person inspections may not be preferable or possible. This rapid evidence review summarizes the literature on three strategies:

1. Targeted enforcement
2. Compliance assistance
3. Self-monitoring programs

In reviewing this literature, we attempted to identify studies that document the disparate impacts of remote versus in-person compliance assistance and regulation, as well as evidence on strategies to limit the impacts on disadvantaged populations, given the pandemic's disproportionate effects on these groups (Rho et al., 2020; Hawkins, 2020). The evidence presented here is based on a rapid review conducted by U.S. Department of Labor's (DOL's) Clearinghouse for Labor Evaluation and Research (CLEAR),<sup>3</sup> including 32 publications. Of these, 18 were classified as causal, 10 were descriptive, and 4 were other types of studies (Figure 1). A supplement to this rapid evidence review (at the end of this synthesis) provides citations with links to the publications, further information about study findings, and details about how this rapid review was conducted.

**Targeted enforcement** is a strategy that prioritizes workplace inspections toward some firms or industries. The strategy helps allocate resources efficiently. In the context of COVID-19, targeted enforcement may be a way to deter workplace violations while limiting on-site inspections.

**Compliance assistance** refers to the guidance that regulatory agencies provide to firms to help them understand and comply with laws and regulations. This may take the form of trainings and educational materials provided through bulletins, posters, and fact sheets to promote and clarify regulations to both employers and employees. Compliance assistance may be additionally valuable in the current environment to the extent that it can be done effectively and remotely.

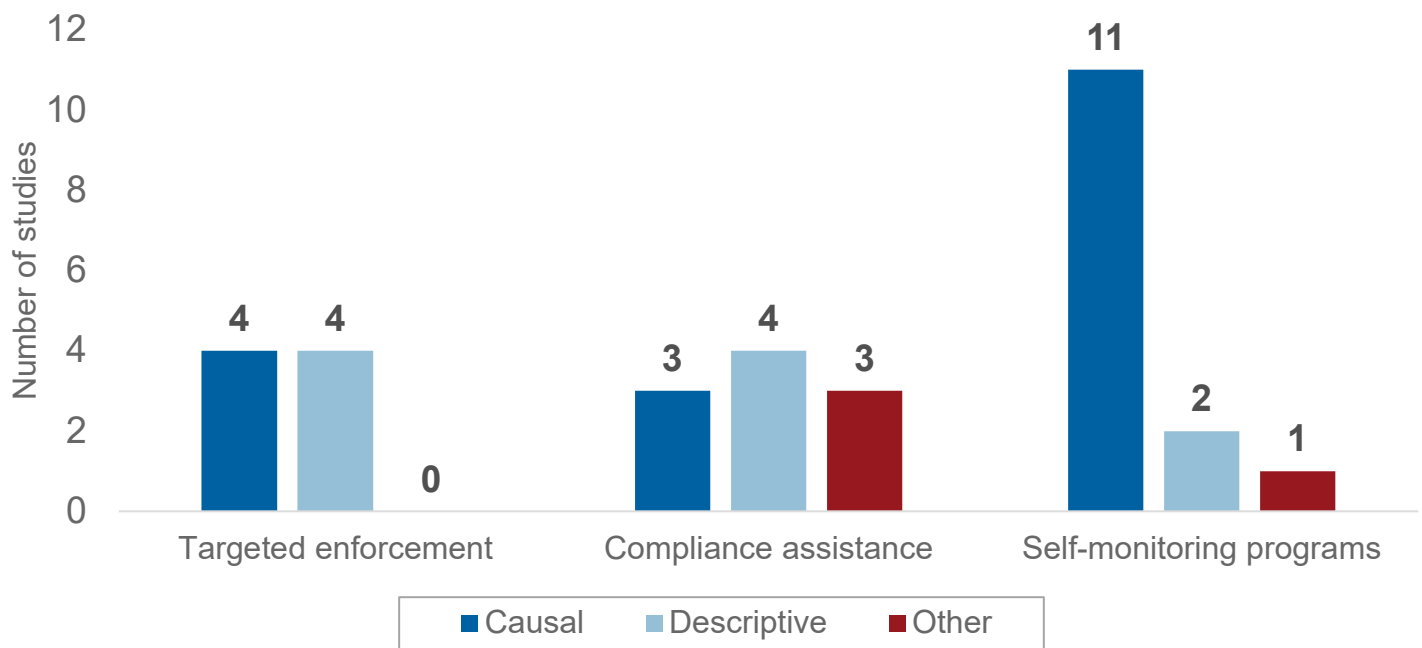
**Self-monitoring programs** are initiatives that encourage firms to monitor their own regulatory compliance and voluntarily report their violations. These programs are often accompanied by incentives, such as lower penalties or immunity for self-disclosed violations. Regulators have employed these programs as a non-adversarial way to enforce laws and regulations. Given that self-monitoring programs do not require in-person contact between regulators and firms, the strategy might be a good alternative to on-site enforcement mechanisms.

<sup>1</sup> This version includes literature published between January 1, 2000, and July 30, 2020. CLEAR continues to search for relevant literature and may update this synthesis as new research emerges.

<sup>2</sup> Regulatory agencies, such as the Occupational Safety and Health Administration (OSHA) and the Wage and Hour Division (WHD) under the U.S. Department of Labor (DOL), have issued new rules and guidelines to mitigate risks associated with the pandemic. For example, OSHA introduced rules aiming to limit the exposure of workers to the virus, and WHD introduced rules to allow workers paid time off to care for the health of family members.

<sup>3</sup> CLEAR's mission is to make research on labor topics more accessible to practitioners, policymakers, researchers, and the public to support evidence-informed decision making. CLEAR does this by conducting systematic evidence reviews, summarizing individual studies of programs, and synthesizing research across individual evidence bases. To date, CLEAR has conducted more than 18 evidence reviews and summarized more than 1,000 studies.

**Figure 1. Types of studies by strategy**



## 1. Targeted enforcement

▶ **The evidence suggests that targeting workplace inspections to high-risk establishments is effective at fostering workplace safety, particularly in some industries.** The most relevant evidence is based on two rigorous evaluations of the Occupational Safety and Health Administration’s (OSHA’s) Site-Specific Targeting (SST) plan that directs routine inspections toward establishments with historically high rates of accidents and injuries. Through the plan, OSHA inspections reduced serious injuries and illnesses—those that lead to days away from work—by an average of 9 percent for high-risk establishments that were randomly chosen for inspections relative to other establishments in the priority list or by 2.4 fewer serious injuries over five years (Johnson et al., 2020). A separate study that compares the outcomes of firms that barely satisfied the criteria to be included in the SST plan versus those that barely did not estimates that the plan averted a broader range of injuries involving days away from work, job restrictions, and job transfers by as much as 20 percent in the year following an inspection or 1.8 injuries per 100 full-time equivalent workers (Li & Singleton, 2019). Research further suggests that targeted inspections were most effective when directed toward firms in the manufacturing industry and least effective in health services (for example, nursing homes). Ergonomics-related injuries comprise a large share of nursing home injuries, and OSHA does not have standards for ergonomics. Therefore, researchers hypothesized that the low efficacy within the health services sector might be due to the lack of ergonomics standards, but further research on this is needed (Johnson et al., 2020).

Evidence from other countries also points to both the effectiveness and limits of targeted enforcement. Cross-country evidence comparing outcomes across Britain, Germany, and France suggests that workplace injuries do not necessarily decline with more workplace inspections but that targeting of establishments that pose the highest risks of violating safety standards might improve outcomes. Although workplace inspections were conducted two to four times more often in Germany and France, Britain experienced substantially fewer fatal occupational injuries per capita than both countries from 2008 to 2014. Researchers suggested that the British system's use of extensive establishment data and risk indicators to direct inspections has been an important factor in achieving this outcome (Blanc, 2018). In Canada, however, a randomized controlled trial did not find any observed differences between work injury claims and disability day rates in high-risk firms that were selected to receive targeted health and safety consultations, targeted inspections, or business as usual (Hogg-Johnson et al., 2016). However, the authors of this study suggested that targeted efforts might not have worked as expected because the targeting strategy did not account for firm size (inadvertently targeting smaller firms that might or might not have truly been high-risk) or because inspections had relatively limited durations and intensities.<sup>4</sup>

Some limited evidence suggests that whistleblower complaints filed by employees, relatives, ex-employees, and others can also be an effective way to direct inspections.<sup>5</sup> A descriptive study of workplace overexposure to chemical substances showed that inspections directed toward establishments that were the subject of complaints in Washington State were at least as likely to uncover violations of chemical exposure standards as targeted firms with historically high rates of health hazards (Lofgren et al., 2010).

► **The use of algorithms or machine learning techniques might further improve the targeting of enforcement.** A study examining simulations of alternative targeting policies that employ state-of-the-art algorithms suggests that it may be possible in the future to avert additional injuries under the SST plan by directing inspections toward establishments where these efforts are predicted to have the largest impact or toward establishments predicted to have the most injuries (rather than simply to those with *historically* high injury rates) (Johnson et al., 2019). Rapid advances in these machine learning and predictive modeling tools may make the targeting of workplace inspections more efficient in the same way that these tools have been demonstrated to work in similar contexts. For example, the use of predictive models on online reviews for restaurants has been demonstrated to predict the restaurants that have severe public health violations with an 82 percent level of accuracy (Kang et al., 2013). However, a separate study of the same data cautions against overstating the predictive power of these models, because data could be based on a select sample

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<sup>4</sup> The method for identifying high-risk firms in this study's targeted enforcement program involved identifying the worst-performing firms based on work injury claims per worker and comparing these firms with other firms in the sector, irrespective of size. As a result, some firms were classified as high-risk simply because they were small and had a single, high-cost injury event. The authors explain that this could have led to ineffective targeting, which in turn drove the lack of significant effects.

<sup>5</sup> Strictly speaking, regulatory agencies do not consider investigations initiated by complaints as targeted enforcement, although using complaints to direct inspections is certainly one way to prioritize inspections (see for example this [WHD Fact Sheet](#) and [OSHA's Field Operations Manual](#)). For OSHA, inspections that are initiated by complaints are classified as unprogrammed inspections. In contrast, programmed inspections refer to scheduled inspections conducted to verify that randomly selected job sites falling under particular industries follow OSHA's rules and regulations. Targeted enforcement refers to the strategy of prioritizing particular firms or industries in programmed inspections.

of establishments (in the case of the original study, those restaurants obtaining extremely high or low inspection scores) (Altenburger & Ho, 2019). One important limitation of targeted approaches is that they may reduce the threat of inspections for a broader set of firms and may encourage noncompliance, so maintaining some form of random selection for inspections may be optimal (Johnson et al., 2020).

► **Targeted enforcement can be cost effective.** Impact estimates from the experimental and quasi-experimental evaluations of OSHA's SST plan suggest that the gains from this targeting exceed its costs (Johnson et al., 2020; Li & Singleton, 2019). One of these studies estimates that each targeted inspection prevented \$120,000 in injury costs over a five-year period—around 35 times the cost of an inspection (estimated at \$3,400 per inspection) (Johnson et al., 2019). Additional evidence suggests that targeted enforcement provides spillovers in the form of general deterrence for similar noninspected firms, generating further cost savings. For example, corporate siblings of SST-inspected establishments (that is, firms with the same corporate parent as inspected establishments) exhibit lower injury rates, especially if they are in close geographic proximity to inspected firms (Johnson et al., 2017).

## 2. Compliance assistance

► **The evidence that traditional compliance assistance leads to greater regulatory compliance is mixed.** Compliance assistance often takes the form of trainings, webinars, and education materials, provided together to firms. The evidence on whether these efforts work comes mostly from studies of environmental regulation that show that compliance assistance is effective for small, but not large, firms. Two quasi-experimental studies examined the compliance assistance program of the U.S. Environmental Protection Agency (EPA) and suggest that compliance assistance has greater impact when provided to smaller firms because they have fewer resources to achieve regulatory compliance. For example, smaller firms are unlikely to have the resources to hire compliance personnel, unlike larger entities (Stafford, 2006, 2012). Findings also suggest that compliance assistance can be better viewed as a complement to, rather than as a substitute for, traditional enforcement tools, as training becomes more effective when coupled with workplace inspections and citations (Stafford, 2012). Indeed, an informal poll of safety professionals indicated that many experts agree that safety in the workplace is best achieved with a combination of compliance assistance and enforcement (Morrison, 2011).

Additional evidence is based on case studies of unique compliance assistance programs. A case study of an Air Quality Compliance Program, which utilized a compliance web portal and inspection checklists in an Air Force base in Florida, suggests that the program reduced emissions by 32 percent after program implementation (Fortenberry, 2012), but the author did not present the accompanying data to support this claim. A case study of an agricultural training program in New Zealand suggests that the program did not translate to greater compliance, even as it increased employee knowledge of laws and regulations (Calcinai, 2011).

Although compliance assistance may be additionally valuable in the current context if it can be performed remotely to mitigate the spread of COVID-19, our search did not yield any studies that considered the effectiveness of delivering compliance assistance remotely as opposed to in person.

▶ **Some stakeholders report that compliance assistance programs might be less effective because of their sometimes generic and broad content.** This critique is found in qualitative interviews with program recipients (Calcinai, 2011; Puhakainen, 2010). Because government rules and regulations can be complex and subject to revision, several case studies suggest that compliance assistance should be simple, practical, and tailored to the context (Fortenberry, 2012; Calcinai, 2011; Puhakainen, 2010; Hai-Jew, 2014).

In this light, new technologies offer a way to enhance the compliance learning experience for employees. One study describes the use of 3D animation in safety training for forklifts to simulate hazardous events so that employees can have greater awareness of injuries and fatalities that could occur if proper workplace procedures are not followed (Weppel, 2011). At Stanford University, a recent research effort has aimed to develop an innovative tool called REGNET, a web-based compliance assistance system, to help consolidate and facilitate the understanding of government rules and regulations for firms (Law & Lau, 2012). Although many reference guides exist to help entities comply with regulations, this tool aims to organize and simplify information for users. Key features of REGNET include the linking of referenced regulation provisions with terms and definitions, the ability to compare regulatory documents, and the ability to conduct tailored compliance checks for users.

▶ **Insights from behavioral science indicate possibilities to improve compliance assistance by managing behavioral barriers.** These barriers include employers' (1) limited attention, (2) potential for procrastination, and (3) misunderstanding of the benefits of compliance. A randomized controlled trial found that low-cost changes to OSHA's citation process designed to overcome such barriers were able to result in higher rates of citation resolution and lower rates of referral to debt collection (Chojnacki et al., 2017). The intervention involved providing employers with a handout and cover letter that aimed to distill essential information and make the citation process less complex. The intervention was followed by reminders in the form of postcards and telephone calls. Although the results pertain to the citation process, the findings suggest that streamlining information provided to employers through compliance assistance may play a role in improving workplace safety.

### **3. Self-monitoring programs**

▶ **The evidence on the effectiveness of self-monitoring programs is mixed.** While some experts support these initiatives as a resource-efficient way to enforce laws and regulations, others raise concerns that firms mostly use self-monitoring to deflect attention away from noncompliant behavior. The empirical evidence in the United States is based on quasi-experimental evaluations of environmental self-monitoring programs, such as the EPA's Audit Policy, although other government agencies also use self-monitoring as

an enforcement tool.<sup>6,7</sup> The Audit Policy reduces or waives certain penalties for environmental violations when firms disclose their violations to the government. Violations take numerous forms, including failure to meet performance standards, emitting air pollutants above regulatory thresholds, making false statements, and tampering with monitoring devices. A key part of the Audit Policy is that firms should self-police their behavior by establishing internal mechanisms to monitor compliance with regulations. Some studies that compare the outcomes of firms that self-disclose under the policy with nonparticipating firms find that encouraging self-disclosures generally improves regulatory compliance and environmental performance, as measured by inspections that resulted in no compliance violations and abnormal releases of toxic chemical emissions (Short & Toffel, 2010; Toffel & Short, 2011). Other studies of the Audit Policy and of the EPA's voluntary pollution prevention practices show that they do not seem to improve compliance and environmental performance in several industries (Stretsky & Lynch, 2009; Sam, 2010). One possible reason is that firms with a history of noncompliant behavior are less likely to follow through with commitments to improve their operations (Short & Toffel, 2010). Findings further show that the Audit Policy was most effective at improving compliance when firms were subject to heavy regulatory surveillance, suggesting that self-monitoring programs may not substitute for traditional deterrence-based enforcement (Short & Toffel, 2010).

Evidence from other Organisation for Economic Co-operation and Development (OECD) countries likewise suggests mixed impacts from self-monitoring programs. In the Netherlands, an event study analysis of the Peterson Committee, a private sector self-regulation initiative that involved voluntary compliance reporting and monitoring on a set of rules to improve the management and supervision of firms but no enforcement of a code of conduct among firms, indicated that the initiative failed to improve measures of corporate governance (De Jong et al., 2005). In contrast, a case study of self-regulation as applied to the auto repair industry in the United Kingdom (U.K.) suggests that self-regulation offers numerous advantages to small businesses by promoting transparency and offering flexibility while reducing the costs of compliance on safety and other minimum standards in the quality of work performed (Anderson & Russell, 2011).

► **Existing research further suggests using caution in implementing self-monitoring programs because they might help firms circumvent regulations.** Findings from several quasi-experimental studies of self-monitoring programs have led researchers to hypothesize that firms may strategically disclose violations in order to deter future scrutiny. Studies of EPA's Audit policy, for example, found that firms that self-disclosed were rewarded with fewer inspections (Toffel & Short, 2011; Stafford, 2007). Facilities that faced recent enforcement actions or were inspected frequently were also more likely to self-disclose than others;

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<sup>6</sup> For example, OSHA's Voluntary Protection Program exempts companies from workplace inspections if they establish internal mechanisms to comply with workers' health and safety regulations. WHD's new Payroll Audit Independent Determination program provides firms the opportunity to conduct self-audits of potential minimum wage or overtime violations and then to self-disclose these to avoid litigation and expensive legal fees. The U.S. Department of Justice, the U.S. Department of Defense, and the Securities and Exchange Commission provide incentives to persuade companies to disclose fraudulent behavior. These incentives include amnesty, limited liability, leniency, and confidentiality (Short & Toffel, 2010).

<sup>7</sup> Khanna and Brouhle's (2009) literature review of voluntary environmental initiatives likewise concludes that the evidence on the effectiveness of these initiatives is mixed. In contrast to this rapid review, their literature review covered articles published prior to 2000 and effects on a broader range of outcomes apart from regulatory environmental compliance.

researchers hypothesized this was because the self-disclosing firms had more to gain from decreased scrutiny (Short & Toffel, 2008; Stafford, 2007). Researchers also examined the nature of violations that were self-disclosed under the Audit Policy and found that most were minor and involved record-keeping and reporting violations, suggesting firms might be hiding more serious violations (Pfaff & Sanchirico, 2004).

A quasi-experimental study of the Responsible Care (RC) program, a voluntary self-regulation program to adopt codes of conduct to improve safety for firms in the chemical industry, indicates that participating firms were subject to fewer OSHA inspections, less intense inspections, and lower penalties for workplace violations when compared to nonparticipating firms (Li & Khanna, 2018). Previous research had estimated that RC averted more than 2.99 accidents per 100 participating plants each year from 1988 to 2001 (Finger & Gamper-Rabindran, 2013). However, analysis of more recent data suggests that this impact was associated only with early adopters of RC and does not apply to subsequent years of the program (Li et al., 2018).

► **While third-party monitoring might provide a mechanism for ensuring the effectiveness of self-monitoring programs, the current evidence about its usefulness is limited.** Third-party monitoring involves certification by independent auditors to ensure that firms are operating up to industry standards. Two quasi-experimental studies investigated the impacts of mandatory third-party certification by leveraging its introduction into the RC program in 2005. Comparing outcomes between RC and non-RC firms before and after third-party monitoring was added to the RC program, researchers found no discernable changes associated with the initiative in the probability and severity of accidents in worksites or on pollution abatement (Li et al., 2018; Vidovic et al., 2019). The studies suggest that the lack of punishment associated with third-party monitoring may have ultimately rendered it insufficient as a means of supporting a self-monitoring program.

## Where are the gaps in evidence on targeted or remote compliance assistance and enforcement?

- **More research on remote compliance assistance is needed.** As organizations look for more information about how to safely reopen and engage workers remotely, the ongoing pandemic has brought about a great demand for compliance assistance. This has resulted in the creation of vast amounts of online resources, including webinars, podcasts, fact sheets, data, and reports. But little research exists on the effectiveness of these remote forms of compliance assistance. In many cases, the studied programs included in this review involved a bundle of services that combined in-person training and workshops with educational material in the form of web resources and guides. More research is necessary to understand whether any of these components are effective on their own or when conducted remotely to inform how these could be deployed effectively in a pandemic situation.
- **There is a lack of evidence on disparate impacts of compliance assistance and enforcement strategies on people with low income or people of color and on strategies that limit these disparities.** People with low incomes and people of color tend to be overrepresented in certain essential services (such as in child care, social services, and cleaning services) that put them at risk for COVID-19 (Rho et al., 2020; Hawkins, 2020). Similarly, they tend to be overrepresented in

occupations with a high risk of workplace injuries, illnesses, and fatalities (Steege et al., 2014). This review identified no research that discussed how any of the strategies may benefit or disadvantage certain groups of people, although, as discussed above, some studies emphasize that strategies can be more effective for certain types of industries (for example, manufacturing—Johnson et al., 2020; Li & Singleton, 2019) or firms (for example, smaller firms—Stafford, 2012; Stafford, 2006).

- **None of the evidence comes from pandemic situations; it is possible that lessons from the existing literature do not generalize to the current context.** For example, the unprecedented nature and severity of the crisis puts a strain on the resources of employers who may want to comply to new and existing regulations and guidelines but do not have the ability to do so. As such, the strategies discussed in this review may have impacts that are more muted than previously found. Future research may need to reflect a different safety environment than in the past, as entire workplaces and employee populations become more concerned with personal safety, organization policies, and fellow employee behavior.

**More information from CLEAR on compliance with and enforcement of health and safety regulations:**

CLEAR's [OSHA Enforcement](#) systematic evidence review examined causal evidence, published between 1979 and 2012, from research determining whether OSHA enforcement activities reduce the occurrence of workplace illnesses, injuries, exposure to hazards, and/or deaths. Individual study profile summaries highlight both individual program designs as well as what challenges, if addressed, could potentially improve results.

CLEAR's [Mine Workers and Mine Health and Safety](#) systematic evidence review examined causal evidence, published between 2008 and 2019, from research on interventions aimed at reducing or preventing mine worker injury, illness, disability, exposure to hazards, and death. The review includes information on interventions implemented in the United States, as well as countries similar to the United States in the scope of industry, technological advancements, and safety practices. CLEAR also provided a summary of 17 studies of interventions designed to improve overall mine safety and prevent fatalities and illnesses among mine workers, but that could not be evaluated according to CLEAR Causal Evidence Guidelines due to the study designs.



## Rapid Evidence Review Supplement: Citations and Further Information

This supplement to the rapid review, “What is the evidence on targeted or remote compliance assistance and enforcement strategies to assist employers in conforming to new and existing health, safety, and work requirements under COVID-19,” provides citations and brief study summaries for the evidence summarized in the rapid review. The final section describes the approach used to create the rapid review.

### CITATIONS AND STUDY SUMMARIES

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This supplement presents the citations and summaries using the same organization as the rapid review. The subsections are as follows:

1. Targeted enforcement
2. Compliance assistance
3. Self-monitoring programs

Numbers in brackets indicate that the citation provides evidence for the corresponding numbered statement in the rapid review. Citations are numbered in the order in which they appear in the rapid review.

#### 1. Targeted enforcement

Altenburger, K. M., & Ho, D. E. (2019). Is Yelp actually cleaning up the restaurant industry? A re-analysis on the relative usefulness of consumer reviews. In *The World Wide Web Conference* (pp. 2543–2550). <https://dl.acm.org/doi/abs/10.1145/3308558.3313683>

- Type of research: Descriptive (statistical model)
- Summary: This study examines whether restaurant reviews on the social media platform Yelp can assist with targeted inspections. **Using a matched dataset from a previous study containing approximately 13,000 inspections of 1,756 Seattle restaurants and 152,000 Yelp reviews between 2006 and 2013**, the authors examined whether customer reviews can predict a restaurant’s future inspection performance using machine learning. Yelp reviews were found to have lower predictive power than a prior study (Kang et al., 2013) suggested, and the reviews did not appear to significantly improve predictions or assist with regulatory targeting as previously suggested.

Blanc, F. (2018). Tools for effective regulation: Is “more” always “better”? *European Journal of Risk Regulation*, 9(3), 465–482.  
<https://search.proquest.com/openview/18928ea16fb45af250739ff6b403538b/1?pq-origsite=gscholar&cbl=136206>

- Type of research: Descriptive (case study)
- Summary: Using a **regional database of occupational inspections and accidents**, the author examines whether more inspections are related to less fatal accidents by comparing occupational inspections and outcomes in **Britain, France, and Germany**. The findings suggested that a higher number of inspections in a country did not correlate with fewer fatal incidents. Instead, the findings suggested that reductions in fatal accidents were best achieved through fewer inspection visits, a more focused approach targeting establishments with a high risk of violating safety standards, and a regulator approach comprised of greater engagement with regulated industries and risk-proportionate enforcement.

Hogg-Johnson, S., Robson, L., Cole, D. C., Amick, B. C., Tompa, E., Smith, P. M., Van Eerd, D., & Mustard, C. (2012). A randomised controlled study to evaluate the effectiveness of targeted occupational health and safety consultation or inspection in Ontario manufacturing workplaces. *Occupational and Environmental Medicine*, 69(12), 890–900.

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.902.9723&rep=rep1&type=pdf>

- Type of research: Causal (randomized controlled trial)
- Summary: This study examines the effectiveness of targeted health and safety consultations and inspections on safety outcomes in manufacturing workplaces in **Ontario, Canada**. Firms that previously performed poorly in measures of occupational health and safety were **randomly assigned** to receive a Health & Safety Association consultation, a Ministry of Labour inspection, or services as usual. There were no significant differences in work injury claims and disability day rates among firms targeted for consultation or inspection compared to those that received usual services after follow-up. The three groups of firms showed similar trends in injury outcomes over time.

Johnson, M. S., Levine, D. I., & Toffel, M. W. (2017). Organizational and geographic spillover effects of regulatory inspections: Evidence from OSHA. *U.S. Department of Labor Scholars Final Report*.

<https://www.dol.gov/sites/dolgov/files/OASP/legacy/files/Organizational-and-Geographic-Spillover-Effects-of-Regulatory-Inspections-Evidencece-from-OSHA.pdf>

- Type of research: Causal (randomized controlled trial)
- Summary: This study estimates the extent to which OSHA's targeted inspections cause general deterrence—that is, occupational health and safety compliance among noninspected firms. Focusing on inspections under OSHA's Site-Specific Targeting (SST) program between 2001 and 2010 in the **United States**, the authors compared the safety outcomes of corporate siblings and neighbors of establishments **randomly selected** for SST inspections to those of siblings and neighbors of establishments that were eligible for an inspection but not selected. Each SST inspection of an establishment in a multiunit firm was associated with a 2.2 percent decrease in the rate of injury related to days away from work among the establishment's corporate siblings over a four-year period, but there was no evidence of spillover effects across other firms.

Johnson, M. S., Levine, D. I., & Toffel, M. W. (2019). *Improving regulatory effectiveness through better targeting: Evidence from OSHA*. <https://escholarship.org/uc/item/1gq7z4j3>

- Type of research: Causal (randomized controlled trial and machine learning)
- Summary: This study estimates the effect of targeted OSHA inspections on injury rates using **administrative and survey data from the agency**. Focusing on inspections under OSHA’s Site-Specific Targeting (SST) program between 2001 and 2010 in the **United States**, the authors compared safety outcomes of establishments **randomly assigned** to an SST inspection to similar establishments that were eligible for an inspection but not selected. The authors also applied **machine learning methods** to simulate the number of injuries that resulted in days away from work if alternative targeting policies were implemented during this period. They found that each SST inspection of an establishment was associated with a 9 percent decrease (or to four fewer days away from work injuries) over the five-year period following an inspection. Findings further suggested that OSHA could have prevented more than twice as many injuries if its inspection policy targeted establishments where inspections were predicted to have the most impact or if inspections were directed toward establishments with the most predicted injuries over the same time period.

Kang, J. S., Kuznetsova, P., Luca, M., & Choi, Y. (2013, October 18–21). Where *not* to eat? Improving public policy by predicting hygiene inspections using online reviews. In *Proceedings of the 2013 conference on empirical methods in natural language processing* (pp. 1443–1448).  
<https://www.aclweb.org/anthology/D13-1150.pdf>

- Type of research: Descriptive (statistical model)
- Summary: This study provides an approach for using restaurant reviews posted on the social media platform Yelp to target restaurant health inspections. Using **Yelp restaurant reviews between 2006 and 2013** and **publicly available inspection records of Seattle restaurants**, the authors built a statistical model and used machine learning to predict health inspection outcomes. The model achieved an 82 percent accuracy when distinguishing between severe offenders and those with no violations, indicating that the statistical model may be a useful tool for targeting health inspections.

Li, L., & Singleton, P. (2019). The effect of workplace inspections on worker safety. *ILR Review*, 72(3), 718–748. <https://journals.sagepub.com/doi/pdf/10.1177/0019793918801575>

- Type of research: Causal (regression discontinuity design)
- Summary: This study estimates the effect of OSHA’s Site-Specific Targeting (SST) plan on worker safety. The SST plan prioritized workplace inspections toward establishments that were known to have high rates of accidents and injuries in the **United States**. Using a **fuzzy regression discontinuity design** that exploits the sharp increase in inspections experienced by firms that were included in the plan versus those that were not, the authors analyzed **establishment-level information from OSHA’s Data Initiative**. They found that the SST Plan was associated with a decrease in the rate of cases involving days away from work, job restriction, and job transfers in the year immediately after the inspection cycle for establishments in the plan—but not thereafter. The study also suggested that inspection from the SST plan was most effective for establishments in manufacturing but not for those in health services.

Lofgren, D. J., Reeb-Whitaker, C. K., & Adams, D. (2010). Surveillance of Washington OSHA exposure data to identify uncharacterized or emerging occupational health hazards. *Journal of occupational and environmental hygiene*, 7(7), 375–388.

<https://www.tandfonline.com/doi/abs/10.1080/15459621003781207>

- Type of research: Descriptive (descriptive statistics)
- Summary: This study compares the percentage of workers exposed to substances above OSHA’s allowable chemical exposure limits by targeting firms for inspection based either on prior health violations or received complaints. Data on chemical substance exposure from the **Washington State OSHA between 2003 and 2008** were used to compare exposure rates between the two groups. Worker overexposure was identified at the same rate for firms where inspections were complaint-initiated and those targeted based on prior health violations. However, complaint-initiated inspections were conducted for a wider variety of industries, and a greater assortment of chemical substance exposures were observed in these firms than for targeted inspections based on previous violations.

## **2. Compliance assistance**

Calcinai, B. (2010). Effective training and assessment of competency and compliance for New Zealand primary industry. In *XXVIII International Horticultural Congress on Science and Horticulture for People (IHC2010): VI International Symposium on 920* (pp. 83–88).

[https://www.actahort.org/books/920/920\\_10.htm](https://www.actahort.org/books/920/920_10.htm)

- Type of research: Descriptive (case study)
- Summary: This article examines an alternative compliance training program to help employers in **New Zealand** meet compliance regulations. A major rural retail company participated in assessing the effectiveness of the Supplier GROWSAFE course by having their employees **interviewed for 40 minutes** to evaluate the training program. The employees who attended the training program provided positive feedback (that is, participants enjoyed spending time with employees from other branches, and good tutor and venue) while the most common negative feedback was related to the density of the course workbook. The employees’ ability to pass a compliance knowledge test after training did not translate into better compliance in the workplace, based on self-reports.

Chojnacki, G., Deutsch, J., Amin, S., Perez-Johnson, I., Darling, M., & Lefkowitz, J. (2017). *Using behavioral insights to help employers resolve OSHA citations: Trial design and findings*.

Mathematica Policy Research. <https://www.mathematica.org/our-publications-and-findings/publications/using-behavioral-insights-to-help-employers-resolve-osha-citations-trial-design-and-findings>

- Type of research: Causal (randomized controlled trial)
- Summary: This study examines how small tweaks to OSHA’s citation process based on behavioral science could improve employers’ responsiveness to these citations. **Thirty-four OSHA offices in**

**the United States** were **randomly assigned** to implement a new process that sought to address three possible behavioral barriers (that is, complexity, limited attention, and procrastination) that limit employers' ability to act on a citation, while another 34 offices followed the usual process. Analyzing **data on more than 12,000 inspection cases**, researchers found evidence suggesting that the new process led to a 5.4 percentage point increase in the proportion of employers who responded to citations and to a 4.4 percentage point reduction in the number of employers referred to debt collection for failing to resolve their case.

Fortenberry, H., Newman, K., & Banks, E. A. (2012). Innovating for cleaner air. *Military Engineer*, 104(675), 51–52. <https://www.jstor.org/stable/26353936>

- Type of research: Descriptive (case study)
- Summary: This article describes the air quality program at Eglin Air Force Base in **Florida** and the challenges it faces. The Air Force base worked with the Science Application International Corporation and developed the Air Quality Compliance Program, which combines web-based compliance tools and a team of compliance experts to conduct in-person assistance. After the program was implemented, emissions decreased by 32 percent. Information is provided on the Air Quality Resource Web Portal—an easy-to-use website that provides online guidance to air source managers; standardized procedures for data collection, analysis, and reporting; links to other essential databases; general compliance information; compliance assistance tools; air emission inventory system; material issue and consumption systems; and training.

Hai-Jew, S. (2014). Online policy-compliance training in higher education: A preliminary design model. In *Remote Workforce Training: Effective Technologies and Strategies* (pp. 53–80). IGI Global. <https://www.igi-global.com/chapter/online-policy-compliance-training-in-higher-education/103184?camid=4v1>

- Type of research: Other (literature review and description of design concepts for online trainings)
- Summary: This article provides a description of a simplified preliminary model for the design and delivery of online policy-compliance training in a higher education environment. The design and delivery concepts were derived from limited research literature and common practices and trainings in online policy-compliance training at a university in the **United States**. The model suggested that anchoring online trainings to real world cases with potential scenarios was an effective way to deliver them.

Law, K. H., Lau, G., Kerrigan, S., & Ekstrom, J. A. (2014). REGNET: Regulatory information management, compliance and analysis. *Government Information Quarterly*, 31, S37–S48. <https://www.sciencedirect.com/science/article/pii/S0740624X14000549>

- Type of research: Other (description of a compliance tool)
- Summary: This article is an overview of the REGNET project, which investigates methodologies and tools to facilitate access, compliance, and use of government regulations in the **United States**. The research involved the development of prototype information service infrastructures that develop methods and tools based on textual repositories aimed toward locating, merging, comparing, and analyzing the information. Using select examples, the article presented a

regulatory compliance assistance framework that focuses on both translating government requirements into computational rules and improving understanding and interpretation of the regulations.

Morrison, K. W. (2011). 2011 State of safety—Keeping workers safe: Does compliance assistance or enforcement work best? *Safety & Health*, 183(1), 32.

<https://www.safetyandhealthmagazine.com/articles/print/2011-state-of-safety-2>

- Type of research: Descriptive (informal polling)
- Summary: This article discusses whether government agencies should focus on compliance assistance or enforcement of the law for injury and illness prevention. The article used data from the **U.S. Bureau of Labor Statistics (BLS)** and an **informal poll** on *Safety+Health* magazine. Based on the informal poll, most people stated that the most effective means to ensure workplace safety was to use an equal mix of strong enforcement and compliance assistance. Based on BLS data, the author found that occupational injury and illness rates have been on a downward trend since BLS started recording incidents. However, the authors could not use the BLS data to assess how various regulatory policies and legislative initiatives impacted workplace injuries, illnesses, and fatalities.

Puhakainen, P., & Siponen, M. (2010). Improving employees' compliance through information systems security training: An action research study. *MIS Quarterly*, 34(4), 757–778.

[https://www.researchgate.net/publication/220260086\\_Improving\\_Employees%27\\_Compliance\\_Through\\_Information\\_Systems\\_Security\\_Training\\_An\\_Action\\_Research\\_Study](https://www.researchgate.net/publication/220260086_Improving_Employees%27_Compliance_Through_Information_Systems_Security_Training_An_Action_Research_Study)

- Type of research: Descriptive (case study)
- Summary: This article discusses the effectiveness of an information systems security training on employee compliance in a technology company in **Helsinki, Finland**. Data from **interviews, surveys, and participatory observation** were used to assess the training. Among other insights, the study authors recommended that compliance training take into account the personal relevance of the training tasks to learners and that security training and communication efforts should be continuous and imbedded into the company's regular communication efforts.

Stafford, S. L. (2006). Rational or confused polluters? Evidence from hazardous waste compliance. *The B.E. Journal of Economic Analysis & Policy*, 5(1).

<https://www.degruyter.com/view/journals/bejeap/5/1/article-bejeap.2006.5.1.1623.xml.xml>

- Type of research: Causal (quasi-experimental design)
- Summary: This study examines the roles that rationality and complexity have in environmental compliance using hazardous waste regulations as a case study. The authors used a **quasi-experimental design** to analyze **data from 13,128 large quantity hazardous waste generators and management facilities in the United States**. Results suggested that (1) factors that increase the cost of compliance increase the probability of violations, (2) factors that increase the likeliness of inspections and detection decrease the probability of a violation, (3) larger facilities and facilities of multiplant companies are less likely to violate, and (4) nonmanagement violations look to be driven more by the complexity of regulations than rational costs and benefits.

Stafford, S. (2012). Do carrots work? Examining the effectiveness of EPA's compliance assistance program. *Journal of Policy Analysis and Management*, 31(3), 533–555.  
<https://onlinelibrary.wiley.com/doi/pdf/10.1002/pam.21633>

- Type of research: Causal (quasi-experimental design)

Summary: This study examines the effects of federal regional compliance assistance programs administered by the Environmental Protection Agency on compliance with hazardous waste regulations, as well as the relationship between traditional deterrence and compliance assistance. Using **U.S. nationwide data on hazardous waste generators**, the author used a **censored bivariate probit model** to estimate impacts. Compliance assistance programs were associated with increased compliance with hazardous waste regulations, particularly for facilities with relatively small quantities of hazardous waste, but not for larger firms. Additional findings suggested that compliance assistance complements traditional enforcement rather than substitutes for it.

Weppel, S. (2011). *Designing SAFE instruction: The use of 3D animation for safety training in a forklift safety module*.

[https://www.researchgate.net/publication/293071131\\_Designing\\_SAFE\\_instruction\\_The\\_use\\_of\\_3D\\_animation\\_for\\_safety\\_training\\_in\\_a\\_forklift\\_safety\\_module](https://www.researchgate.net/publication/293071131_Designing_SAFE_instruction_The_use_of_3D_animation_for_safety_training_in_a_forklift_safety_module)

- Type of research: Other (description of a 3D animation tool for safety training)
- Summary: This article discusses how to develop Scenario, Activity, Feedback, and Evaluation (SAFE) instruction in eLearning modules for forklift safety in the **United States**. The article stated that the SAFE design method can engage learners in an authentic, online experience for safety training. The author found that using 3D animation to simulate the environment can engage the learner with interactive scenarios and provide feedback to the learners.

### 3. Self-monitoring programs

Anderson, A. R., & Russell, E. O. (2011). Self-regulation: A strategic alternative for small firms? *Journal of Business Strategy*, 32(4), 42–47. [https://www.researchgate.net/publication/235277983\\_Self-regulation\\_A\\_strategic\\_alternative\\_for\\_small\\_firms](https://www.researchgate.net/publication/235277983_Self-regulation_A_strategic_alternative_for_small_firms)

- Type of research: Descriptive (case study)
- Summary: This article discusses how small firms have difficulties complying with regulations, and how self-regulation—as opposed to legislation—could offer a better option for compliance. The article noted that self-regulated organizations match the needs of customers and ability of the firm because they are created within the industry. The study authors argued, utilizing a case study of the auto industry in the **United Kingdom**, that self-financed regulatory organizations offer an effective policing system to ensure that compliance is in line with industry codes of conduct.

De Jong, A., DeJong, D. V., Mertens, G., & Wasley, C. E. (2005). The role of self-regulation in corporate governance: Evidence and implications from the Netherlands. *Journal of Corporate Finance*, 11(3), 473–503. <https://www.sciencedirect.com/science/article/pii/S0929119904000288>

- Type of research: Causal (event study)
- Summary: This study examines the impact of a self-regulation initiative, The Peters Committee, on corporate governance practices in the **Netherlands'** private sector. The initiative provided recommendations designed to increase the effectiveness of management, supervision, and accountability to investors in Dutch corporations. This was to be achieved through voluntary compliance and monitoring, but no enforcement related to codes of conduct. The sample consisted of all nonfinancial firms listed on Euronext Amsterdam from 1992 to 1999. **Event study analysis** of firm data before and after The Peters Committee suggested that the initiative had no effect on corporate governance practices.

Finger, S. R., & Gamper-Rabindran, S. (2013). Testing the effects of self-regulation on industrial accidents. *Journal of Regulatory Economics*, 43(2), 115–146.

<https://link.springer.com/article/10.1007%2Fs11149-012-9201-8>

- Type of research: Causal (quasi-experimental design)
- Summary: This study examines the impact of self-regulation on industrial accidents, specifically, the effects of Responsible Care (RC) on the **U.S.** chemical manufacturing sector. The study constructed a **database of 1,867 firms that owned 2,963 plants** between 1988 and 2001. The study suggested that firms that participated in RC reduced the chances of accidents by 2.99 accidents per 100 plants (or by 69.3 percent) in a given year. Firms that participated in RC also had fewer safety accidents related to processes and violations of RC codes—a difference of 5.75 accidents per 100 plants (or by 85.9 percent) in a given year.

Khanna, M., & Brouhle, K. (2009). The effectiveness of voluntary environmental initiatives. In M. A. Delmas & O. R. Young (Eds.), *Governance for the environment: New perspectives* (pp. 142–182).

<https://experts.illinois.edu/en/publications/the-effectiveness-of-voluntary-environmental-initiatives>

- Type of research: Other (literature review)
- Summary: This paper reviews the literature on the effectiveness of voluntary environmental initiatives (VEI) on firms' environmental performance. The VEI's discussed in the paper aimed to reduce emissions by a specific numerical goal, adopted certain practices or principles for reducing emissions, and made other efforts for improving environmental performance. The authors suggested, based on previous study findings, that VEIs are a more appealing strategy than mandatory regulations because they reduce administrative burden on regulatory agencies and encourage collaborative relationships between firms and the regulatory agencies. However, the authors acknowledged that the emissions reductions reported by VEIs were likely exaggerated in some instances, as overall emissions were decreasing during the studied time period.

Li, H., & Khanna, N. (2018). Does voluntary self-regulation provide regulatory relief? A lesson from the Responsible Care Program in the United States. *The Journal of Law and Economics*, 61(1), 63–96.

<https://www.journals.uchicago.edu/doi/abs/10.1086/698105>



- Type of research: Causal (quasi-experimental design)
- Summary: This study investigates whether organizations are rewarded for self-regulation by examining whether companies participating in the Responsible Care (RC) program experience less Occupational Safety and Health Administration inspections. The authors used **an instrumental variable approach** to study **RC participation data** to determine if voluntary reporting leads to fewer mandated inspections. Study findings showed that organizations that self-regulate experienced reduced government enforcement pressure.

Li, H., Khanna, N., & Vidovic, M. (2018). The effects of third party certification on voluntary self-regulation of accidents in the U.S. chemical industry. *Journal of Regulatory Economics*, 53(3), 327–356. <https://link.springer.com/article/10.1007/s11149-018-9355-0?shared-article-renderer>

- Type of research: Causal (quasi-experimental design)
- Summary: This study examines the impact of mandatory third-party certification under the Responsible Care (RC) program on accidents in participating facilities in the **U.S.** chemical industry. The study used a **database of 10,315 observations from 1,136 facilities owned by 566 RC and non-RC firms** from 1996 to 2010. It estimated the average treatment effect of imposing mandatory third-party certification of voluntary self-regulation in 2005 and found no significant differences, using a **difference-in-difference** approach. The evidence suggested that self-regulation combined with independent verification by auditors did not reduce accidents.

Pfaff, A., & Sanchirico, C. W. (2004). Big field, small potatoes: An empirical assessment of EPA's self-audit policy. *Journal of Policy Analysis and Management*, 23(3), 415–432. <https://academiccommons.columbia.edu/doi/10.7916/D8FJ2V0P>

- Type of research: Descriptive (summary of case records)
- Summary: This study examines the Environmental Protection Agency's (EPA's) Self-Audit Policy in the **United States**. The policy lowers punitive fines when firms disclose and fix their own environmental violations. Using **data from case records involving violations of environmental laws from the EPA**, the authors concluded that, while the policy has encouraged firms to self-audit, the typical self-audit violation is relatively minor. The findings call into question the significance of the self-audit policy.

Sam, A. G. (2010). Impact of government-sponsored pollution prevention practices on environmental compliance and enforcement: evidence from a sample of US manufacturing facilities. *Journal of Regulatory Economics*, 37(3), 266–286. <https://link.springer.com/article/10.1007/s11149-009-9103-6>

- Type of research: Causal (quasi-experimental design)
- Summary: This study examines the impact of government-sponsored pollution prevention practices on environmental compliance and enforcement in the **U.S.** manufacturing sector. The study used a **two-way fixed effects Poisson model** to investigate the impact of 43 EPA-sponsored pollution prevention (P2) practices on compliance and enforcement. P2 adoption appeared to reduce environmental violations in three industries, but increase violations in two

industries. The authors suggested that firms with P2 practices that involved changes in operating procedures were effective in reducing violations, while firms with P2 practices that involved equipment or material changes did not reduce violations. The authors also reported that firms with P2 practices that involved changes in operating procedures or equipment were rewarded with more cooperative treatment of environmental infractions, with fewer enforcement actions.

Short, J. L., & Toffel, M. W. (2008). Coerced confessions: Self-policing in the shadow of the regulator. *The Journal of Law, Economics, & Organization*, 24(1), 45–71.

[https://repository.uchastings.edu/cgi/viewcontent.cgi?article=2190&context=faculty\\_scholarship](https://repository.uchastings.edu/cgi/viewcontent.cgi?article=2190&context=faculty_scholarship)

- Type of research: Causal (quasi-experimental design)
- Summary: This study examines how regulatory enforcement activities influence facilities' decisions to self-disclose violations of environmental laws and regulations. The authors used **data on manufacturing and other facilities in pollution-intensive industries** gathered from the **U.S.** Environmental Protection Agency's Toxic Release Inventory program between 1997 and 2003 to determine whether specific deterrence measures increase the probability of a facility self-disclosing a violation. The study suggested that an additional Resource Conservation Recovery Act inspection increased the probability of self-reporting the next year by 14 percent, and being subject to at least one enforcement action doubled the likelihood of self-reporting in the next year. Additionally, they found that facilities targeted by a U.S. EPA Compliance Incentive Program were more likely to self-disclose violations, and facilities targeted by both a Compliance Incentive Program and a National Priority Sector were nearly three times more likely to self-disclose a violation that year compared to facilities not targeted by either program. They also reported that facilities targeted by only a Compliance Incentive Program were more than 20 times more likely to self-disclose a violation. The study suggested that regulatory oversight is an important component of self-monitoring policies.

Short, J. L., & Toffel, M. W. (2010). Making self-regulation more than merely symbolic: The critical role of the legal environment. *Administrative Science Quarterly*, 55(3), 361–396.

<https://journals.sagepub.com/doi/10.2189/asqu.2010.55.3.361>

- Type of research: Causal (quasi-experimental design)
- Summary: This study examines the impact of federal regulations on corporate organizations ability to self-regulate, looking specifically at whether government regulations promote effective corporate self-regulation. Using **data from U.S. industrial facilities subject to the federal Clean Air Act from 1993 to 2003**, the authors used **regression analysis** to assess impacts. The study suggested that regulations set forth by governing bodies play a significant role in organizations' ability to self-regulate, noting that facilities that disclosed regulatory violations without facing prior regulatory threats showed improved regulatory outcomes. The study also noted that historically poor compliers are less likely to follow through with their commitments to self-regulate.

Stafford, S. L. (2007). Should you turn yourself in? The consequences of environmental self-policing. *Journal of Policy Analysis and Management*, 26(2), 305–326. <https://onlinelibrary.wiley.com/doi/pdf/10.1002/pam.20249>

- Type of research: Causal (quasi-experimental design)
- Summary: This study discusses the effect of the EPA’s Audit Policy disclosures on enforcement. The author used **data on self-disclosures and enforcement activity** from **U.S.** hazardous waste facilities and a **bivariate probit regression** to examine the impact of disclosures on future enforcement activity. The study found that facilities that self-disclose under EPA’s Audit Policy had a lower probability of future inspection. Facilities that are inspected frequently are also more likely to self-disclose, potentially in order to lower the probability of future inspections.

Stretesky, P. B., & Lynch, M. J. (2009). Does self-policing reduce chemical emissions? *The Social Science Journal*, 46(3), 459–473. <https://www.tandfonline.com/doi/abs/10.1016/j.soscij.2009.02.009>.

- Type of research: Causal (quasi-experimental design)
- Summary: This study examines the impact of the **U.S.** Environmental Protection Agency’s Self-Policing Policy (also known as the Audit Policy) on changes in Toxic Release Inventory emissions. The study examined 178 chemical or allied product industry facilities. The study used **ordinary least squares regression** to analyze the data and found that facilities that use the Audit Policy have similar emission trends as facilities that do not use it.

Toffel, M. W., & Short, J. L. (2011). Coming clean and cleaning up: Does voluntary self-reporting indicate effective self-policing? *Journal of Law and Economics*, 54(3), 609–649. [https://repository.uchastings.edu/cgi/viewcontent.cgi?article=2257&context=faculty\\_scholarship](https://repository.uchastings.edu/cgi/viewcontent.cgi?article=2257&context=faculty_scholarship)

- Type of research: Causal (quasi-experimental design)
- Summary: This study examines whether corporate voluntary self-reporting of regulatory compliance issues leads to effective self-policing. Using a nationwide **sample of facilities that are subject to the U.S. Clean Air Act**, the authors used **regression analysis** to discuss the impact of self-reporting on self-policing outcomes. The study provided evidence that self-reporting can reliably lead to improved regulatory compliance and environmental performance. Further, the study asserted that regulators shifted enforcement resources away from those that voluntarily disclosed environmental violations, implying that firms might strategically take advantage of self-disclosure policies to receive less inspections.

Vidovic, M., Delgado, M. S., & Khanna, N. (2019). Third-party certification and the effectiveness of voluntary pollution abatement programs: Evidence from responsible care. *Economic Inquiry*, 57(4), 1751–1770. <https://onlinelibrary.wiley.com/doi/epdf/10.1111/ecin.12818>

- Type of research: Causal (quasi-experimental design)
- Summary: This article considers whether third-party certification has improved the effectiveness of voluntary pollution abatement in the **U.S.** chemical industry through the Responsible Care (RC) program. The authors used **emissions data from 821 chemical plants** to conduct a **difference-**

**in-difference analysis** comparing the performance of RC versus non-RC firms before and after the introduction of mandatory third-party certification. The article reported no significant relationship between certification and emissions. This suggests that third-party certification may not be an effective way of enhancing voluntary abatement programs.

#### **4. Additional research cited**

Hawkins, D. (2020). Differential occupational risk for COVID-19 and other infection exposure according to race and ethnicity. *American Journal of Industrial Medicine*, 63(9), 817–820. <https://onlinelibrary.wiley.com/doi/full/10.1002/ajim.23145>

Rho, H. J., Brown, H., & Fremstad, S. (2020). *A basic demographic profile of workers in frontline industries*. Center for Economic and Policy Research. <https://mronline.org/wp-content/uploads/2020/06/2020-04-Frontline-Workers.pdf>

Steege, A. L., Baron, S. L., Marsh, S. M., Menéndez, C. C., & Myers, J. R. (2014). Examining occupational health and safety disparities using national data: A cause for continuing concern. *American Journal of Industrial Medicine*, 57(5), 527–538. <https://onlinelibrary.wiley.com/doi/abs/10.1002/ajim.22297>

## ABOUT THE RAPID REVIEW

CLEAR’s rapid review of evidence on strategies related to targeted or remote compliance assistance and enforcement was created by Mathematica under the CLEAR contract with the U.S. Department of Labor (DOL), Chief Evaluation Office (CEO). The review was created for internal use at DOL, although the review or a revised version may be made available on the CLEAR website in the future. The contents of the review do not represent the views or policies of DOL.

Due to the rapid turnaround for this review, the evidence scan did not follow CLEAR’s documented systematic approach. The evidence scan for this review had three components. First, CLEAR conducted a literature search using Google Scholar and a large abstract and citation database of peer-reviewed literature (Scopus) published from 2000 to the present. The search terms used for each strategy are provided in Table 1 below. Second, CLEAR reached out to four experts in the compliance and enforcement fields to seek input on programs and studies to be included in the review. Finally, citations from relevant studies were used to identify additional studies for review. This version of the brief was last updated with literature published before July 31, 2020.

**Table 1. Keywords used in database searches by employee retention strategy**

Strategy	Search terms
Targeted inspections	(inspect* OR comply* OR compliance OR enforc* OR investigation) AND (employer* OR firm* OR employee* OR worker* OR safety OR "work* requirement* OR "work* regulation* OR violation OR sanction) AND target* WHERE this is within 2 words of (inspect* OR comply* OR compliance OR enforc* OR investigation)
Compliance assistance	("remote compliance" OR "remote enforcement" OR "compliance assistance" OR "compliance training" OR "compliance information" OR "compliance material") AND (employer* OR firm* OR employee* OR worker* OR safety OR requirement* OR regulation* OR regulatory)
Self-monitoring programs	("self-monitoring" OR "self-disclosure" OR "self-regulation" OR "self-policing" OR "self-inspection*") AND (employer* OR firm* OR employee* OR worker* OR safety OR "work* requirement* OR "work* regulation* OR industr* OR facilit*) AND (comply* OR compliance OR enforc*)

CLEAR screened the abstracts of studies identified by the search to consider whether they investigate relevant strategies that took place in OECD countries. Thirty-two studies were screened in and summarized.

Due to the rapid nature of this review, studies identified for review were not assessed according to CLEAR's causal evidence guidelines. Instead, reviewers used a short rubric to summarize information for each study. Each citation is classified by study type: causal, descriptive, or other. **Causal** research can assess the effectiveness of a strategy—in other words, whether there is a cause-and-effect relationship between the strategy and the results or impacts. High quality causal research (impact studies) can produce the most credible type of evidence. **Descriptive** research does not determine cause-and-effect relationships but uses quantitative methods to identify trends, correlations, projections, and costs and benefits of actions taken. CLEAR also categorized qualitative studies under the descriptive category for the purposes of this rapid review. CLEAR's rapid reviews also summarize **other** types of evidence and research that describe how, where, and why strategies are implemented, and includes opinion pieces by subject matter experts (SMEs). This type of research does not aim to identify cause-and-effect relationships or use quantitative or qualitative methods but can be useful to identify emerging strategies potentially worthy of future replication and additional study. For more information on how CLEAR reviews and rates different types of studies, see CLEAR's reference documents at <https://clear.dol.gov/about>.

More information about CLEAR can be found here: <https://clear.dol.gov/about>.

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