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Occupational Safety and Health Conditions in the Apparel Factories: Worker Perceptions and the Role of Management Systems

Jeffrey Eisenbraun
Kelley Cohen
Drusilla Brown

April 2015

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Jeffrey Eisenbraun
International Finance Corporation

Kelley Cohen
Tufts University

Drusilla Brown
Tufts University

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Abstract

Occupational safety and health management (OSH) systems are considered an important factor in protecting workers from injury and illness. Yet whether and how managers in the apparel sector choose to implement such systems in their factories is not well understood. This paper compares trends in non-compliance with standards regulating OSH management systems, as well as non-compliance with actual OSH conditions in apparel factories. Analyzing data from Better Work Compliance Assessments, factories found in compliance with having OSH management systems in place are generally more likely to be in compliance with standards for OSH conditions in the factory. Trends in OSH management systems and actual OSH conditions are tracked over time, and no clear pattern emerges regarding which element takes hold first in the factory. Through comparison of data from Better Work Compliance Assessments and data from surveys completed by workers and managers as part of the independent Better Work Impact Evaluation, this paper demonstrates that workers perceive similar changes in their working conditions as assessed by Better Work Enterprise Advisors. This seems to suggest that a focus on continuous compliance improvement in OSH can improve working conditions.

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1. INTRODUCTION

Occupational safety and health (OSH) conditions in apparel factories have a significant effect on both the wellbeing of workers and the business outcomes of their employers. Research in Better Work factories has shown that worker wellbeing increases most dramatically when workers experience improvements in OSH conditions such as less extreme temperatures, safer equipment and fewer accidents (Domat 2013). In addition, factories with better working conditions and better occupational safety and health indicators are significantly more profitable than factories with poor conditions (Brown 2015). Yet, the link between management decisions to attempt to comply with certain OSH management practices and their actual success in meeting OSH compliance outcomes is not clear. This paper attempts to uncover the interplay between OSH management systems and compliance with international labour standards covering OSH conditions. In attempting to uncover which actions or policies instituted by factory management can lead to desirable outcomes related to the health and safety of the working environment, the analysis contributes to the effort of understanding how change occurs in apparel factory settings. The analysis herein focuses on the link between compliance with occupational safety and health management systems and outcomes, and worker reports, in two Better Work countries: Vietnam and Jordan.

2. LITERATURE REVIEW

2.1. Occupational safety and health at the workplace

Work-related accidents and diseases exact a high cost for workers, their employers and society as a whole. Recent worldwide estimates from the International Labour Organization suggest that in 2003 there were about 358,000 fatal and an additional 337 million non-fatal occupational accidents in workplaces. In addition to the tragic human toll these accidents and occupational illnesses have on workers and their families, the ILO reports that annual economic losses due to workplace injuries account for up to five percent of global GDP (ILO 2009).

Most of the world's workers are engaged in workplace environments that do not meet international labour standards (LaDou 2003). The apparel sector is no exception, and mitigating and preventing occupational safety and health hazards remains a difficult challenge in the globalized apparel industry. Even as compliance improves in other areas of labour law in Better Work factories, complying with international and national standards for proper OSH conditions in the work environment is difficult to achieve in many factories. A recent compliance synthesis report from Better Work Vietnam, for example, notes that occupational safety and health issues make up the greatest number of non-compliance incidences as assessed by Better Work Enterprise Advisors. These areas of non-compliance include emergency preparedness, chemical handling and labeling, health services and first aid, OSH management, worker protection and working environment (Better Work Vietnam 2014).

Framing observed OSH trends over time for a longitudinal case study for the Better Work Program in Haiti, Davis (2013) notes that there is a gap in the OSH literature for describing the process of change and improvement in OSH conditions in apparel factories in developing country contexts. However, the author reviews the general literature addressing issues of OSH improvement in developing world manufacturing settings, which suggests certain underlying conditions that should be in place to support improvements in OSH conditions, including: industry profitability, stable economic and legal systems, trained and experienced

management and worker participation (Davis 2013). Narrowing in from these broad categories of underlying conditions (several of which lie outside of direct control by factory management), the presence of a management system to address occupational safety and health in particular is recognized as important to reduce hazards to workers while preserving their productivity in the workplace (ILO 2001).

2.2. Management systems and OSH

Upon issuing its guidelines for OSH management systems, the ILO defined OSH management systems as: "A set of interrelated or interacting elements to establish OSH policy and objectives, and to achieve those objectives" (ILO 2001). Previous research has investigated the impact of management systems on the work environment and business outcomes for firms. Bottani et al. (2009) compare firms adopting safety management systems (SMS) with non-adopting firms to determine whether implementation of such a system affects overall safety performance. Surveying a sample of 116 manufacturing companies, the researchers found that the average safety performance across SMS adopters is significantly higher than non-adopters, as measured by the volume of accidents. Furthermore, SMS-adopting firms are significantly more likely to implement health and management safety measures that are widely recognized to benefit the performance of firms, including defining safety and security goals and communicating them with workers, performing risk analysis and developing worker training programs. However, the study is limited in identifying the causal mechanism at work among these firms. Further evidence suggests that having a safety management system and policies in place to raise awareness and encourage communication regarding safety issues can have a positive effect on not only safety performance, but also on the financial performance of the firm (Fernandez 2009). Maintaining a SMS has been shown to be source of competitive advantage (Rechenthin 2004). Undertaking a systematic review of the effectiveness of OSH management systems, Robson et al. (2007) describe a general gap in the literature that investigates the effectiveness of such systems to address worker health, safety and other economic concerns. Despite the general lack of rigorous research on the impact of OSH systems, the reviewers find that the body of research produces mostly positive (and a few null) results regarding the effectiveness of OSH management systems on worker health and safety outcomes (Robson 2007).

3. DATA AND APPROACH

The trends in OSH management systems and outcomes presented in this paper are based on data attained from the Better Work program, which is a partnership of the ILO and the International Finance Corporation (IFC). The Better Work program works with factories in the apparel and footwear industries to improve compliance with international labour standards and the national labour law of each of the eight countries in which it operates.[1] The program brings together workers' and employers' organizations, as well as government stakeholders and prominent international buyers to address root causes of non-compliance with labour standards and laws in apparel and footwear factories.

Better Work carries out detailed, unannounced factory assessments to establish areas where a factory is non-compliant with international labour standards and national labour law, and this assessment

[1] As of 2014, Better Work operates programs in Bangladesh, Haiti, Indonesia, Jordan, Lesotho, Nicaragua and Vietnam. Better Factories Cambodia, the model from which Better Work was developed, was established in 2001.

serves both as a foundation for improvement plans and as a baseline for comparison against subsequent assessments. Regular factory and industry-level reports highlight non-compliance findings from these assessments, which use a rigorous method of inspection based on Better Work's Compliance Assessment Tool (CAT). Reporting is organized into eight areas of labour standards, or clusters. Four of the clusters are based on ILO fundamental rights at work regarding Child Labour, Discrimination, Forced Labour and Freedom of Association and Collective Bargaining. The remaining clusters assess conditions at work, including Compensation, Contracts and Human Resources, Occupational Safety and Health, and Working Time. In countries where national law either fails to address or lacks clarity around a relevant issue regarding conditions at work, Better Work establishes a benchmark based on international standards and good practices. Each of the eight clusters is divided into key components. These components are known as compliance points.[2] The compliance points covered in these clusters are largely consistent across countries; however, each compliance point contains specific questions that may vary from country to country due to differences in national legislation. A compliance point is reported to be non-compliant if even one question within it is found in non-compliance.

Enterprise Advisors are Better Work staff tasked with completing the unannounced factory assessments. Working in teams of two, Better Work EAs conduct a factory assessment over two days using the CAT to identify areas of non-compliance. They complete this work using direct observation of factory conditions, documentation reviews at the factory, and through interviews with management and interviews or focus groups with workers. Enterprise Advisors employed by Better Work use the assessments from factories as a basis for tailoring the advisory and training services the factory will receive. A different set of Enterprise Advisors than those who conducted the unannounced assessment of the factory will provide advisory services and support the establishment of worker-manager dialogue mechanisms within the factory. The Enterprise Advisors will also share their input on what kinds of targeted training courses, such as hazardous chemicals management or supervisory skills training, the factory would benefit from to improve their business operation and rates of compliance with labour standards.

In order to understand the impact of its assessment, advisory and training services on working conditions and the competitiveness of factories, Better Work commissioned an independent impact assessment beginning in 2009 to study the effects of its efforts. The Better Work Impact Evaluation is a multi-year independent research project, led by researchers at Tufts University, designed to assess the impact of the Better Work program on labour management practices, conditions of work, worker wellbeing, factory productivity, factory profitability, compensation, worker voice and agency and the broader development impact of Better Work. The primary source of data that informs this ongoing Impact Evaluation is derived from computer and tablet-based audio assisted surveys of a random selection of 30 workers per factory enrolled in Better Work, and up to four managers per factory. To maintain the distinction of the Impact Evaluation from regular Compliance Assessments, data collection firms independent from Better Work are contracted to liaise with factory managers to schedule and implement these surveys. Analysis conducted on the results of these surveys is complemented with employee rosters detailing workforce size, composition and job assignments, and case study interviews of factory managers concerning workplace innovations and occupational safety and health. Additionally, the Impact Evaluation survey data retrieved

[2] A table showing each of the Compliance Assessment Tool's 8 clusters and 39 compliance points can be found in Table 1 in the Annex.

directly from workers and managers is merged with Compliance Assessment data collected on a regular basis by Better Work Enterprise Advisors.

The data employed in the analysis below are collected from two sources: Better Work Compliance Assessments and the Better Work Impact Evaluation. The Better Work CAT contains questions that assess compliance of occupational safety and health from both an OSH systems and an OSH outcomes perspective. The enterprise assessments carried out by Better Work staff first assesses OSH systems, determining (1) whether firms have an approved occupational safety and health feasibility study/written plan for OSH program, (2) whether the factory has performed a general OSH assessment and (3) the extent to which there are dedicated units in the business for addressing OSH concerns. These three compliance questions are part of the larger OSH management systems compliance point in the CAT (and the OSH management systems compliance point resides within the larger OSH cluster). Tables II and III in the Annex provide a full list of the compliance questions analyzed in the paper. Compliance assessments have been implemented in Better Work Vietnam and Jordan factories since 2009.

The Better Work Impact Evaluation collects data from workers and managers in participating factories. The central battery of questions mirrors the compliance categories. In addition, workers are asked to report on mental health, physical health, life satisfaction and life aspirations. Factory managers report on key performance indicators, production and strategic planning, and business performance challenges. Workers are asked about a range of OSH conditions, including factory temperature, work accidents, dusty and polluted air, chemical hazards and dangerous equipment (see Table IV in the Annex for the full text of the question as it appears on the worker survey). Tracking workers' assessments of working conditions to see whether it corresponds with Compliance Assessments can verify whether Better Work Enterprise Advisors are capturing factory dynamics as workers perceive them. Data analyzed in this paper include responses from over 1,000 workers in Better Work Jordan factories and over 4,000 workers in Better Work Vietnam factories surveyed from 2010-2013.

First, data from Better Work enterprise assessments are disaggregated and visually plotted in bar graphs to determine whether certain management systems-level questions ("systems" questions) are significantly related to compliance with actual OSH conditions (compliance "outcome" questions). Non-compliance rates on a variety of OSH outcomes are disaggregated by whether a factory is in compliance with one of the three OSH "systems" questions described above. The sample used to construct these graphs consists of observations from several time periods of compliance assessments, including repeat visits to a single factory. Correlations are run to determine the strength of relationship between non-compliance with instituting one of the OSH systems and non-compliance with related OSH outcomes.

Next, the dynamics of how non-compliance rates on OSH systems and outcomes change over time are examined at the factory-level over multiple compliance assessment dates. Line graphs are used to track non-compliance rates of each OSH outcome over time within a single factory, along with the lines representing OSH systems questions. Visually plotting the compliance trends over multiple visits gives the opportunity to observe whether improved compliance with OSH management systems appears to be achieved ahead of improvements in OSH outcomes, or vice versa.

Finally, the question of whether improvements in OSH working conditions are perceived by workers in the factory is considered. Impact Evaluation surveys ask workers to assess their working conditions, and results are presented in bar charts disaggregated by whether factories are compliant on related OSH outcomes. Visually presenting how worker responses differ based on whether they work in a factory

assessed compliant with OSH conditions can demonstrate how compliance adherence with labour standards affects the experience of workers on the factory floor.

4. RESULTS

Results are presented in three sections. First, section 4.1 compares factories with OSH management systems against those without OSH management systems in place in relation to the non-compliance rates in OSH outcomes. This section aggregates results across all factories and time periods, including repeat visits to a single factory. In Section 4.2, the sequencing of changes in OSH systems and OSH outcomes within individual factories is considered in an attempt to understand which improvement may take hold first and contribute to change in the other. Finally, in section 4.3, feedback on OSH conditions as reported by workers is compared to the assessments made by Better Work Enterprise Advisors.

4.1 OSH management systems and compliance with OSH conditions

Vietnam

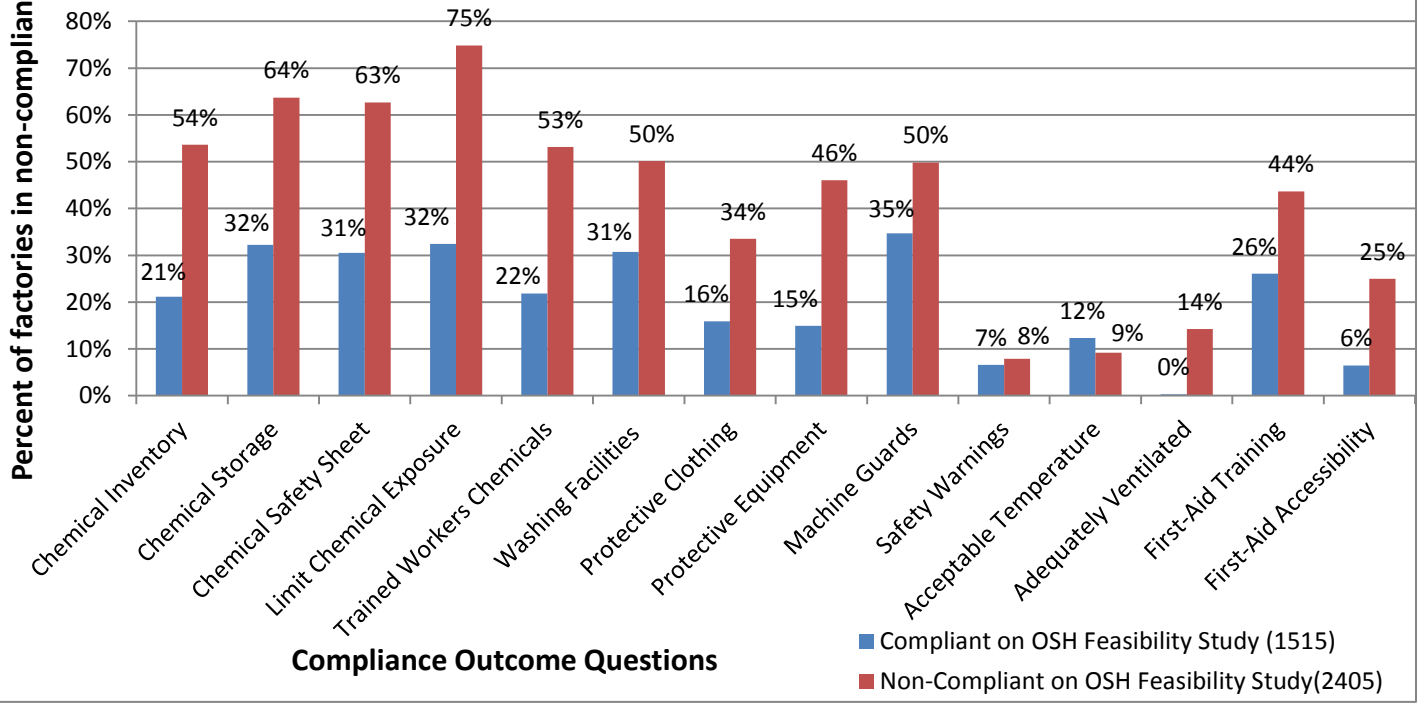
One way Better Work determines whether an OSH system exists in a factory is to ask managers whether their firm has undertaken an OSH feasibility study. The management system CAT question reads, "Does the factory have an approved OSH feasibility study?" The majority of observations in Vietnam (2,405 or 61%) found assessed factories to be non-compliant with having an OSH feasibility study. Figure 1 below depicts average non-compliance rates in Vietnam on each OSH outcome question for factories with and without an OSH feasibility study. (Non-compliance rates refer to the percentage of assessments that find a factory to be non-compliant with a particular compliance point on the CAT across all time periods.) That is, for each outcome category, compliance rates are reported for factories compliant with having an OSH feasibility study and those that were not. Along the horizontal axis, compliance "outcome" questions are listed.[3] The vertical axis measures the rate of non-compliance for each of the outcome questions. The height of each bar represents the rate of non-compliance with each outcome question. The red bars report outcome non-compliance for those factories out of compliance with the "systems" questions. The blue bars report outcome non-compliance for factories in compliance with the "systems" question.

For example, the first compliance outcome question, "Does the employer keep an inventory of chemicals and hazardous substances used in the workplace?" is represented by the label "Chemical Inventory." Factories which are *non-compliant* with having an approved OSH feasibility study are 33 percentage points more likely (54% non-compliant to 21% NC) to also be *non-compliant* with chemical inventory. Factories having an OSH feasibility study are 43 percentage points more likely to be in compliance with the outcome question, "Has the employer taken action to assess, monitor, prevent, and limit workers' exposure to chemicals and hazardous substances?" represented by "Limit Chemical Exposure" on the horizontal axis. Similar trends occur across nearly all compliance outcome questions in Figure 1. Factories are 31 percentage points more likely to be found compliant with effectively training and encouraging use of personal protective equipment (PPE) (15% NC vs. 46% NC) if they have an approved OSH feasibility study. Exceptions emerge for compliance with safety warnings and acceptable factory temperature. These results generally suggest that encouraging firms to develop an appropriate feasibility study for factory OSH is

[3]Full versions of the compliance outcome questions on the CAT are reported in the Annex in Tables II and III.

associated with improvement in other assessed areas of OSH compliance, possibly through increased organizational awareness. Correlations are run to show the strength of the relationship between non-compliance with OSH systems and non-compliance with OSH outcomes. Table V in the Annex displays correlation coefficients that correspond to Figures 1-3. While the strength of the relationship varies across the OSH outcomes, in most cases the relationship is found to be statistically significant.

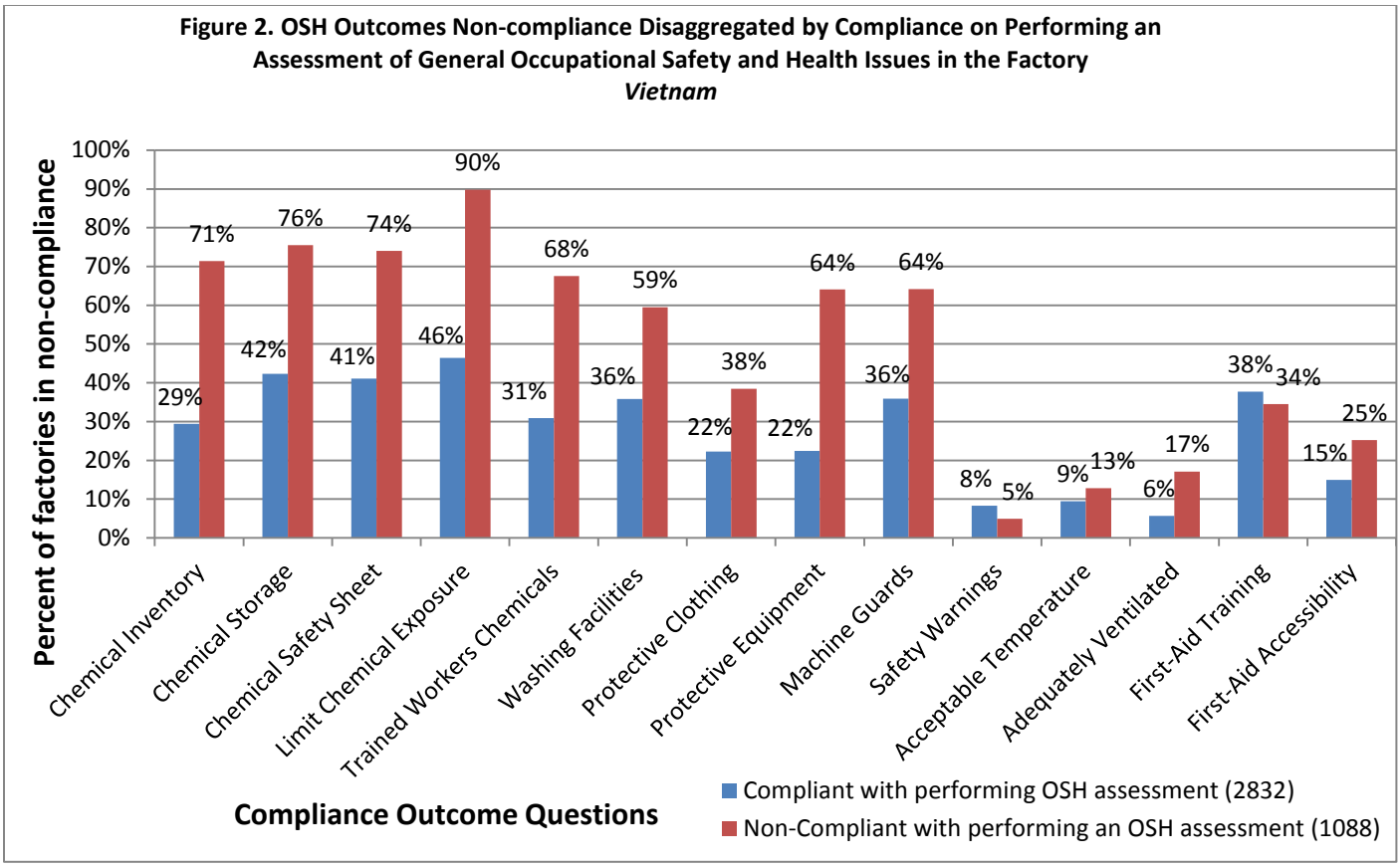
Figure 1. OSH Outcomes Non-compliance Disaggregated by Compliance with OSH Feasibility Study
Vietnam



Compliance Assessments in Better Work Vietnam also ask whether factory managers have performed "an assessment of general occupational safety and health issues in the factory" (Figure 2). Similar to the OSH feasibility study compliance question, the general OSH assessment question represents an attempt to capture whether a factory upholds a required management practice that could lead to better outcomes in other compliance areas. Unlike the OSH feasibility study compliance question, a majority of the 3,920 compliance assessment data points in the current data set (2,832, or 72%) show factories are compliant with performing general OSH assessments.

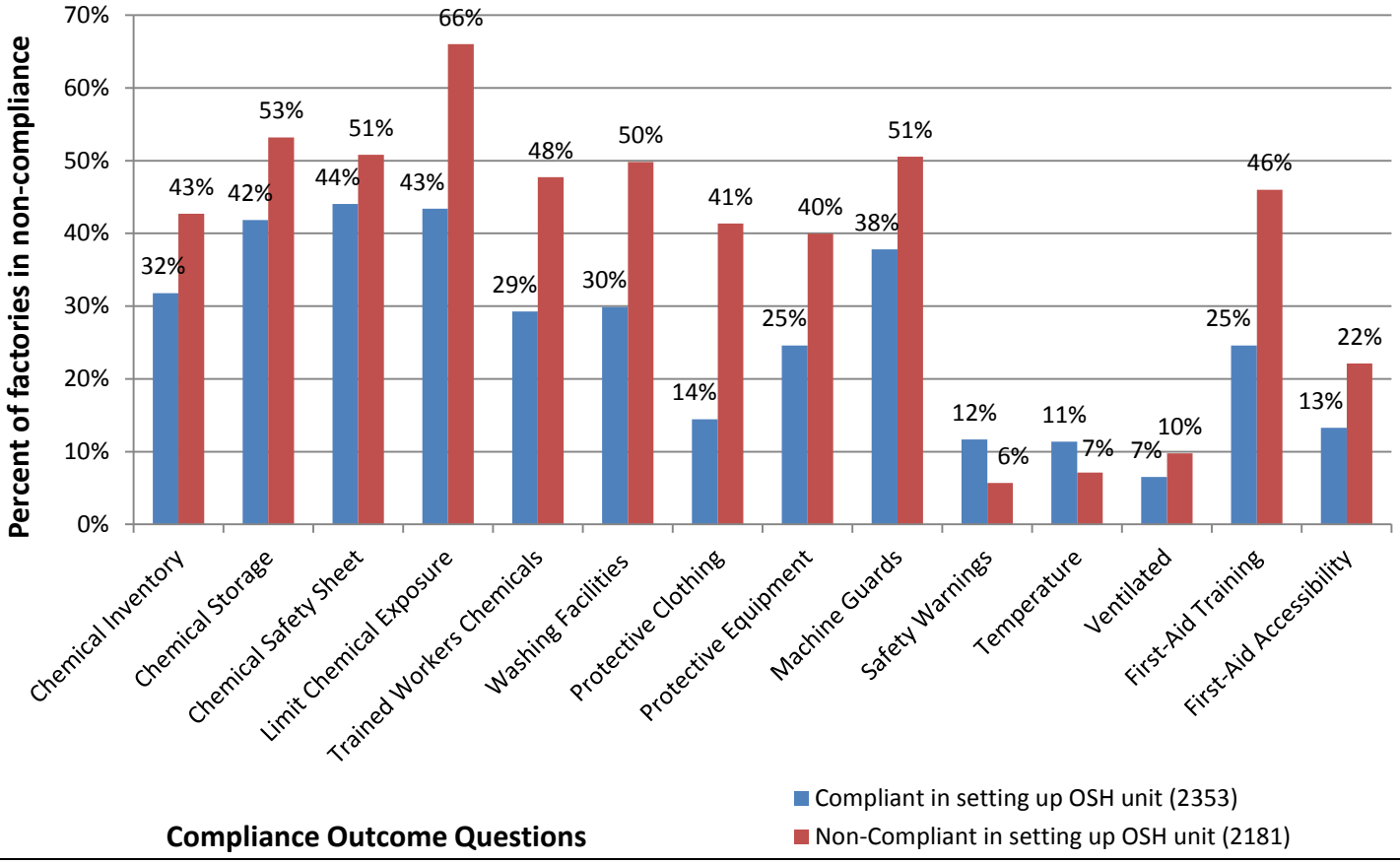
Encouragingly, the data displayed in Figure 2 show that performing general OSH assessments is associated with lower levels of non-compliance in other areas of occupational safety and health. Those factories that are in compliance with the general OSH assessment management practice are also much more likely to have higher compliance with chemical handling, storage and training issues, and are 28 percentage points more likely to be in compliance with having proper guards installed and maintained on dangerous moving equipment ("Machine guards").

Figure 2. OSH Outcomes Non-compliance Disaggregated by Compliance on Performing an Assessment of General Occupational Safety and Health Issues in the Factory
Vietnam



The final management systems-related compliance question in Vietnam asks whether factories have a properly functioning unit that oversees OSH matters (Figure 3). A slight majority (2,353 or 52%) of the 4,534 compliance assessment data points available for this question have positive compliance assessments of Better Work Vietnam factories. As with the previous management systems questions related to OSH, factories compliant with a properly-functioning unit for OSH matters tend to also perform well on other areas of OSH compliance that are assessed.

Figure 3. OSH Outcomes Non-compliance Disaggregated by Compliance on Setting up a Properly Functioning Unit in Charge of OSH and/or Labour Protection Council and OSH Collaborators Network
Vietnam



Jordan

Better Work's compliance assessment tool in Jordan also measures the extent of compliance each factory achieves regarding management systems to promote and maintain improvements in occupational safety and health. First, factories are assessed against whether they maintain the management practice of having written plans for OSH programs (Figure 4). About three quarters of factories have a written plan for OSH programs (1,033 of 1,333 or 77%). A number of compliance outcomes follow intuitive and expected trends when factories are in compliance with having a written OSH plan. For example, those with a written plan for OSH are 19 percentage points more likely to be compliant (34% NC vs. 53% NC) with "protective equipment" (training and encouragement of personal protective equipment use among workers), and over twice as likely to be compliant with ensuring that there are sufficient readily available first aid supplies ("first-aid accessibility").

However, not all trends in compliance outcomes questions are as clear or intuitive as seen in the OSH feasibility study question in Vietnam. For example, factories having written plans for OSH programs are also more likely to be non-compliant with acceptable factory temperature (34% NC to 24% NC) and

ventilation (10% NC to 2% NC). In these particular cases, creating greater organizational awareness of the need to address OSH concerns and standards may not be sufficient for factories to make substantial improvements in OSH outcomes. Correspondingly, Table VI in the Annex reflects some of these counterintuitive results by showing negative correlation coefficients – that is, as non-compliance with OSH systems questions falls, non-compliance with OSH outcomes moves in the opposite direction (increases).

Figure 4. OSH Outcomes Non-compliance Disaggregated by Compliance in written OSH plans
Jordan

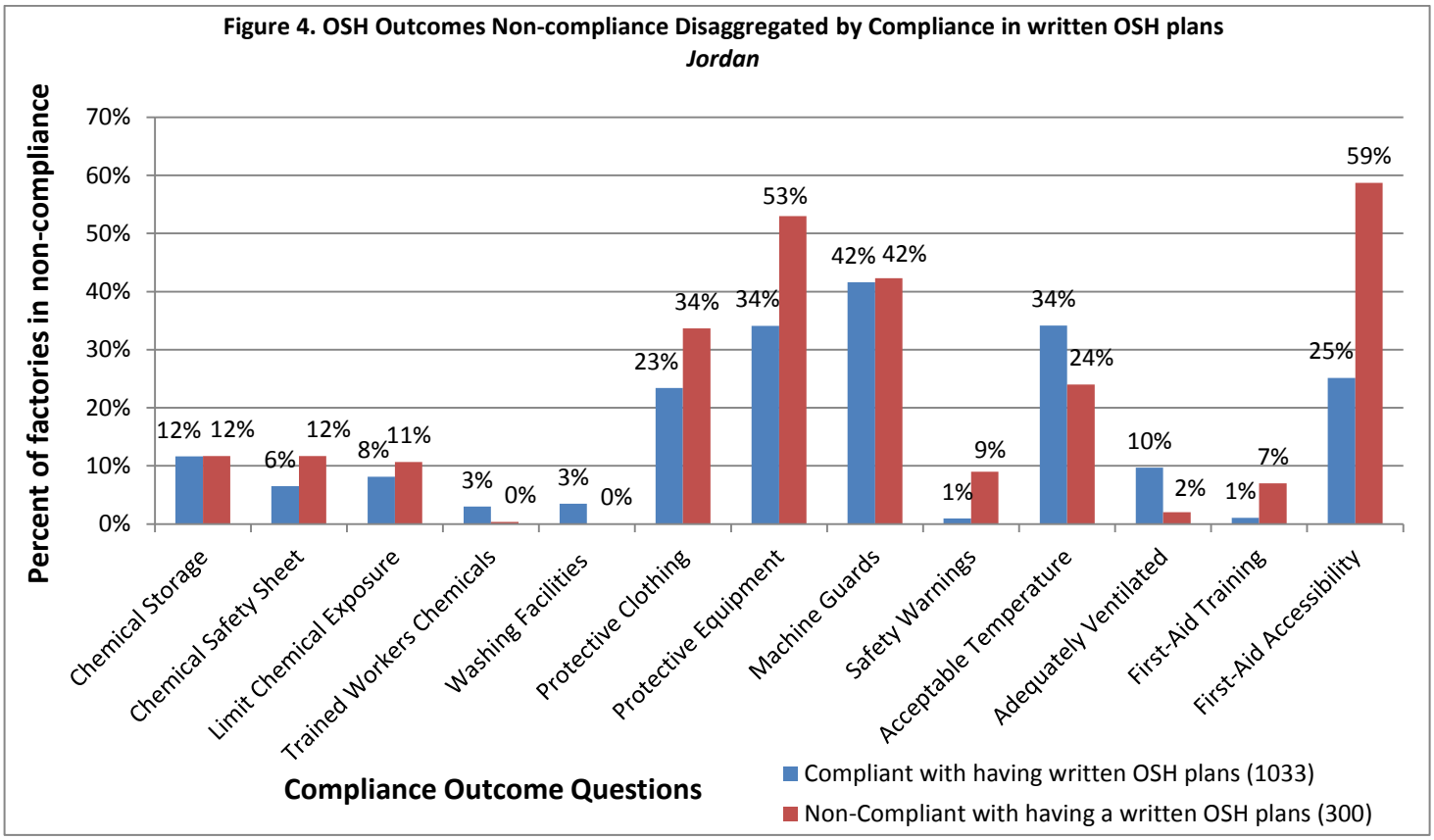
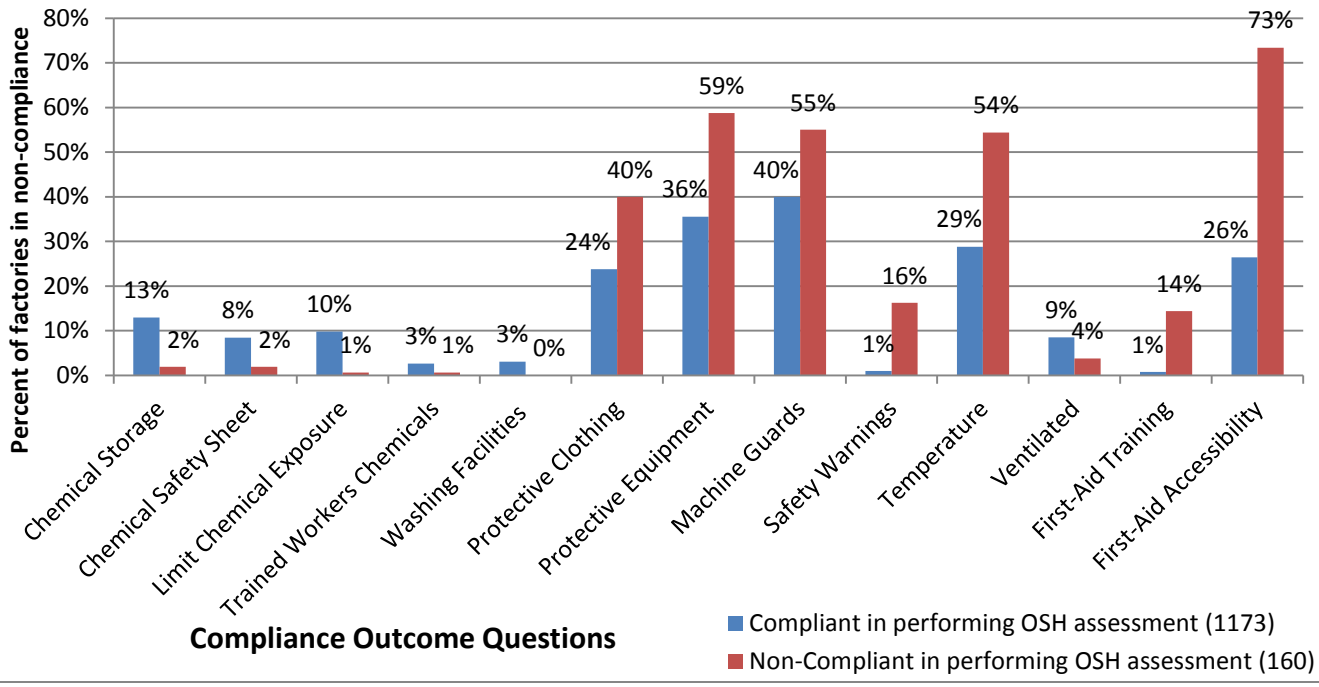
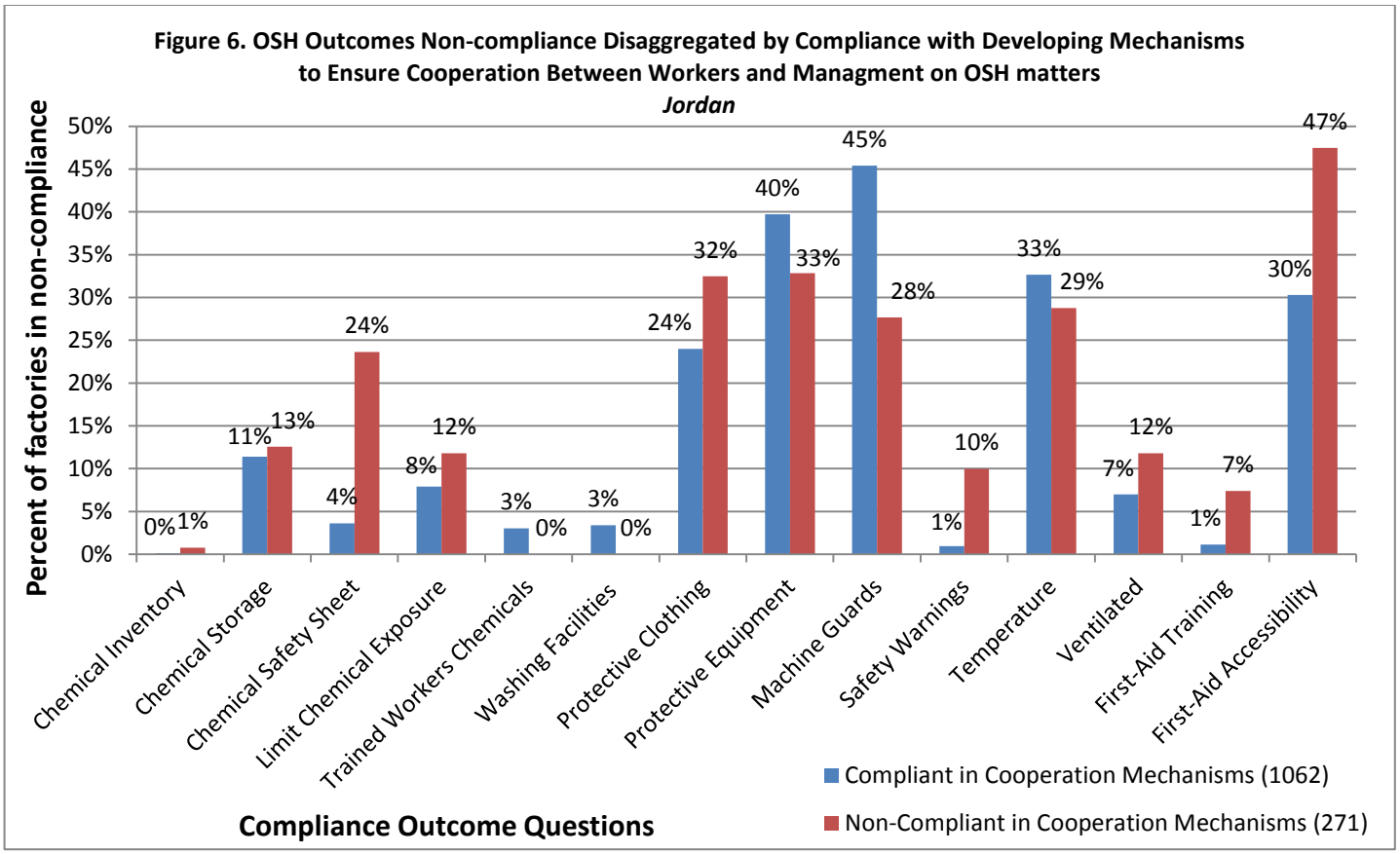


Figure 5 depicts compliance outcome results for factories, both compliant and non-compliant, with the management systems-level question concerning whether managers have performed an assessment of the general OSH issues in the factory in Jordan. A large majority of assessments in this area in Jordan find factories compliant (1,173 of 1,333 or 88%). With the exception of chemical handling and ventilation, compliance with the general OSH assessment question is associated with higher compliance in OSH conditions.

Figure 5. OSH Outcomes Non-compliance Disaggregated by Compliance with Performing an Assessment of General OSH Issues in the Factory
Jordan



Better Work Jordan factories' compliance assessment also includes evaluation of whether sufficient dialogue mechanisms have been put in place to ensure cooperation on OSH-related matters among workers and managers. Figure 6 details the 1,333 assessment data observations available for the dialogue mechanism question. Of this pool, 1,062 or 80% of the assessments find compliance. When comparing compliance with dialogue mechanisms across compliance outcomes questions, several counterintuitive results are found. Factories compliant with dialogue mechanisms are more likely to be out of compliance with training and encouraging use of personal protective equipment ("protective equipment"), ensuring proper guards are installed on machines ("machine guards") and in factory temperature. These particular compliance outcomes may be considered poor measures of the effectiveness of dialogue mechanisms to discuss OSH conditions, and may explain the otherwise counterintuitive results.

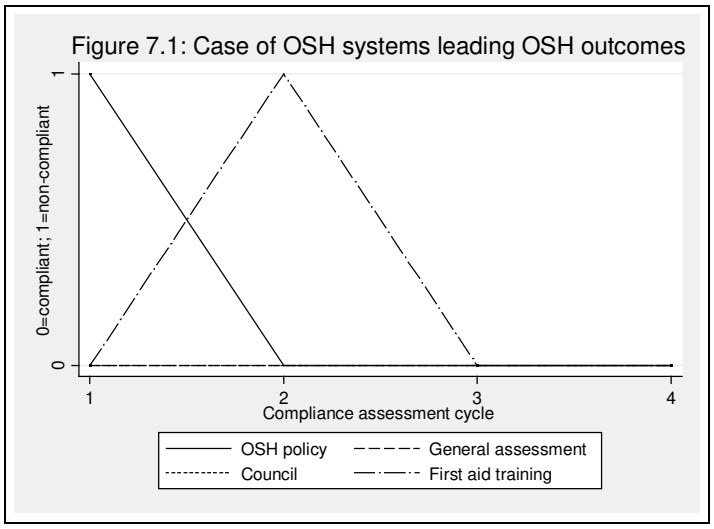


4.2. Sequencing of changes in OSH management systems compliance and OSH outcomes

Examining compliance trends over time at the factory level can provide further insight into the dynamics of change in factories, including which areas of compliance may spur change in another area. Evidence displayed in Figures 7 through 10 shows changes over time in OSH management systems compliance and OSH conditions compliance at the individual factory level. Each of these figures represents the progression of Compliance Assessment findings for three OSH systems questions and one OSH outcome question for a different factory in Vietnam. Examining the patterns in factories across BWV over time, four categories of patterns tend to emerge: cases where 1) compliance in OSH systems precedes OSH outcome compliance; 2) compliance in OSH systems follows OSH outcome compliance; 3) OSH outcomes remain static over time while OSH systems compliance changes, and 4) no discernable pattern.

First, in Figures 7.1-7.3, we see cases where compliance with an OSH outcome occurs *after* a factory becomes compliant with having OSH systems in place (Category 1). In Figure 7.1, we see a factory initially out of compliance with having an OSH feasibility study (thus the solid line representing OSH policy rests at "1" at cycle #1), while in compliance with two other OSH systems, conducting a general assessment of OSH conditions and setting up a unit in charge of OSH. As the factory comes into compliance with having an OSH feasibility study by the second compliance cycle, it slips out of compliance in providing first-aid training to its employees, an OSH outcome compliance point. It is conceivable that deteriorating compliance between the

first and second cycles could be attributed to greater familiarity and skill by Better Work Enterprise Advisors in uncovering non-compliance. In any case, by the time of the third and fourth follow-up compliance assessments, the factory has come into compliance with first aid training, matching the compliance status found for all OSH systems.



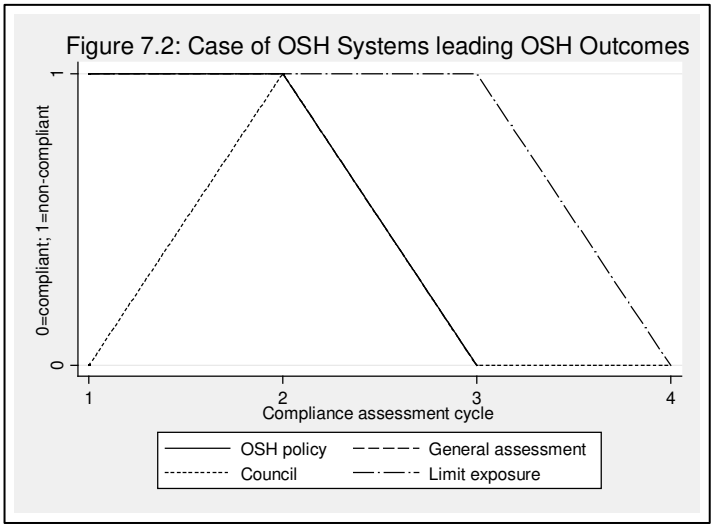
OSH Policy = Does the employer have written plans for OSH programs?

General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Council = Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?

First aid training = Has the employer provided first-aid training for workers?

Figure 7.2 shows a similar progression for another OSH outcome measured by the CAT in Vietnam: assessing whether employers have taken action to assess, monitor, prevent and limit worker exposure to chemicals and hazardous substances. In this case, the factory represented in Figure 7.2 is out of compliance with this OSH outcome until the fourth compliance assessment cycle. Prior to that assessment date, all three OSH management systems are also out of compliance in the second cycle, before all transitioning into compliance by the third assessment date. The pattern of OSH management systems coming into compliance by the third assessment date and the OSH outcome – in this case related to chemicals and hazardous substances – moving to compliance by the fourth assessment, suggests that management systems set the conditions for compliance with OSH outcomes.



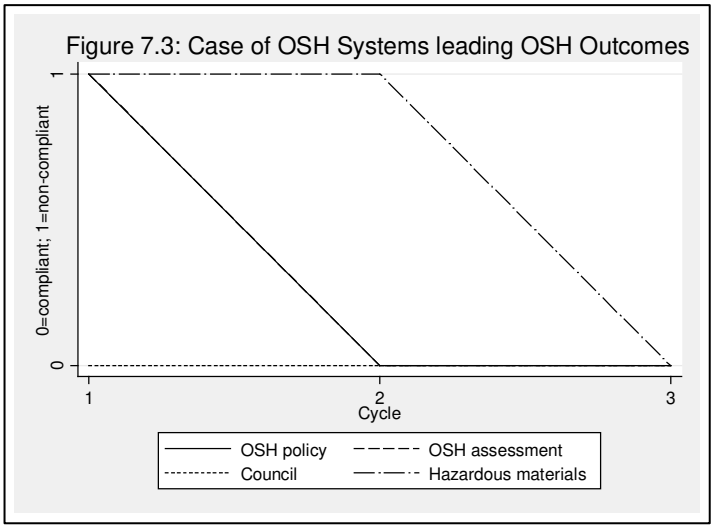
OSH Policy = Does the employer have written plans for OSH programs?

General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Council = Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?

Limit exposure = Has the employer taken action to assess, monitor, prevent and limit workers' exposure to chemicals and hazardous substances?

Figure 7.3 provides a final example of a factory achieving compliance first with OSH management systems, and later achieving compliance with a related OSH outcome. The factory in Figure 7.3 is initially found out of compliance with having written plans for an OSH program and conducting a general assessment of OSH conditions (both management systems), as well as non-compliant in properly storing chemicals and hazardous materials. The factory is found compliant in the first assessment, however, with setting up a unit in charge of OSH. By the second compliance assessment cycle, all three OSH management systems are found to be in compliance, while the factory remains out of compliance with storing chemicals. By the third assessment cycle, the factory is found compliant with the OSH outcome, while maintaining compliance with the OSH management systems.



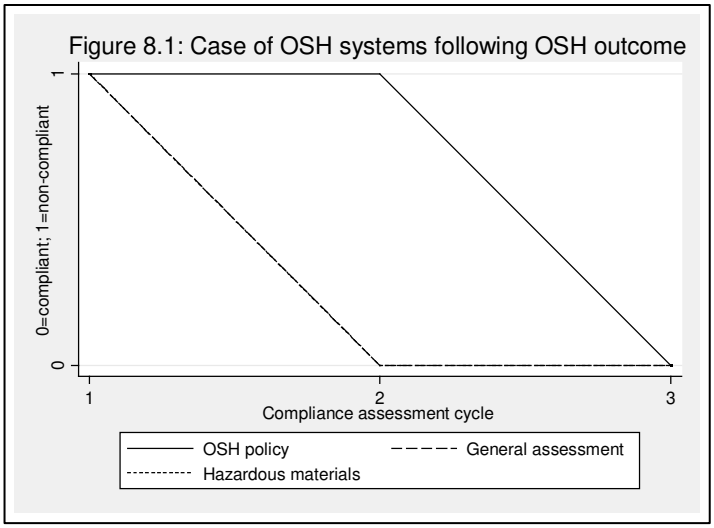
OSH Policy = Does the employer have written plans for OSH programs?

General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Council = Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?

Hazardous materials = Are chemicals and hazardous substances properly stored?

The pattern of compliance with OSH outcomes following compliance in OSH management systems is not consistently observed across factories, and Figures 8.1-8.3 show an opposite pattern (Category 2). This second category consists of factories that show areas of OSH outcomes achieving compliance followed by achieving compliance in OSH management systems. For example, the factory represented in Figure 8.1 is found to be initially out of compliance with having written plans for OSH programs, conducting general OSH assessments and with properly storing chemicals and hazardous materials.



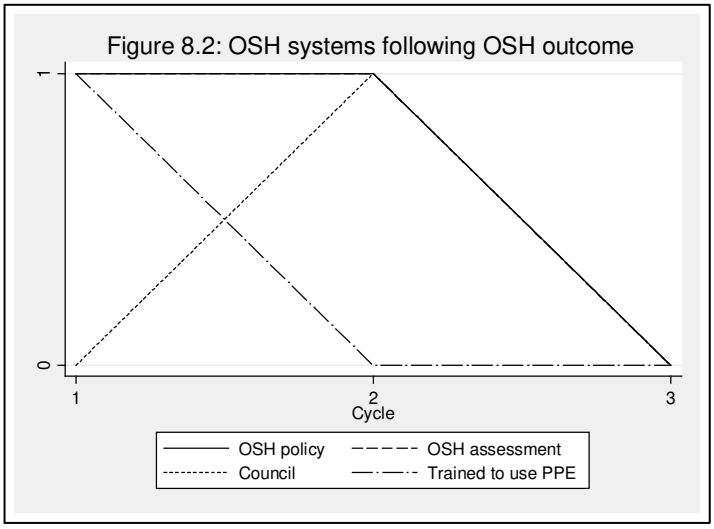
OSH Policy = Does the employer have written plans for OSH programs?

General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Hazardous materials = Are chemicals and hazardous substances properly stored?

The factory in figure 8.1 is compliant with having a written OSH policy only after achieving compliance with the hazardous materials compliance question in second cycle. Such a scenario provides evidence for the possibility that incremental changes take hold in factories and then lead to more systematic or institutionalized policy changes, such as an OSH management system.

Similarly, all three OSH management systems considered are in place in the factory represented in Figure 8.2, but this occurs after the factory is found to be compliant in training workers to use personal protective equipment.



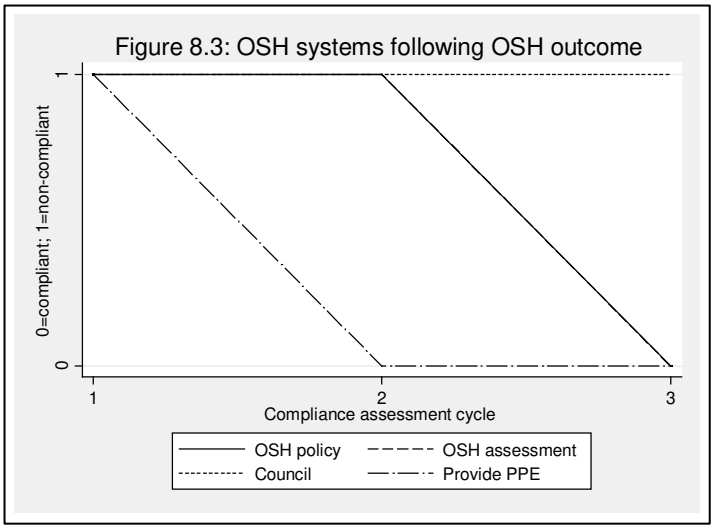
OSH Policy = Does the employer have written plans for OSH programs?

General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Council = Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?

Trained to use PPE = Are workers effectively trained and encouraged to use the personal protective equipment that is provided?

In another factory represented in Figure 8.3, compliance with maintaining an OSH policy and conducting a general OSH assessment occurs in the third cycle, following the factory reaching compliance with providing PPE to workers in the second cycle. Again, this pattern conflicts with the first pattern identified in Figures 7.1-7.3, and provides evidence that a factory may establish OSH management systems – including policies and general assessments – after first achieving incremental change in an area OSH measured by compliance outcomes questions.



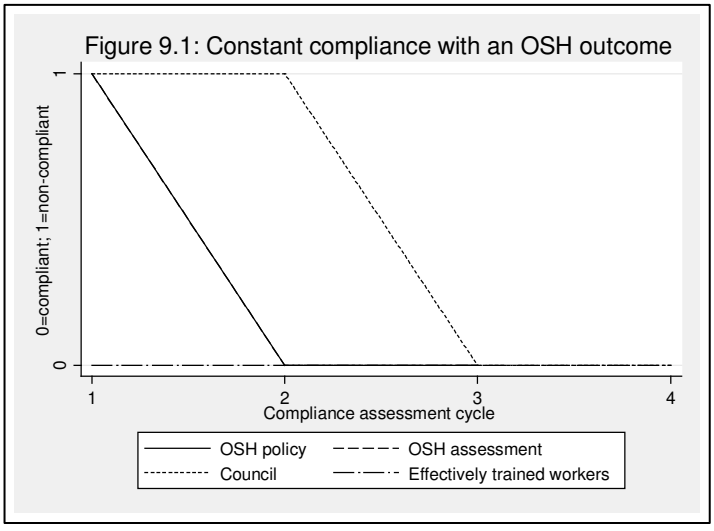
OSH Policy = Does the employer have written plans for OSH programs?

General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Council = Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?

Provide PPE = Does the employer provide workers with all necessary personal protective clothing and equipment?

A third category of factories consists of cases where the relationship between OSH management systems and OSH outcomes is ambiguous because there is no variation in the compliance findings for OSH outcomes (category 3). First, there are cases where a factory is found to be consistently compliant with an OSH outcome, such as effectively training workers who work with chemicals and hazardous substances (Figure 9.1), and later found to be in compliance with OSH management systems, at a subsequent assessment date. It is possible that an OSH outcome, such as consistently training workers, could eventually induce a factory to formalize OSH management systems; however, without any observed change over time for training workers, it is difficult to begin postulating whether this OSH outcome could have an effect on OSH systems.

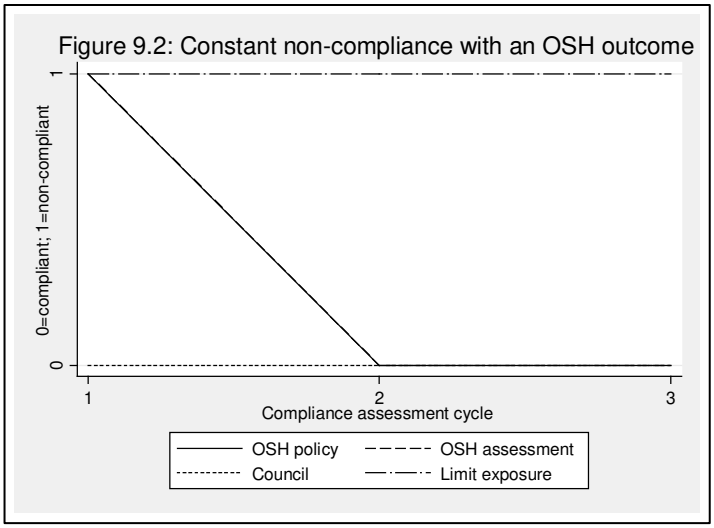


OSH Policy = Does the employer have written plans for OSH programs?

General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Council = Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?

Effectively trained workers = Has the employer effectively trained workers who work with chemicals and hazardous substances?



OSH Policy = Does the employer have written plans for OSH programs?

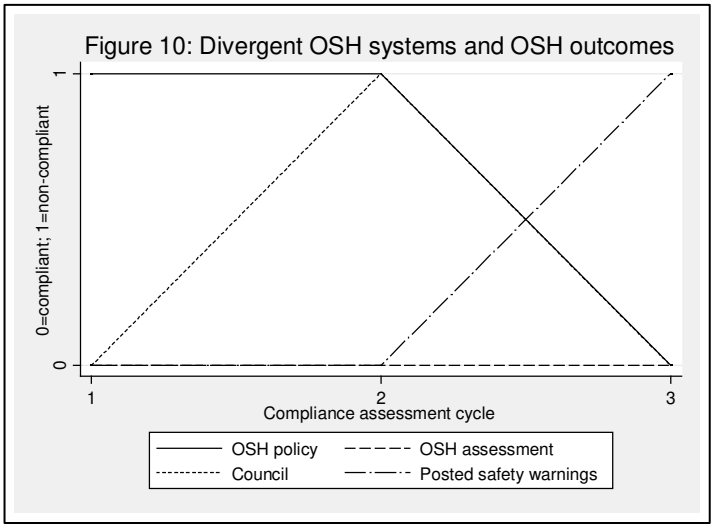
General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Council = Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?

Limit exposure = Has the employer taken action to assess, monitor, prevent and limit workers' exposure to chemicals and hazardous substances?

Figure 9.2 shows another factory without any variation in a particular OSH outcome – in this case in taking action to assess, monitor, prevent and limit worker exposure to hazardous substances – but this factory is consistently *non-compliant* with this question. Furthermore, this factory is initially out of compliance with two OSH management systems, which improve and are found compliant by the second and third assessment cycles. Regardless of this improvement, the exposure to chemicals and hazardous materials OSH compliance outcome remains unchanged.

A final pattern (Category 4) identified when examining OSH compliance over time in a single factory is that of a lack of a clear pattern in compliance trends. Figure 10 demonstrates these dynamics within one factory. The factory is found compliant with posted safety warnings (an OSH outcome) in the first two assessment cycles, while the management systems regarding written OSH plans is found non-compliant in the first two assessment cycles. By the time of the third assessment, the compliance finding for each of these two questions has reversed. Additionally, the two other OSH management systems are found to be in compliance in the third assessment cycle.



OSH Policy = Does the employer have written plans for OSH programs?

General assessment = Has the employer performed an assessment of general occupational safety and health issues in the factory?

Council = Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?

Posted safety warnings = Are appropriate safety warnings posted in the workplace?

While four categories of trends have been identified among factories with multiple compliance visits,

it is Categories 3 and 4 (no observed variation in the compliance status of OSH outcomes and no discernable pattern, respectively) that dominate the patterns observed in factories. For each factory, graphs were produced similar to the examples seen in Figures 7-10 for each of the 13 OSH outcomes along with the three OSH systems question. Each of the 39 relationships was assigned a category (1-4), which determine the overall classification for the factory. In factories where there was not a single dominant pattern and a second pattern constituted at least 15 percent of the OSH outcome-system relationships, a "secondary pattern" was identified. The breakdown of classification of factories is presented in Table 1. Classification of factories fitting category 3 are suppressed, as these represent cases where no movement – positive or negative – is observed in OSH outcomes. Excluding category 3 and restricting classification of factories only to those in instances where OSH outcomes vary, category 4 (no identifiable pattern) is the dominant category, observed in over 80 percent of the sample.

Table 1: Dominant compliance trends in factories in Vietnam and Jordan, excluding Category 3

	Primary pattern		Secondary pattern*	
	# of factories	%	# of factories	%
Category 1 – OSH systems leading OSH outcomes in compliance	7	7.9	20	52.6
Category 2 – OSH systems following OSH outcomes in compliance	7	7.9	8	21.1
Category 4 – No clear relationship	75	84.3	10	26.3
Total	89	100.1	38	100

*factories included if category pattern observed in at least 15% of 39 OSH outcome-systems questions relationships

The remaining proportion of factories are found to be nearly evenly split between the pattern of OSH systems leading OSH outcomes in compliance (Category 1), and OSH systems following OSH outcomes in compliance (Category 2). In factories where there appears to be a significant secondary classification, Category 1 is most common. These results demonstrate that cases exist in Better Work factories where compliance improvements in OSH outcomes occur after OSH management systems are instituted. However, the most frequently observed case involves no clear pattern of compliance improvement, limiting the interpretation of these results.

4.3 Worker reports on occupational safety and health

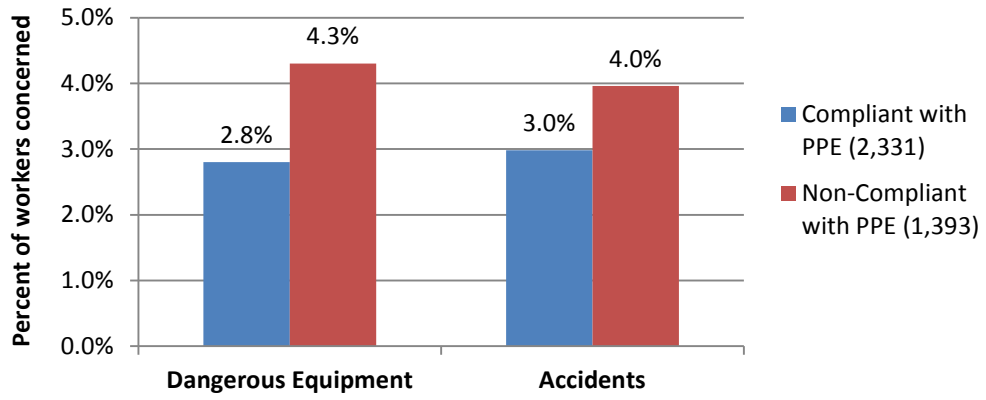
Presumably, workers benefit from improved factory compliance with labour standards and labour laws. In this section, results of Compliance Assessments carried out by Better Work Enterprise Advisors are compared with feedback elicited directly from workers regarding factory conditions. The results presented and described here suggest that assessing compliance and focusing on improvement in this area is directly

reflected in the perception workers have of conditions in the workplace. For each OSH compliance question, compliant and non-compliant factories are compared with regard to their workers' responses to Better Work Impact Evaluation survey measures of corresponding factory conditions. Survey participants are asked to rate the intensity of concern among workers in the factory concerning dangerous equipment, accidents and injuries, dusty or polluted air, chemical smells and extreme temperature. Responses range from "not a concern" to "caused a strike." The data presented here measure worker concern by grouping all affirmative responses and measuring the total percentage of workers who express any level of concern.

Vietnam

Compliance in areas of occupational safety and health in Vietnam is reflected in workers' own assessment of their working conditions. Workers in Vietnam are reluctant to express concern with dangerous equipment and accidents. As seen in Figure 11, fewer than 5% of workers across compliant and non-compliant factories are concerned with these conditions. Regardless of the relatively low levels of reported concern, factories compliant in training and encouraging PPE among workers have a lower rate of workers who cite dangerous equipment and accidents as concerns.

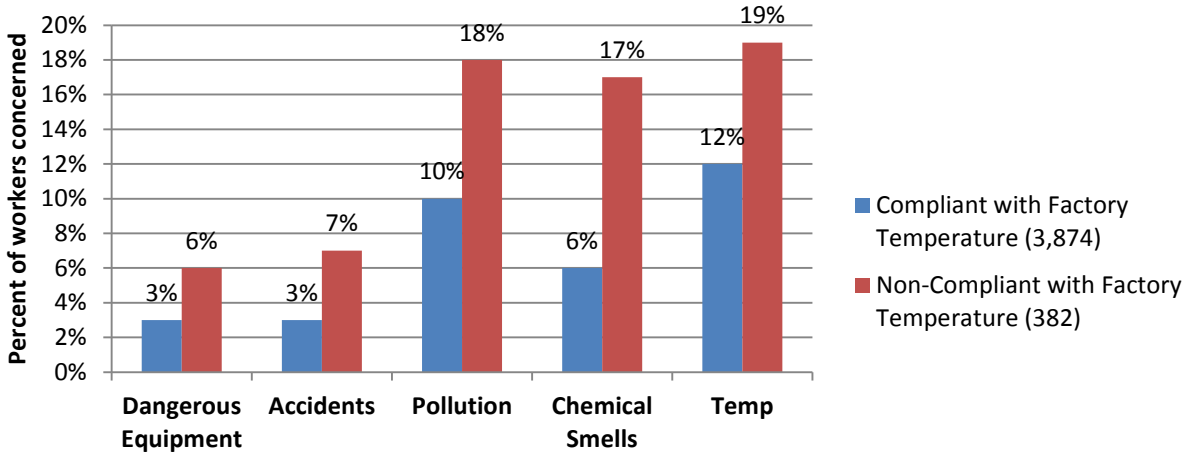
Figure 11. Worker Concern with Dangerous Equipment and Accidents Disaggregated by Compliance with PPE
Vietnam



Workers are asked about their concerns with each condition

Unsurprisingly, greater compliance with workplace temperature translates into less concern about extreme temperature among workers (from 19% concerned to 12%). Most assessments (over 90%) find that factories are compliant with workplace temperature. Yet differences emerge among the two groups of compliant and non-compliant factories. Furthermore, compliance with workplace temperature is also a good predictor of greater worker satisfaction on a range of occupational safety and health conditions, including dangerous equipment, accidents, pollution and chemical smells, as seen in Figure 12.

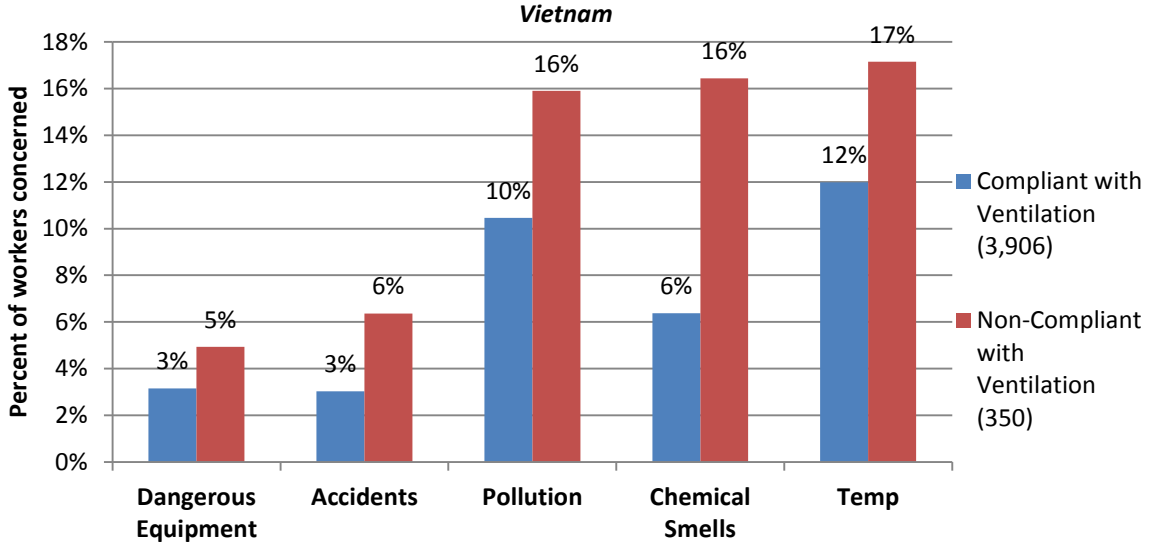
Figure 12. Worker Concern with OSH Conditions Disaggregated by Compliance with Factory Temperature
Vietnam



Workers are asked about their concerns with each condition

Figure 13 illustrates the finding that factories compliant with proper ventilation have workers who report significantly better working conditions. These workers report concern with dangerous equipment, accidents and injuries, polluted or dirty air, chemical smells and extreme temperature at lower levels than factories that are non-compliant with ventilation standards.

Figure 13. Worker Concern with OSH Conditions Disaggregated by Compliance with Adequate Ventilation
Vietnam



Workers are asked about their concerns with each condition

Among the other findings from comparing the compliance assessments of Better Work Vietnam Enterprise Advisors and responses elicited separately from workers include:

- Workers are less likely to be concerned with dangerous equipment if factories are in

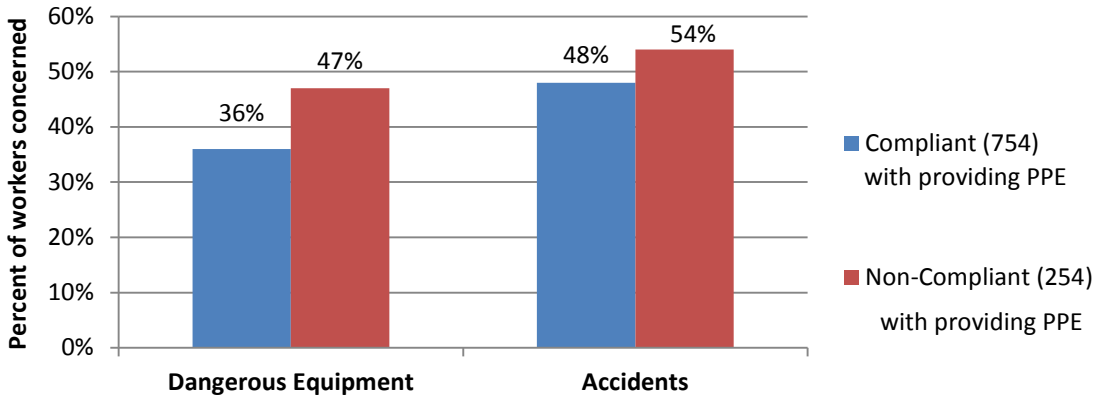
compliance with providing first aid training (from 4% to 3% concerned) and in ensuring that there are a sufficient number of readily accessible first aid boxes and supplies (from 5% to 3% concerned).

- Compliance on issues of hazardous chemicals management is associated with less concern among workers regarding bad chemicals smells in the factory. For example, if the factory has effectively trained workers who work with chemicals and hazardous substances, its workers are 4 percentage points less likely to be concerned with chemical smells. Similarly, compliance with maintaining a proper inventory of chemicals reduces concern with smells (from 8.0% to 6.7%), as does proper chemical storage (from 8.1% to 6.4%) and using chemical safety data sheets for the hazardous chemicals (from 8.3% to 6.2%).

Jordan

Similar to findings from Vietnam, Better Work factories in Jordan that provide workers with personal protective clothing and equipment (PPE) have lower rates of worker concern with dangerous equipment and accidents, as seen in Figure 14.

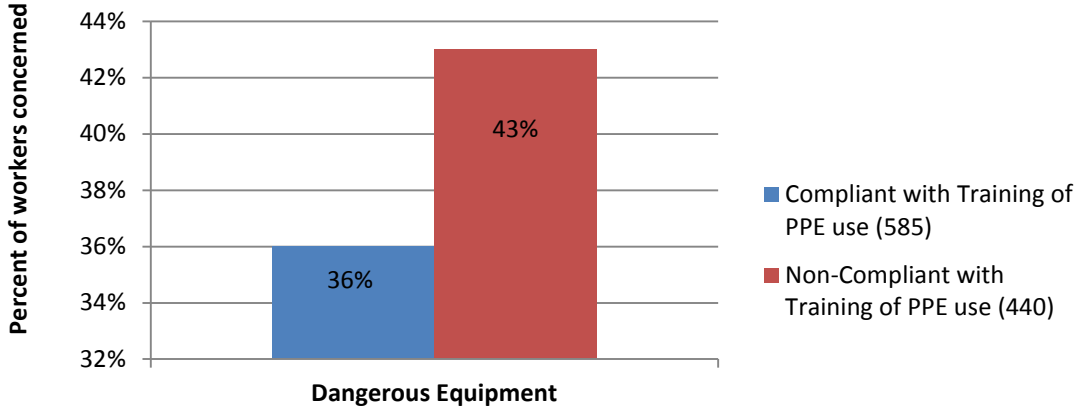
Figure 14. Worker Concern with OSH Conditions Disaggregated by Compliance with PPE
Jordan



Workers are asked about their concerns with each condition

A large portion of Compliance Assessment data points (440 of 1,025 or 43%) show non-compliance problems with training and encouraging the use of PPE (Figure 15). However, those factories which are compliant in encouraging and training workers to use personal protective equipment have a workforce that is on average 7 percentage points less likely to be concerned with dangerous equipment.

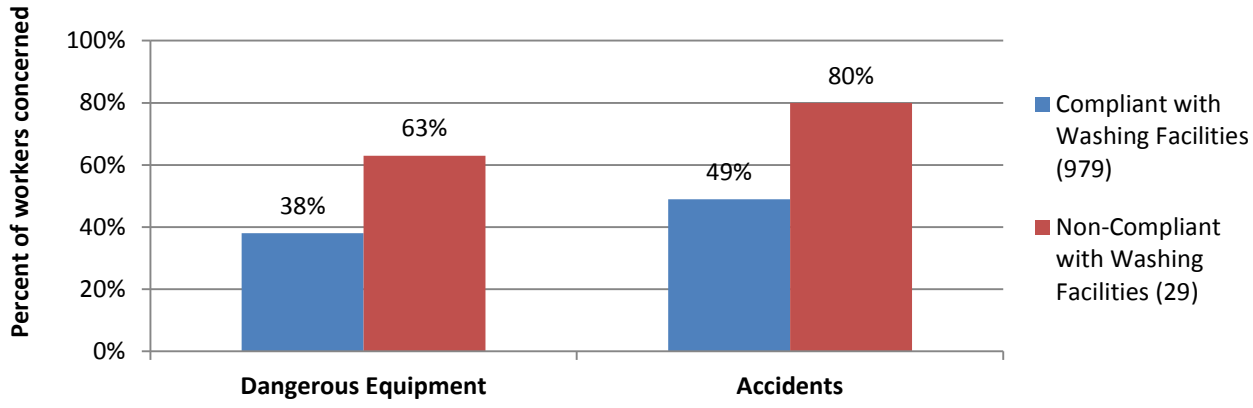
Figure 15. Worker Concern with OSH Conditions Disaggregated by Compliance with PPE Training
Jordan



Workers are asked about their concern with specific working conditions

If factories are in compliance with washing facilities, by providing adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals, workers are 25 percentage points less likely to be concerned with dangerous equipment and 31 percentage points less likely to be concerned with accidents, as seen in Figure 16.

Figure 16. Worker Concern with OSH Conditions Disaggregated by Compliance with Providing Adequate Washing Facilities
Jordan



Workers are asked about their concern with each condition

Finally, concerns with chemical smells among workers in Jordan is reduced by 2.5 percentage points when factories are compliant in training workers who work with chemicals, and concern is reduced by 7 percentage points when factories have safety data sheets for the hazardous chemicals used in the workplace.

V. CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The present analysis tracking trends in compliance with OSH management systems, OSH conditions outcomes and worker perceptions of OSH conditions in Better Work factories in Jordan and Vietnam provides useful information on the breakdown of compliance dynamics in factories. This analysis:

(1) Summarized evidence on the correlation between systems and outcomes questions in Vietnam. Future research could focus on identifying the causal relationship between the two.
(2) Summarized evidence on the correlation between systems and outcomes questions in Jordan, which produced some counterintuitive results.
(3) Summarized evidence that workers' feedback on OSH conditions is related to similar changes found in Better Work Compliance Assessments, suggesting that improved compliance improves working conditions.

Although correlations were found between OSH management systems and OSH outcomes, the direction of causality remains in question. From examining trends at the factory level, there is evidence that in some factories, instituting management systems precedes later improvements in OSH outcomes. In other cases, improvements in OSH conditions outcomes may result from Better Work interventions and serve as the basis to establish better management systems in factories. Ongoing research conducted as part of the Better Work Impact Evaluation can further examine the exact mechanisms that spur improvements in OSH conditions in apparel factories.

ANNEX

Table I.			
	Compliance Clusters from full Better Work Compliance Assessment Tool (CAT)		**Compliance Points**
Core Labour Standards	1	Child Labour	1. Child Labourers 2. Unconditional Worst Forms 3. Hazardous Work 4. Documentation and Protection of Young Workers
	2	Discrimination	5. Race and Origin 6. Religion and Political Opinion 7. Gender 8. Other Grounds
	3	Forced Labour	9. Coercion 10. Bonded Labour 11. Forced Labour and Overtime 12. Prison Labour
	4	Freedom of Association and Collective Bargaining	13. Union Operations 14. Freedom to Associate 15. Interference and Discrimination 16. Collective Bargaining 17. Strikes
Working Conditions	5	Compensation	18. Minimum wages 19. Overtime wages 20. Premium Pay 21. Method of Payment 22. Wage Information, Use and Deduction 23. Paid Leave 24. Social Security and Other Benefits
	6	Contracts and Human Resources	25. Employment Contracts 26. Contracting Procedures 27. Termination 28. Dialogue, Discipline and Disputes
	7	**Occupational Safety and Health**	**29. OSH Management Systems** **30. Chemicals and Hazardous Substances** **31. Worker Protection** **32. Working Environment** **33. Health Services and First Aid** 34. Welfare Facilities **35. Worker Accommodation** 36. Emergency Preparedness
	8	Working Time	37. Regular Hours 38. Overtime 39. Leave

Table II. CAT questions on OSH Management Systems	
Vietnam	Jordan
Does the factory have an OSH feasibility study?	Does the employer have written plans for OSH programs?
Has the employer performed an assessment of general occupational safety and health issues in the factory?	Has the employer performed an assessment of general occupational safety and health issues in the factory?
Has the employer set up a properly functioning unit in charge of OSH and/or labour protection council?	Has the employer formed a joint worker/management OSH committee?

Table III. CAT questions on OSH conditions outcomes	
Abbreviated label used in this paper	**Full compliance question**
Chemical inventory	Does the employer keep an inventory of chemicals and hazardous substances used in the workplace?
Chemical storage	Are chemicals and hazardous substances properly stored?
Chemical safety sheet	Does the employer have chemical safety data sheets for the hazardous chemicals used in the workplace?
Limit chemical exposure / Limit exposure	Has the employer taken action to assess, monitor, prevent, and limit workers' exposure to chemicals and hazardous substances?
Trained workers chemical	Has the employer effectively trained workers who work with chemicals and hazardous substances?
Washing facilities	Does the employer provide adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals?
Protective clothing / Provide PPE	Does the employer provide workers with all necessary personal protective clothing and equipment?
Protective equipment / Effectively trained	Are workers effectively trained and encouraged to use the personal protective equipment that is provided?
Machine guards	Are proper guards installed and maintained on all dangerous moving parts of machines and equipment?
Safety warnings	Are appropriate safety warnings posted in the workplace?
Temperature	Is the temperature in the workplace acceptable?
Ventilated	Is the workplace adequately ventilated?
First-aid training	Has the employer provided first aid training for workers?
First-aid accessibility	Has the employer ensured that there are a sufficient number of readily accessible first aid boxes/supplies in the workplace?

Table IV. OSH issues from worker survey used for Better Work Impact Evaluation	
	For each question, workers choose from the following responses: - No, not a concern - Yes, discussed with co-workers - Yes, discussed with supervisor or manager - Yes, discussed with the trade union representative - Yes, considered quitting - Yes, threatened a strike - Yes, caused a strike
Are workers in your factory concerned about dangerous equipment or machinery?	
Are workers concerned about accidents or injuries in your factory?	
Are workers concerned about dusty or polluted air in your factory?	
Are workers concerned about bad chemical smells in your factory?	
Are workers concerned that your factory is too hot or too cold?	

Table V. Correlation coefficients for OSH management systems non-compliance and OSH conditions outcomes non-compliance: Vietnam		
Does the factory have an approved OSH feasibility study?	Correlation coefficient	Standard Error
Does the employer keep an inventory of chemicals and hazardous substances used in the workplace?	**0.507**	0.021
Are chemicals and hazardous substances properly stored?	**0.47**	0.021
Does the employer have chemical safety data sheets for the hazardous chemicals used in the workplace?	**0.481**	0.021
Has the employer taken action to assess, monitor, prevent, and limit workers' exposure to chemicals and hazardous substances?	**0.617**	0.018
Has the employer effectively trained workers who work with chemicals and hazardous substances?	**0.49**	0.021
Does the employer provide adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals?	**0.297**	0.031
Does the employer provide workers with all necessary personal protective clothing and equipment?	**0.34**	0.026
Are workers effectively trained and encouraged to use the personal protective equipment that is provided?	**0.526**	0.021
Are proper guards installed and maintained on all dangerous moving parts of machines and equipment?	**0.237**	0.025
Are appropriate safety warnings posted in the workplace?	0.058	0.038
Is the temperature in the workplace acceptable?	**-0.108**	0.034
Is the workplace adequately ventilated?	**0.741**	0.034
Has the employer provided first aid training for workers?	**0.289**	0.025
Has the employer ensured that there are a sufficient number of readily accessible first aid boxes/supplies in the workplace?	**0.471**	0.027
Note: bolded = p ≤ 0.05		
Has the employer performed an assessment of general occupational safety and health issues in the factory?	Correlation coefficient	Standard Error
Does the employer keep an inventory of chemicals and hazardous substances used in the workplace?	**0.593**	0.02
Are chemicals and hazardous substances properly stored?	**0.489**	0.022
Does the employer have chemical safety data sheets for the hazardous chemicals used in the workplace?	**0.481**	0.022
Has the employer taken action to assess, monitor, prevent, and limit workers' exposure to chemicals and hazardous substances?	**0.672**	0.019
Has the employer effectively trained workers who work with chemicals and hazardous substances?	**0.526**	0.021
Does the employer provide adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals?	**0.359**	0.029
Does the employer provide workers with all necessary personal protective clothing and equipment?	**0.278**	0.027
Are workers effectively trained and encouraged to use the personal protective equipment that is provided?	**0.601**	0.02

Are proper guards installed and maintained on all dangerous moving parts of machines and equipment?	**0.414**	0.024
Are appropriate safety warnings posted in the workplace?	**-0.155**	0.041
Is the temperature in the workplace acceptable?	**0.106**	0.035
Is the workplace adequately ventilated?	**0.373**	0.033
Has the employer provided first aid training for workers?	-0.052	0.027
Has the employer ensured that there are a sufficient number of readily accessible first aid boxes/supplies in the workplace?	**0.221**	0.03
Note: bolded = p ≤ 0.05		
Has the employer set up a properly functioning unit in charge of OSH and/or Labour Protection Council and OSH Collaborators Network?	Correlation coefficient	Standard Error
Does the employer keep an inventory of chemicals and hazardous substances used in the workplace?	**0.18**	0.023
Are chemicals and hazardous substances properly stored?	**0.178**	0.023
Does the employer have chemical safety data sheets for the hazardous chemicals used in the workplace?	**0.106**	0.023
Has the employer taken action to assess, monitor, prevent, and limit workers' exposure to chemicals and hazardous substances?	**0.35**	0.021
Has the employer effectively trained workers who work with chemicals and hazardous substances?	**0.298**	0.022
Does the employer provide adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals?	**0.319**	0.026
Does the employer provide workers with all necessary personal protective clothing and equipment?	**0.489**	0.021
Are workers effectively trained and encouraged to use the personal protective equipment that is provided?	**0.266**	0.023
Are proper guards installed and maintained on all dangerous moving parts of machines and equipment?	**0.201**	0.023
Are appropriate safety warnings posted in the workplace?	**-0.239**	0.032
Is the temperature in the workplace acceptable?	**-0.162**	0.032
Is the workplace adequately ventilated?	**0.134**	0.034
Has the employer provided first aid training for workers?	**0.354**	0.022
Has the employer ensured that there are a sufficient number of readily accessible first aid boxes/supplies in the workplace?	**0.212**	0.027
Note: bolded = p ≤ 0.05		

Table VI. Correlation coefficients for OSH management systems non-compliance and OSH conditions outcomes non-compliance: Jordan		
Does the factory have a written OSH policy?	Correlation coefficient	Standard Error
Does the employer keep an inventory of chemicals and hazardous substances used in the workplace?	0.104	0.241
Are chemicals and hazardous substances properly stored?	0.002	0.063
Does the employer have chemical safety data sheets for the hazardous chemicals used in the workplace?	**0.19**	0.066
Has the employer taken action to assess, monitor, prevent, and limit workers' exposure to chemicals and hazardous substances?	0.089	0.066
Has the employer effectively trained workers who work with chemicals and hazardous substances?	**-0.409**	0.13
Does the employer provide adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals?	**-1**	
Does the employer provide workers with all necessary personal protective clothing and equipment?	**0.177**	0.05
Are workers effectively trained and encouraged to use the personal protective equipment that is provided?	**0.278**	0.046
Are proper guards installed and maintained on all dangerous moving parts of machines and equipment?	0.011	0.048
Are appropriate safety warnings posted in the workplace?	**0.556**	0.071
Is the temperature in the workplace acceptable?	**-0.171**	0.05
Is the workplace adequately ventilated?	**-0.389**	0.075
Has the employer provided first aid training for workers?	**0.474**	0.08
Has the employer ensured that there are a sufficient number of readily accessible first aid boxes/supplies in the workplace?	**0.499**	0.052
Note: bolded = p ≤ 0.05		
Has the employer performed an assessment of general occupational safety and health issues in the factory?	Correlation coefficient	Standard Error
Does the employer keep an inventory of chemicals and hazardous substances used in the workplace?	-1	
Are chemicals and hazardous substances properly stored?	**-0.43**	0.085
Does the employer have chemical safety data sheets for the hazardous chemicals used in the workplace?	**-0.332**	0.096
Has the employer taken action to assess, monitor, prevent, and limit workers' exposure to chemicals and hazardous substances?	**-0.508**	0.106
Has the employer effectively trained workers who work with chemicals and hazardous substances?	-0.267	0.15
Does the employer provide adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals?	**-1**	
Does the employer provide workers with all necessary personal protective clothing and equipment?	**0.243**	0.056
Are workers effectively trained and encouraged to use the personal protective equipment that is provided?	**0.306**	0.052

Are proper guards installed and maintained on all dangerous moving parts of machines and equipment?	**0.199**	0.054
Are appropriate safety warnings posted in the workplace?	**0.689**	0.06
Is the temperature in the workplace acceptable?	**0.346**	0.052
Is the workplace adequately ventilated?	**-0.205**	0.089
Has the employer provided first aid training for workers?	**0.688**	0.063
Has the employer ensured that there are a sufficient number of readily accessible first aid boxes/supplies in the workplace?	**0.622**	0.05
Note: bolded = p ≤ 0.05		
Has the employer developed mechanisms to ensure cooperation between workers and management on OSH matters?	Correlation coefficient	Standard Error
Does the employer keep an inventory of chemicals and hazardous substances used in the workplace?	0.392	0.211
Are chemicals and hazardous substances properly stored?	0.033	0.063
Does the employer have chemical safety data sheets for the hazardous chemicals used in the workplace?	**0.589**	0.049
Has the employer taken action to assess, monitor, prevent, and limit workers' exposure to chemicals and hazardous substances?	**0.131**	0.067
Has the employer effectively trained workers who work with chemicals and hazardous substances?	**-1**	
Does the employer provide adequate washing facilities and cleansing materials in the event of exposure to hazardous chemicals?	**-1**	
Does the employer provide workers with all necessary personal protective clothing and equipment?	**0.145**	0.051
Are workers effectively trained and encouraged to use the personal protective equipment that is provided?	**-0.105**	0.05
Are proper guards installed and maintained on all dangerous moving parts of machines and equipment?	**-0.265**	0.47
Are appropriate safety warnings posted in the workplace?	**0.584**	0.069
Is the temperature in the workplace acceptable?	-0.063	0.051
Is the workplace adequately ventilated?	**0.171**	0.067
Has the employer provided first aid training for workers?	**0.474**	0.08
Has the employer ensured that there are a sufficient number of readily accessible first aid boxes/supplies in the workplace?	**0.264**	0.062
Note: bolded = p ≤ 0.05		

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