Developing Performance Indicators for Alberta's Internal Responsibility System

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Final Report

Dr. Bob Barnetson, Dr. Jason Foster, and Jared Matsunaga-Turnbull

barnetso@athabascau.ca (780) 454-9881

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SUMMARY FOR GENERAL PUBLIC AUDIENCE

This report summarizes the results of a 2017 study of the occupational health and safety (OHS) experiences of 2000 Alberta workers. This study sought to pilot and benchmark potential performance measures for the internal responsibility system (IRS), identifying which are associated with reductions in injury rates. The study also sought to determine the degree to which workers are able to exercise their safety rights under the IRS. The study was unable to identify any appropriate measures of the IRS. The key problem is that none of the facets of the IRS that the study measured appear meaningfully related to the rate of injury. That said, this study does generate a number of important conclusions.

Of particular concern is that the true level of injury in Alberta is much higher than that captured in workers' compensation claim statistics. This study suggests over 400,000 Albertans were injured in the previous 12 months, including approximately 170,000 who suffered a disabling injury. Approximately 69% of these disabling injuries went unreported to the WCB. This level of injury puts into question the effectiveness of Alberta's injury-prevention system.

Although it was beyond the scope of this study to explain these incidental findings, the data collected does provide some potential explanations. Employers are frequently non-compliant with basic health and safety rules and Alberta has historically conducted only limited OHS enforcement. This means it falls to workers to trigger hazard abatement, something they may be unwilling to do because of fear of retaliation (particularly in high-hazard workplaces). This has different implications for different audiences:

- Decision makers: Alberta's injury-prevention system requires additional non-legislative change in order to operationalize Bill 30.
- Workers: Alberta workplaces remain profoundly unsafe and government injury-prevention requires improvement.
- Practitioners: Alberta's IRS system is not operating effectively with fear of retaliation, limited employer compliance, and limited enforcement being key issues.
- Academics: This study supports prior research on injury under-reporting, worker fear of retaliation, and the inadequacy of complaint-driven enforcement.

In December of 2017, the Legislature passed Bill 30. This Act made significant legislative improvements to *Alberta Occupational Health and Safety Act*. The following recommended changes to policy, practice, and funding will help operationalize the intent of Bill 30 and address persistent non-legislative shortcomings in the current OHS system:

1. **Increase the Number of Government Inspectors**: Quadrupling the inspectorate (~500 OHS inspectors) would significantly increase the potential for employers being caught violating health and safety rules at a cost of about $75 million per year.
2. **Inspections Should be Targeted and Proactive**: Additional inspectors should focus on employers (1) in high-injury industries, (2) that have a record of occupational injuries as well as (3) industries known to employ vulnerable workers (e.g., migrant workers, youth).
3. **Allow Inspections by Civil Society Groups**: Empowering and funding civil society groups to perform workplace inspections would increase the frequency of OHS investigations in traditionally under-regulated areas of the labour market and among vulnerable workers.

4. **Orders Must be Public, Tracked, and Enforced**: Orders must contain deadlines for compliance, be posted in the workplace, and publicly reported (at least in aggregate). Officers should be encouraged to write orders in order to create more nuanced data to drive targeted enforcement.
5. **Penalties Should be Mandatory and Escalating**: Non-compliance with orders, repeated non-compliance with OHS rules, or non-compliance causing significant risk of injury should trigger mandatory and escalating monetary penalties, in addition to the employer being ordered to remedy the infraction(s).
6. **Violators Should be Publicly Shamed**: Alberta should establish a monthly "sunshine list" that publicly reports which employers were found to have significantly violated OHS rules, especially if these violations have led to injuries or fatalities.
7. **Additional Prosecutions Should Take Place**: Alberta should once again hire dedicated OHS prosecutors to increase its capacity to sanction serious employer non-compliance.
8. **Inspectors Should Stop Ticketing Workers**: Eliminating worker ticketing would prevent the creation of an adversarial relationship between workers and the OHS inspectors they rely upon to enforce their safety rights.
9. **Retaliation Should be Prosecuted**: Informing workers and employers that retaliation is illegal alongside aggressively prosecuting instances of retaliation will alter employer behaviour and, in turn, increase workers' willingness to exercise their safety rights.
10. **OHS Issues Should be Better Integrated into the K-12 Curriculum**: Workplace rights education should be expended beyond the Career and Life Management (CALM) course an integrated in the social studies and science curriculums via OHS-focused examples, problems, and concepts into existing lessons and evaluation materials.
11. **Government Should Develop Worker-Focused OHS Education**: Government-delivered OHS information and training should focus on worker OHS rights. This will heighten employer awareness of workers' rights and their obligations to comply with them. Developing such materials would require the government to consult with workers (and specifically vulnerable workers) in order to build its capacity to discuss worker issues.
12. **Government Should Support Independent OHS Education**: The government should fund worker-focused OHS training for populations in particular need of it (e.g., new Canadians, young workers, worker in specific industries). This training should be delivered through groups that the targeted workers already have trusting relationships with, such as community agencies.
13. **Independent Training Should be Provided to Worker JHSC Representatives**: The government should fund the provision of training for joint health and safety committee members by worker-operated agencies. In addition to orientation training, these agencies should also be funded to provide ongoing advice and access to resources (such as research expertise).

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LIST OF ACRONYMS

IRS: Internal Responsibility System

OHS: Occupational Health and Safety

WCB: Workers' Compensation Board

INTRODUCTION

This report summarizes the results of a 2017 study of the occupational health and safety (OHS) experiences of 2000 Alberta workers. This study sought to pilot and benchmark potential performance measures for the internal responsibility system (IRS), identifying which are associated with reductions in injury rates. The study also sought to determine the degree to which workers were willing and able to exercise their safety rights under the IRS. The study was unable to identify any appropriate measures of the IRS. The key problem is that none of the facets of the IRS that the study measured appear meaningfully related to the rate of injury.

One incidental finding of this study was there were approximately 408,500 workplace injuries in Alberta in 2016, of which 170,700 were disabling injuries. Most of these injuries went unreported. This level of injury suggests that the OHS system is not achieving its goal of making Alberta workplaces safe and healthy. It is difficult to say conclusively why Alberta's OHS system is not functioning effectively but we propose the following explanation:

1. **Employers are not remediating hazards**: The high number of injuries demonstrates the existence of a vast number of un-controlled hazards in Alberta workplaces. This matters because workers in high-hazard workplaces are more likely to report injuries (i.e., hazards exposure is related to injury). Lack of hazard remediation is also consistent with the evidence (and may flow from the fact) that many employers are not complying with basic OHS requirements.
2. **Non-compliance is in employers' economic interests**: The IRS assumes employers and workers share an interest in preventing injury. Research suggests this assumption is, at least sometimes, untrue. Where operating safely entails higher operational costs, employers are likely to apply a cost-benefit analysis when selecting which hazards to control and how to do so.
3. **Non-reporting changes the economic calculus**: The high-levels of injury non-reporting means injury-related costs can often be externalized onto workers, their families, and the health-care system. This reduces the cost of injuries to employers and, therefore, makes the benefits of hazard control lower (relative to the costs of injury) than would be the case if employers bore the full cost of injuries.
4. **Weak enforcement regime contributes to non-compliance**. Historically OHS enforcement in Alberta has been limited. Employers have faced little risk of being caught violating the rules and even less risk of being punished for doing so. Weak enforcement further reduces the cost of hazardous workplaces (and the injuries that result from them) to employers. This, in turn, makes non-compliance and injuries more likely.
5. **Complaint-based enforcement is ineffective**: Alberta relies upon worker complaints to trigger enforcement activity. The high levels of worker fear of exercising their rights in high-hazard workplaces coupled with workers' low expectation that exercising their rights will improve their situation undermines workers' willingness to trigger enforcement. This, in turn, directs enforcement away from the workplaces that most need it.
6. **Fear impedes worker participation in the IRS**: Workers fear retaliation for exercising safety rights in the workplace. This fear is particularly pronounced in high-hazard workplaces. Fear likely compounds the effect of employers ignoring their obligations to

inform workers of hazards and controls, involve them in hazard identification and control, and address unsafe work. The result of worker fear is a less effective IRS. This is particularly concerning because limited government enforcement means the IRS is often the only protection employees have against injury.

The upshot of this analysis is that Alberta's OHS system exhibits multiple points of failure. And these failures create a vicious circle, wherein the effects of one failure intensify the effects of other failures. The result is a high level of workplace injury. In late 2017, Alberta took significant steps to improve it OHS legislation by passing Bill 30. Additional non-legislative steps are necessary to operationalize the intent of Bill 30.

METHODOLOGY

This report is based upon an online poll conducted between March 24 and April 5, 2017 on behalf of the researchers by a commercial polling company. The respondents comprised 2000 Albertans engaged in paid employment in the previous 12 months. The key objectives of this study were to:

1. Provide Alberta Labour with insight into the degree to which workers are able to and do exercise their safety rights under the IRS in specific industries.
2. Provide an initial exploration of the any instances where workers report they cannot and/or do not exercise their rights.
3. Design and benchmark metrics assessing workers' experiences with the operation of the IRS, identifying those that may be suitable for ongoing use by Alberta Labour.
4. Identify which aspects of the IRS appear to be associated with reductions in injury rates, an undertaking that required assessing the true rate of injury in Alberta.

The subsections that follow provide an overview of instrument development, a discussion of the difficulties associated with operationalizing workplace injuries, participant recruitment (and its impact on generalizability), and data analysis.

Instrument Development

Instrument design followed a fairly conventional process. The researchers developed an initial list of demographic information required to (1) screen out potential respondents not within the scope of the study (e.g., non-residents, long-term unemployed, employers, independent contractors), (2) confirm that the respondents matched the population, and (3) addressed workers' characteristics that the literature suggested were analytically important. This list was then refined in an iterative manner through consultation with the polling company as well as other researchers and health-and-safety professionals in our network.

We also developed a list of potential measures that assessed workers' experiences with the IRS system as well as questions probing key instances where workers reported difficulty exercising their rights. This development process included consulting the OHS and workplace-injury literature, staff at Alberta Labour, and a 2013 study commissioned by the AWHC. These measures were then tested against the seven criteria recommended by the USAID (1996) for developing performance indicators:

1. Valid: Indicators should measure the result it is intended to measure. Where a proxy measure is required, the assumption(s) linking the proxy measure to the result should be explicit.

2. Objectives: Indicator be uni-dimensional and precise with no ambiguity about what is being measured.
3. Adequate: Indicators (or groups of indicators) should adequately measure the performance under scrutiny. Complex performances (such as worker experiences exercising their safety rights) may require multiple indicators.
4. Quantitative: Numerical indicators are desirable to allow comparisons over time and between jurisdictions or population subsets.
5. Disaggregated: The data underlying performance indicators should allow for analysis of population subsets in order to reveal the different experiences of specific types of workers.
6. Practical: Data should be cost-effective and collected in a timely manner such that the indicators can inform future decisions.
7. Reliable: The data should be reliable enough to base decisions upon, although this standard might be lower than that typical of academic research.

These criteria broadly accord with the SMART (specific, measurable, accountable, reasonable, timely) principles advocated by WorkSafe Alberta (2015). They are also broadly similar to the criteria adopted by Alberta (understandability, relevance, reliability, comparability) during an assessment of public performance reports (CCAF, 2008).

Once a firm list of measures was established, we consulted with the polling firm to refine the question wording, focusing on ensuring respondents would be able to understand and answer the questions we were asking. The instrument and research process was then subjected to review by the Athabasca University Research Ethics Board and, after minor revisions, ethics clearance was granted. An initial piloting confirmed that respondents appeared able to answer the online questionnaire without difficulty.

Operationalizing Workplace Injuries

An important challenge during instrument design was operationalizing the concept of workplace injury in a way that respondents could understand and that yielded analytically useful data. Workplace-injury data was necessary to ascertain whether certain behaviours associated with each safety right were associated with different injury outcomes. Most government injury statistics are based on workers' compensation claims data. This data divides injuries into categories such as lost-time, modified-work, disabling-injury, and medical-aid claims. We were specifically interested in the overall number of workers who sustained an injury each year, and the number of workers sustaining a disabling injury.

Our experience with workers (and specifically injured workers) suggested that respondents would likely struggle to locate their injury experiences using the terminology and typology of injuries used by the WCB and Alberta Labour. Workers don't use this language, their injuries can fall into more than one category (e.g., a time-loss injury can shift into a modified work-injury), and these categories can overlap (e.g., time-loss and modified-work injuries are both disabling injuries). The expected difficulty with this terminology for respondents posed potentially significant threats to the validity and reliability of the data.

We felt confident that respondents could identify and relate the number of workplace injuries and illnesses (both major and minor) that they had experienced in the past 12 months, although we recognized that memory decay might result in some degree of mis-reporting. We also felt

confident that injured respondents could accurately relate whether or not they had filed a workers' compensation claim for an injury. Claim-filing behaviour was important to validate the study's disabling-injury count against WCB disabling injury numbers. Based on our belief about respondents' ability to reliably and accurately answer these questions, we straight-forwardly asked about overall injury numbers and workers' compensation claim filing.

The literature clearly supports the proposition that injuries for which claims were filed represent a minority of all compensable workplace injuries. In order to get at the true level of disabling injury, we had to identify injuries that respondents should have reported to the WCB. Such injuries would include those where there was time lost from work (beyond the date of injury) and where modified work was required.

We began by asking respondents to identify whether they had experienced an injury that meant they could not do their full range of duties the next day. In theory, WCB policy requires injuries requiring all instances of modified work to be reported to the WCB. Many practitioners assert, however, that a large number of modified-work arrangements resulting from injury are not reported to the WCB. Instead, employers simply informally shift and/or delay a worker's responsibilities to accommodate the injury. In this view, WCB reports of modified work most commonly reflect instances when (1) the accommodation is significant and/or of long duration (and possibly formalized), or (2) a worker undertakes modified work as part of a return-to-work program following a time-loss injury. The survey results support the assertion that only a portion of all modified-work injuries is reported to the WCB.

Reflecting that there is a systematic difference between the WCB's policy on reporting (i.e., all modified-work injuries must be reported) and the practice (i.e., only significant modified work is reported), we then sought to develop a measure that encompassed significant modified-work claims plus lost-time claims. This measure was intended to measure disabling injuries as operationalized by workers, employers, and the WCB. Consequently, the study asked respondents about the number of injuries and illnesses they had sustained where they could not work at all the next day. To researchers and policy makers, this "could not work at all" formulation seems to include only time-loss claims. Discussions with injured workers suggested, however, that they understood this phrasing to include both time-loss injuries as well as instances of significant modified work (the kind which is normally reported to the WCB). In their view, modified work meant they could not work.

To empirically test whether this understanding of the question held true during the poll, we extrapolated from the poll to determine the number of workers in the population who reported being unable to work. We then multiplied that number by the percentage of respondents who reported filing claims with the WCB and accounted for a typical rejection rate. If the assumption about the question held true, we would expect the resulting number of reported disabling injuries to broadly match the actual number of disabling injuries reported in Alberta in 2016. As set out below, this test was satisfied and we are confident the assumption about the meaning of "could not work at all" encompasses respondents experiencing disabling injuries as normally reported in Alberta.

Participant Recruitment and Generalizability

Respondents were selected from a list of over 1 million Canadian adults (18+) who had volunteered to participate in online polls. This pool of potential respondents broadly matched the overall composition of the Canadian population. From this pool of potential respondents,

the polling firm randomly drew a poll of Alberta residents who received an invitation to respond to the survey.

Consistent with the principles of non-probability sampling (Vehovar et al., 2016), the demographic characteristics (e.g., age, gender, industry) of the respondents completing the poll were screened in order to generate a final group of respondents that broadly matched the known demographic characteristics of Alberta's labour force. This recruitment process was selected in order to maximize the number of respondents that could be recruited within the project budget.

There are a number of sources of error that can skew the results of a survey, such as question design. The easiest (and thus most common) source of error that researchers quantify in a survey using probability sampling is sampling error (i.e., error introduced by talking to a non-representative subset of the population). Surveys traditionally report the margins of sampling error in their results. Margins of sampling error are normally expressed a range of numbers that the answer likely falls between (e.g., the results are accurate +/-3 percentage points 19 times out of 20). The margin of sampling error declines (albeit in a nonlinear manner) as the sample size increases. If the respondents in this poll had been randomly selected, the margin of error would have been +/- 2.2% 19 times out of 20.

When a survey (like this one) uses non-probability based sampling (e.g., the use of a pre-established panel), it is inappropriate to calculate a margin of sampling error. Instead, polling firms are increasingly replacing traditional margins of error with Bayesian Credibility Intervals to reflect that polls can systematically exclude certain groups of respondents. Bayesian models allow researchers to generalize from a sample to a population by correcting for unbalanced samples. That said, credibility intervals tend to be sensitive to assumptions that can be difficult to validate and thus should be used with caution. The credibility interval for a poll of 2000 people is +/-2.5% (IpsosPA, 2012; AAPOR, 2012).

There is significant (although now dated) academic criticism of the accuracy and consistency of online, non-probability polls (e.g., Yeager et al., 2011). A recent comparison of nine online polls found polls with more elaborate sampling and weighting schemes yielding more accurate results (Kennedy et al., 2016). Other studies note that the response patterns and relationships among variables generated by online panels broadly mirror those found in conventional probability samples (Walter et al., 2016; Martinsson et al., 2013). Criticism of error rates in non-probability samples often ignore the question of whether slightly lower margins of error found in probability sampling warrant the significant (e.g., 10x) additional cost of probability sampling given how end users will use the data (Goel et al., 2015).

Past comparisons by the polling firm of simultaneously conducted online polls and random telephone surveys found few differences in results. The results of this poll are also comparable with those of a similar, 2013 poll that the polling firm conducted for the Alberta Workers' Health Centre. Based upon the efforts made by the polling company to match the demographic characteristics of the Alberta workforce and our own analysis of the results, we are proceeding based upon the assumption that the dataset can be generalized to the Alberta workforce.

Data Analysis

A variety of basic statistical techniques were employed to analyze the survey results. A full set of cross-tabulation tables, provided by the polling company, provided a baseline of statistically significant variations of means between variables (e.g., age, gender). Further analysis was performed by the researchers to evaluate potential measures of IRS effectiveness. In some

places below, percentages reported total greater than 100%. This reflects the effects of either (1) rounding or (2) workers being able to select more than one response.

In the survey, respondents were asked to indicate the number of minor or serious work-related injuries or illnesses they experienced in the past 12 months. The answers ranged from zero to 100. For purposes of the statistical analysis below, the authors translated the raw responses into a binary variable indicating whether the respondent reported an injury or not (injury=1; no injury=0). This was done for two reasons. First, it reduces concerns related to unreliable reporting due to memory decay and question misinterpretation. A respondent is more likely to remember that they were injured than the accurate number of injuries they experienced. Second, the binary variable reflects the logic of incident prevention; the goal is to prevent injury in workplaces. Comparative testing showed similar results for both forms of variable.

Respondents were also asked to identify which hazards they were exposed to at work and how frequently (a five point scale ranging from all the time to never) from a list of 15 common occupational hazards. Binary variables were created for each hazard, with respondents reporting "all of the time" and "most of the time" classified as being exposed to the hazard. From the binary variables a scale of hazard exposure was created with a range of 0 to 15.

Other variables were also transformed into binary form for the purposes of statistical analysis. When prompted with a range from "always" to "never", answers of the two highest options ("always" and "most of the time") were categorized as the item being present and the remaining options ("some of the time", "rarely" and "never") as it being absent. For questions that provided yes/no/unsure options, unsure was folded into the no category. The decision to include unsure with no was based on the logic that when a worker is uncertain they possess or have exercised a right (e.g., has participated in a hazard assessment) there is reason to believe aspects of the IRS are not working as intended and that a worker is likely to not utilize these rights. Testing found this inclusion did not affect whether relationships were found or statistically significant.

The variables were tested via an independent samples T-test or bivariate correlation test, as appropriate. Logistic regression was performed on variables found to be significant to check for mediation and to more accurately assess the strength of the association. Due to the large size of the sample (2000) and, therefore, its large statistical power, small associations between variables can be statistically significant. Caution is advised in interpreting results of such a large sample.

RIGHT-TO-KNOW MEASURES

A total of four measures related to the right to know were developed and piloted. The measured assessed (1) the presence of a hazard assessment, (2) access to health-and-safety documents, (3) the rate of new worker orientation, and (4) rate at which employers provided specific information about hazards and controls.

Not surprisingly the four measures are highly correlated to one another (see Table 1), suggesting that, if workers have access to one form of information, they are more likely to have access to others. Nevertheless, the measures' relationships to injury are, overall, weak. Two measures – hazard assessment and new worker orientation – show no correlation to injury rates. The remaining measures display a weak correlation to lower incidence of injury that may in large part be due to the size of the dataset (it is easier to find positive correlations in larger samples).

Presence of a Hazard Assessment

Section 7 of the *Occupational Health and Safety Code* requires employers to develop written hazard assessments. Employers identifying hazards and determining how to control them is necessary for workers to exercise their right to know. To determine the rate at which employers have completed hazard assessments, respondents were asked:

> *A hazard assessment is a written list of dangerous conditions in the workplace and how they should be managed or controlled. Again thinking of the job we have been discussing, is there a written hazard assessment for this workplace? (Yes/No/Not sure)*

The result was:

- Yes: 50%
- No: 23%
- Unsure: 27%

Approximately one quarter of employers appear non-compliant with this requirement. The large number of unsure answers is difficult to interpret. It could be that there is a hazard assessment present in the workplace but these respondents are not aware of it. It could also mean that there is no hazard assessment. On a practical level, a worker who is unsure of the existence of a hazard assessment is highly unlikely to take advantage of the information to be found within it, rendering the assessment ineffective for the purposes of exercising their safety rights.

The large number of unsure answers is not something that can be remediated through amending the question and negatively affects the utility of this measure. The measure is not associated with the occurrence of injuries (i.e., the presence or absence of a hazard assessment has no statistically significant relationship with respondents' propensity to report an injury).

The awareness of hazard assessments is not uniform across all respondents. Not surprisingly respondents reporting exposure to a greater number of potential hazards are more likely to report that a hazard assessment is available. Men, full-time workers, and union members are more likely to report a hazard assessment. Conversely, respondents with small employers are more likely to answer that there is no hazard assessment.

Some industries are also more likely to have hazard assessments. Specifically, industries that have higher reported injury rates and where respondents report being exposed to more hazards are more likely to have hazard assessments. That industries with higher hazard exposure turn to hazard assessments is consistent with expectations, but that the increased use of hazard assessments is not associated with lower injury rates runs counter to the intent of the hazard-assessment process.

While this measure addresses a core right-to-know legislative requirement, it has two limitations. First, the high level of unsure answers raises questions about the data validity (auditing employers would be a better way to assess compliance). Second, there is an absence of a statistical relationship between the presence of a hazard assessment and respondents reporting injury. These results suggest this measure is not a suitable way to assess the IRS system's performance. It is unknown if data based on an employer audit would demonstrate a relationship to injury rates.

Access to Health-and-Safety Documents

Section 8(2) of the Code requires employers to inform affected workers of identified hazards and the methods used to control such hazards. Written documents are a common (and

sometimes required) way to provide this information. To determine the frequency with which employers provided workers with access to health-and-safety documents, respondents were asked:

> *Whenever I need them, I have access to health and safety documents such as accident forms and reports, safety data sheets on hazardous materials, safety policies or emergency plans.*

The result was:

- Always: 54%
- Most of the time: 19%
- Some of the time: 10%
- Rarely: 7%
- Never: 10%

Of note in the results is that slightly more than a quarter of respondents report limited access to important safety documents. Further, young respondents (18-24 years) were more likely to report limited access (33%), while older respondents (55+) are more likely to report always accessing documents (62%). There are no significant differences based upon sex or other respondent characteristics.

With respect to industry, we find similar patterns as for hazard assessments. Respondents in construction and forestry, oil and gas, utilities and transportation, government and public administration, health care, and manufacturing industries are more likely to report access to documents, while respondents in finance and business services, tourism and food, retail, education, and communications, culture and recreation industries are more likely to report limited access.

This measure touches a core right-to-know requirement (i.e., the provision of hazard-related information). Access to documents is weakly associated with a decrease in the occurrence of injury (i.e., greater access is associated with lower injury reports). That said, the correlation is modest and regression testing finds access to documents explains less than 1% of the variation in injury occurrence. This suggests that this measure is not a suitable way to assess the IRS system's performance.

New Worker Orientation

Section 8(2) of the Code requires employers to inform affected workers of identified hazards and the methods used to control such hazards. One common way to provide this information to new workers (who are particularly vulnerable to injury) is through formal or informal health-and-safety orientation or training. To determine the frequency with which employers provided new workers information about hazards and controls, respondents were asked:

> *New workers receive a health and safety orientation or training.*

The result was:

- Always: 50%
- Most of the time: 16%
- Some of the time: 11%
- Rarely: 9%
- Never: 13%

Overall, 66% of respondents reported new workers receiving a health-and-safety orientation on a consistent basis. The level of agreement among respondents with two or fewer years of job tenure was slightly lower (61%), perhaps suggesting that longer-tenure was slightly lower have less accurate perceptions.

These findings are higher than those found in prior Ontario research (Ipsos Reed, 2003; Vector Research, 2002) and significantly higher than the 1-in-5 findings in Smith's and Mustard's (2007) study. It is not possible to definitively explain this difference, but potential explanations include jurisdictional and data differences as well as the passage of time (these other studies are now significantly dated).

There are few significant differences between was slightly lower, although men are slightly more likely to report training takes place (71%) and women slightly more likely to report limited training (38%). We again find the same pattern among industries, with the same six industries report more consistent training and the same five industries reporting more limited training.

While this measure touches a core right-to-know requirement (i.e., the provision of hazard-related information), it is not associated with the occurrence of injuries. This suggests that this measure is not a suitable way to assess the IRS system's performance.

Employer Provides Specific Information About Hazards and Controls

Section 8(2) of the Code requires employers to inform workers of the presence of hazards in the workplace and control strategies for those hazards. There is no prescribed form for this information. To determine the frequency with which employers complied with this requirement, respondents were asked:

> *A supervisor or the employer gives me specific information about workplace hazards I am exposed to and how to control them.*

The result was:

- Always: 39%
- Most of the time: 20%
- Some of the time: 13%
- Rarely: 12%
- Never: 17%

The finding that 42% of employers routinely fail to provide respondents with hazard-control information is concerning. Women were more likely to report not receiving information about hazards (46%), while men were more likely to report the opposite (62% receiving information). Full-time respondents were more likely than part-time respondents to report receiving information (60% to 54%). No other differences were significant. Among industries, the same pattern emerges as with other measures for the right to know.

This measure addresses a core right-to-know requirement (identifying and controlling hazards). It has a weak association with reduced injury reporting (i.e., greater provision is correlated with fewer injuries). However, the correlation is modest and regression testing finds that it explains less than 1% of the variation in injury. This suggests that this measure is not a suitable way to assess the IRS system's performance.

Conclusion

The study results suggest that measures probing workers' use of the right to know were likely not robust enough to be useful in assessing the effectiveness of the IRS. The primary shortcoming is that accessing training and information is insufficiently linked to reduced injury. That said, together these measures raise some concerning questions about Alberta employers' OHS practices. That only 50% of respondents could confirm the presence of a hazard assessment is troubling. Also concerning is the finding that only 59% of respondents reporting that their employer regularly provides them with specific information about hazards and controls and only 61% of new respondents report routine safety orientations for new workers.

RIGHT-TO-PARTICIPATE MEASURES

A total of five measures related to the right to participate were tested. The measures assessed were (1) participation in hazard assessment process, (2) input into control strategies, (3) involvement in creating health-and-safety policy, (4) presence of health-and-safety committee in the workplace, and (5) frequency of health-and-safety meetings.

The five measures are highly correlated to one another (see Table 2) suggesting they form a coherent cluster regarding participation. Four of the five measures have no statistically significant association with injury rates. One measure, participation in the hazard assessment process, is significant. Interestingly, its association runs in the opposite direction to expectation: participation in hazard assessment is associated with higher likelihood of injury. This anomaly will be discussed below.

Participation in Hazard Assessment Process

Section 8(1) of the Code requires employers to involve affected workers in the assessment of and in the control and elimination of hazards. To determine whether or not workers were being permitted and required to participate in hazard assessments, respondents were asked:

> *A hazard assessment process includes identifying hazards in the workplace and either eliminating the hazards or controlling them in order to keep workers safe. In the job we have been discussing, did you ever participate in a hazard assessment process? (Yes/No/Don't Recall)*

At a high level, the result was:

- Yes: 37%
- No: 50%
- Don't recall: 13%

That half of respondents indicate they have not been involved in the hazard assessment process is concerning. A factor potentially affecting respondents' answers is that, where work processes and locations are stable, hazard assessments may be infrequent. The increase in reported respondent participation in hazard assessment with increasing job tenure provides some support for this notion.

There are a number of statistically significant differences between types of workers' involvement in hazard assessment. The younger a respondents is, the less likely they are to participate. For example, among respondents between 18 and 24, only 29% respond yes to this question, in contrast to 41% of those aged 55 and up. This pattern closely matches and may actually reflect job tenure, with older and long-tenure respondents having more opportunity to participate in hazard assessments than younger and short-tenured respondents. Men, full-time

respondents, and union members are all more likely to report participation than their opposites. For this measure, employer size is significant, with respondents at employers with fewer than 20 employees report less participation (28%) compared to both mid-sized (40%) and large companies (42%).

In five industries, respondents report higher than average participation: construction and forestry (60%); oil, gas and mining (61%); manufacturing (50%); utilities and transportation (42%); health (41%). In five industries, respondents report lower than average participation: finance and business services (13%); tourism and food (20%), Education (32%); retail (24%); communications, culture and recreation (25%).

This indicator addresses one of the core participation requirements in the Code (participation in hazard assessment). Hazard-assessment participation is theorized to reduce injury rates as workers' involvement increases their engagement with safety and improves the effectiveness of the assessment process. Nevertheless, the study finds participation in hazard assessment is associated with increased injury. This counter-intuitive result is likely due to the fact that hazard assessments are more likely in industries with higher hazard exposure and higher injury rates, rather than due to any impact of participation itself.

This anomalous association combined with the possibility that respondent responses may be skewed downwards due to the infrequency of hazard assessments in many workplaces suggests that this measure is not a suitable way to assess the IRS system's performance

Input into Control Strategies

Section 8(1) of the Code requires employers to involve affected workers in the control and elimination of hazards. To assess the frequency with which workers were engaged in hazard-control discussions, respondents were asked how often the following happened:

I have input into how to control workplace hazards.

The result was:

- Always: 26%
- Most of the time: 19%
- Some of the time: 17%
- Rarely: 10%
- Never: 16
- Not sure: 11%

That approximately half of respondents report not regularly having input into how workplace hazards are controlled is concerning. As with the preceding question, stable work processes may reduce the frequency of opportunities for input into hazard control. The increase in respondent agreement with increasing job tenure provides some support for this notion, although the pattern of increase may also suggest that longer-tenured respondents may simply be consulted on controls more often.

Men are more likely than women to report regular input into hazard control (53% to 39%). A pattern similar to the hazard-assessment participation measure emerges regarding industry, with the same five industries with above average input and the same five industries below.

This indicator addresses one of the core participation requirements in the Code (participation in hazard control) that meets most of the USAID criteria for performance measures. The two main

weaknesses of the measure are that respondents' answers are not correlated with injury data (i.e., absence of hazard control input does not mean higher injury rate) and the possibility that respondents' responses are skewed downwards due to the infrequency of hazard-control development in many workplaces. This suggests that this measure is not a suitable way to assess the IRS system's performance

Involvement in Creating Health-and-Safety Policy

There is no requirement in the Code to involve workers in the creation of health-and-safety policy except to the degree that health-and-safety policy is related to hazard control. That said, involving workers in the establishment of health-and-safety policies is often considered a best practice and most health-and-safety policy is likely to be related to some form of hazard control. To assess the frequency with which workers were engaged in overall health-and-safety policy discussions, respondents were asked how often the following happened:

A supervisor or the employer involves me in creating health and safety policy and procedures.

The result was:

- Always: 18%
- Most of the time: 15%
- Some of the time: 17%
- Rarely: 14%
- Never: 28%
- Not sure: 9%

Only 33% of respondents reported regular involvement in creating health-and-safety policy and procedures. Over one-quarter report never being involved in creating policy.

There are not many significant differences between respondent groups and policy involvement. Men are more likely to report involvement (39%) than women (27%). Full-time respondents were more likely to be involved as well (36% compared to 26% for part-time workers). The same industry patterns emerge as for other measures discussed in this report. Not surprisingly, as shown in Table 2, having a health-and-safety committee in the workplace is linked to greater involvement in policy development. This point is noteworthy as it suggests health-and-safety committees are a significant vehicle for respondent involvement in policy development. Nevertheless, neither measure is significantly correlated to reduction in injury.

While this measure touches a core right-to-participate requirement (i.e., developing hazard controls), it is not correlated with the occurrence of injuries. This suggests that this measure is not a suitable way to assess the IRS system's performance.

Health-and-Safety Committee in Workplace

At the time this study was undertaken, Alberta's OHS Act was unique in that it did not mandate joint health-and-safety committees in any workplaces, except 24 ministerially designated OHS committees established in 1978 (Alberta Labour, 2017a). Some Alberta workplaces have joint health-and-safety committees, often as a result of collective bargaining. Other workplaces will have other forms of health-and-safety committees. To measure the frequency with which workers reported some form of workplace health-and-safety committee, respondents were asked:

Is there a health and safety committee in [your] workplace?

The result was:

- Yes: 51%
- No: 29%
- Not sure: 19%

Although 51% of respondents report some form of a health-and-safety committee in this workplace, this number should be viewed with caution since the survey was unable to provide a clear definition of such a committee and there can be a wide variety of health-and-safety committee structures, some of which have little or no employee participation. Further, the high proportion of respondents who were not sure if they have a committee potentially confounds analysis of this measure.

Reporting the presence of a health-and-safety committee varies between groups of respondents. Age is correlated to a positive response: the older respondents are, the more likely they are to report having a committee. Once again, men are more likely to respond yes than women (56% to 47%). Full-time respondents are more likely to have a committee than part-time workers (57% to 38%). Respondents who have experienced a lost-time injury are less likely to report a committee (45%). The same industry differences appear with this variable as well. Of note, unionized respondents are also more likely to report a committee (64% to 44%). This result reflects the fact that many unions incorporate language around health-and-safety committees into their collective agreements.

This indicator is definitionally weak and also is not associated with injury reports. This suggests that this measure is not a suitable way to assess the IRS system's performance. The requirement for mandatory joint health-and-safety committees in workplaces with greater than 20 employees created by Bill 30 may ease the definitional problem through slight rewording.

Frequency of Meetings about Health and Safety

There is no requirement in the Code for employers to hold health-and-safety meetings. Indeed, the frequency of any such meetings may well depend upon the circumstances of the work. We included a measure of health-and-safety meeting frequency because we believe it is perhaps the most common form of health-and-safety participation for workers. For this reason, respondents were asked:

> *How often are there meetings at work about health and safety with a supervisor or the employer?*

At a high level, the result was:

- Every work day: 4%
- At least once a week: 9%
- At least once a month: 26%
- Less often: 19%
- Never: 20%
- Not sure: 22%

Interpretation of this measure is challenging. Without the context of the hazards present at the workplace, we cannot determine which frequency of meetings is appropriate. In a low hazard, stable workplace, holding meetings less than once a month might be acceptable, while, in more dynamic workplaces, once a week may be insufficient. Nevertheless, we can postulate that meeting at least once a month is an indication of active participation in safety meetings, as it

shows a regular pattern. Less frequent than monthly may suggest, in general terms, a more passive approach to safety participation. If making that assumption, then 39% of respondents report relatively frequent safety meetings.

Men are more likely to report more frequent meetings than women (47% to 31%). Full-time respondents are more frequent than part-time respondents (44% to 25%). The more potential hazards to which a respondent is exposed is linked to higher frequency of meetings. This is a logical result, however it should be noted that even among respondents with the greatest hazard exposure (7 or more identified hazards), fewer than one-half (47%) reported meetings greater than once a month.

The industry pattern replicates with one exception. Respondents in health care, who on other measures report more participation, are less likely to report frequent meetings, with only 28% reporting meetings more often than once a month. Given that health care is an industry with both high potential hazards and dynamic workplaces, the infrequency of meetings is a point for concern.

While this measure touches upon a facet of the right-to-participate, the inability to contextualize frequency undermines its operationalization. Further, it is not associated with the occurrence of injuries. This suggests that this measure is not a suitable way to assess the IRS system's performance.

Conclusion

None of the right-to-participate measures that were developed and piloted appear to be appropriate for evaluating the effectiveness of the IRS due to (1) a lack of association with injury reports, (2) a lack of legislative anchoring, and/or (3) definitional weaknesses. Although not appropriate as performance measures, together these measures raise some concerning questions about Alberta employers' OHS practices.

That only 35% of respondents reported participation in hazard assessments and 45% reported regularly having input into control strategies is troubling. More hopeful is that 65% of respondents reported safety orientations for new workers.

That these right-to-participate measures (e.g., involvement in hazard assessment, input into hazard controls, new worker orientations) are not associated with the prevalence of injuries is both notable and a recurring theme in this report.

RIGHT-TO-REFUSE MEASURES

A total of three measures related to the right to know were tested. The measures assessed were (1) knowledge of the right to refuse, (2) refusal rates, and (3) effectiveness of refusal. Two of these measures were associated with injury reports, as reported in Table 3. The group of measures are not correlated with one another, which suggests caution is required in considering these a valid cluster of measures. One of the reasons for the lack of correlation may be that one measure (knowledge) is based upon the entire sample while the latter two are based on subsets.

Knowledge of the right to refuse is found to be linked to injury reporting. Use of the right to refuse is also related to injury, but in the opposite direction to expectations – using the right to refuse is associated with higher injury levels. These results are discussed below.

Knowledge of Right to Refuse

Section 35 of the Act requires workers to refuse unsafe work and report it to their employer. Logically, a worker needs to know they possess the right to refuse unsafe work if they are to use it. To assess workers' awareness of their legal right (obligation) to refuse unsafe work we asked the following question

> *Unsafe work is work that creates a serious or immediate risk of harm to a worker. In the job we have been discussing, do you have the right to refuse unsafe work?*

The results were:

- Yes: 79%
- No: 7%
- Unsure: 15%

It is encouraging that a large majority of respondents are aware of their right to refuse unsafe work. However, it is not unimportant that more than one in five are not aware or unsure of this basic right.

Not all respondents have the same base of knowledge. The older respondents are, the more likely they are aware of the right to refuse, ranging from 77% for under 24 years to 83% for 55 years and over. This measure is also one of the few where we find a significant difference based on race. Those respondents self-identifying as visible minorities are less likely to know they have the right (73%) than those who do not (80%). There are no significant differences based on gender or other work characteristics.

Only in three industries do respondents report a significantly higher awareness of the right: construction, agriculture and forestry (86%); oil, gas and mining (87%); and utilities and transport (82%). Three industries have lower awareness: finance and business services (69%); tourism and food (70%); and retail (73%).

At the risk of stating the obvious, respondents workers who are unaware of their rights have difficulty exercising them. Not surprisingly, respondents who fail to refuse unsafe work disproportionately comprise respondents who don't know they can or are unsure of their right to refuse. Among the 50 respondents who failed to refuse unsafe work, only 30% said they are aware of their right, while 32% said they were not, and 38% were unsure.

Additionally, the more hazards a respondents was exposed to, the less likely they were to know about their right to refuse. Eighty percent of respondents routinely exposed to 1-3 hazards knew of their right to refuse while 5% did not. By contrast, only 69% of respondents routinely facing seven or more hazards knew about their right to refuse while 17% did not. This pattern suggests education about the right to refuse is not reaching the workers who most need to know about this right.

This measure addresses one of the core right-to-refuse requirements in the OHS Act. It is statistically linked to injury rates. Respondents who indicate awareness are less likely to report being injured in the past year. While the correlation is quite strong, two cautions are required. First, a regression analysis finds it explains only about 2% of variation between the groups, which is a small effect. Second, the small number of no responses suggests the interpretation may go in the opposite direction, namely that NOT knowing of the right to refuse increases the likelihood of injury. This may speak to a need to target rights education to the groups of workers

who are less likely to be aware of their rights – young workers, visible minorities, and in low-awareness industries.

Overall, this measure has the potential to be used to evaluate the effectiveness of the IRS. However, the small effect requires caution in this regard. Further study may be required.

Refusal Rate

Section 35 of the Act requires workers to refuse unsafe work and report it to their employer. The literature suggests that workers often choose not to formally refuse unsafe work (Gray, 2002). To assess the rate of refusals, we first asked workers about their exposure to unsafe work in the past year. Approximately 16% of the sample indicated one or more exposures to unsafe work. We then asked this subset of respondents how many times they had refused unsafe work.

The results were:

- Refused at least once: 49%
- Never refuse: 51%

The rate at which respondents refused work at least once is based upon expressing exposure to and refusal of unsafe work as binaries. This approach significantly over-states the true rate of refusal because most refusers reported failing to refuse unsafe work at least once in the past year (i.e., a refuser will not always refuse). For example, when asked about their most recent experience of unsafe work, only 60.6% of refusers (109 of 159) reported refusing that specific instance of unsafe work. This suggests that true rate of refusal is approximately 33.6%. This represents a definitional challenge with this indicator that could be resolved through some minor rewording.

There are not many significant differences among groups' willingness to use the right to refuse. Visible minorities were more willing to refuse than non-minorities (65% to 45%), although this result is somewhat counter-intuitive. Respondents exposed to more hazards are more likely refuse. Only 40% of those experiencing three or fewer types of hazards refused, compared to 63% of those exposed to seven or more types of hazards.

With this measure, industry sector is not as significant. Respondents in manufacturing are more likely to refuse (62%) while tourism workers are less likely (27%). All other industries cluster toward the mean.

This indicator addresses one of the core right-to-refuse requirements in the Code (refusing unsafe work). It meets most of the USAID criteria for performance measures. This measure is positively associated with injury reports, meaning those who refuse are more likely to report injury. Further tests reveal this association is partially mediated by the respondents' exposure to hazards, suggesting it is not the act of refusal that is linked to higher injuries, but it is the types of jobs where workers are more likely to refuse.

Despite the statistical correlation, this measure has a weakness. It relies on a fairly specific subset of workers – those exposed to dangerous hazards. This limitation raises the practical concern of the need for a large sample size to create sufficient responses to the measure and the question of whether it is too affected by filtering effects (e.g., not being aware of right to refuse, not being exposed to imminent danger). Overall the effectiveness of this measure is in question.

Effectiveness of Refusal

Section 35 of the Act specifies that when there is a refusal the employer shall investigate and remedy any imminent danger, while ensuring that no other worker is exposed to that danger. The literature suggests employers may not remedy the hazard and/or may assign the work to someone else (Gray, 2002). To assess the effectiveness of the refusal, respondents who refused unsafe work were asked what happened subsequent to the refusal. Respondents were allowed to choose one or more outcomes from a fixed list (consequently, the percentages below add up to more than 100%).

The results were:

- Supervisor made the work safer: 24%
- The work remained unsafe: 24%
- I did the work even though it was unsafe: 34%
- Supervisor got someone else to do the work: 28%
- I took steps on my own to make the work safer: 43%
- I was punished to refusing to do the work: 20%
- A supervisor no longer asked me to do the work: 14%

These results suggest that, even when there is a refusal, the effectiveness of the refusal is limited. Only 24% of respondents reported that the supervisor took steps to make the work safer (which is the legislative requirement). This raises profound questions about whether the right to refuse (which respondents only used part of the time) is at all effective in the current context.

Due to multiple answers (45% of respondents provided multiple outcomes), caution must be taken in interpreting the results. For respondents who reported that the work was made safer, half indicated only this answer. Others combined this answer with taking their own steps, being no longer asked to do the work, or having someone else do the work, which can be interpreted as being sub-aspects to resolving the issue. This finding suggests working being made safer is the optimal outcome in a refusal situation. However, it should be noted that six respondents reported being punished for refusing even though the employer made the work safer.

In total, 39% of respondents selected one or both of the answers that explicitly indicate the work remained unsafe. In addition 16% answer only that they took steps themselves, suggesting the employer did nothing in response to the refusal and the safety of the work is in question.

There are few significant correlations with this measure. Union members are more likely to report the employer made work safer (36% to 15%). Health-care respondents were more likely to report the work remained unsafe (56%) or that they did the work even though it remained unsafe (50%), although caution is required due to small sample sizes.

This indicator addresses the core refusal requirement in the Code. Its utility is in demonstrating the degree to which workplace behaviour matches (or doesn't match) the legislative requirement when a refusal occurs. There are multiple weaknesses with this measure. It is not associated with injury reports. The potential for multiple outcomes from a refusal means this measure can be difficult to parse. The measure also does not engage with the question of whether or not the respondents' belief that the work was unsafe was correct. And the measure requires a large sample to get enough refusers to determine the outcomes of refusing. This suggests that this measure is not a suitable way to assess the IRS system's performance.

Conclusion

Examining the rate at which workers who were exposed to unsafe work reported refusing unsafe work appears to be the more useful to the right-to-refuse measures that were piloted and developed. It addresses the core right-to-refuse requirement, and it meets the USAID criteria for performance measures. Its key weaknesses are being positively correlated with injury reports (i.e., as refusals go up, so too do injuries), likely because it is at least partially mediated by hazard exposures, and the need for a large sample size in order to properly measure the rate of refusal.

None of the other right-to-refuse measures that were developed and piloted appear to be appropriate for evaluating the effectiveness of the IRS due to a lack of association with injury reports. Although not appropriate as performance measures, together these measures raise some concerning questions about Alberta employers' OHS practices.

That 18% of workers fear retaliation for refusing and that 20% of refusers experienced it is troubling. As with the other safety rights, workers in high-hazard industries report much higher levels of fear of and actual retaliation. This dynamic appears to affect the decision-making of workers who decide against refusing unsafe work. That these right-to-refuse measures are not associated with the prevalence of injuries is both notable and explored below.

WORKERS' FEAR OF RETALIATION

Workers' willingness to exercise their safety rights in the workplace as well as report employer non-compliance is particularly important in Alberta because, historically, Alberta's enforcement efforts have been limited. For example, in 2016, the government inspected the workplaces of only 2% of Alberta employers (Alberta Labour, 2017a). Only 12 employers (or groups of employers) were charged under the OHS Act that year (Alberta Labour, 2017b) in addition to 7 administrative penalties being meted out (Alberta Labour, 2017c). Essentially, there is little chance that a workplace inspection will occur and, when an inspection occurs and a violation of the law is noted, there is little chance of a meaningful penalty.

To encourage workers to exercise their safety rights as well as trigger enforcement, Section 36 of the *Occupational Health and Safety Act* prohibits disciplinary actions against workers complying with the Act, regulations, or the Code. This reflects that workers are often reluctant to voice concerns at work when they fear retaliation (Galizzi et al. 2010; Milliken, Morrison and Hewlin 2003; Morrison and Milliken 2000). There is significant evidence that fear of retaliation affects workers' willingness to exercise their employment rights (Lewchuk 2013; Tucker and Turner 2013; Weil and Pyles 2005; Boroff and Lewin 1997; Fiorito and Bozeman 1996; Walters and Haines 1988).

The survey asked whether respondents felt there would be negative consequences for taking steps to protect their safety. Specifically, they were asked the following question: "For each of the following please indicate if you think it would have a negative effect on the way you are treated by your supervisor or employer." Three actions related to the IRS and two more broadly OHS-related actions were included in the question. We will look at each separately.

Asking for Health-and-Safety Information

The first question queried whether respondents feared that asking for health-and-safety information would lead to negative consequences.

Asking for health and safety information from a supervisor or employer.

- Yes: 10%
- No: 82%
- Unsure: 8%

Overall, 10% of respondents reported concern that asking for health-and-safety information would have a negative effect on the way they were treated by their employer. This percentage is low and it is tempting to dismiss it as an anomaly, perhaps reflecting a small subset of fearful respondents with a limited appreciation of their employers' true responses, or respondents giving mischievous answers.

Disaggregating the data presents a different picture. Respondents fearful of retaliation are not randomly distributed. Forty-three percent of respondents who are routinely exposed to seven or more hazards (and thus the most likely to be injured) expressed fear of asking for OHS information. Similar (but less pronounced) differences were found for young respondents (14%), respondents who are members of visible minority groups (15%), respondents who experienced serious injuries (36%) and in construction/agriculture/forestry (14%) and manufacturing/processing (15%) industries and transport industries. No significant differences were found for gender.

Further the measure is significantly correlated to the occurrence of injury (as shown in Table 4). Respondents who report fear of retaliation are more likely to report injury.

Raising a Health-and-Safety Concern

The second question explored respondents' fears around raising a concern around a health-and-safety concern.

Raising a health and safety concern with a supervisor or employer.

- Yes: 12%
- No: 81%
- Unsure: 7%

Overall, 12% of respondents reported concern that raising a health-and-safety concern would have a negative effect on the way they were treated by their employer. This percentage is also low when looked at in the aggregate.

Again, disaggregating the data presents a different picture. Forty-three percent of respondents who are routinely exposed to seven or more hazards (and thus the most likely to be injured) expressed fear of asking for OHS information. Similar (but less pronounced) differences were found for young respondents (18%), respondents with fewer than 2 years of job tenure (15%), respondents who are members of visible minority groups (17%), respondents who experienced serious injuries (34%), respondents who had refused unsafe work (49%), and respondents in the utilities/transportation (15%) and retail (15%) sectors.

The measure is significantly correlated to reporting of injury (Table 4). Respondents who report fear of negative consequences for raising a health-and-safety concern are more likely to report being injured.

Refusing Unsafe Work

The third action included was fear of negative consequences for refusing to perform unsafe work.

Refusing unsafe work.

- Yes: 18%
- No: 69%
- Unsure: 13%

Overall, 18% of respondents feared that refusing unsafe work would have a negative effect on the way they were treated by their employer. That 20% of respondents who did refuse work reported punishment as a result of the refusal provides significant support that this level of respondent expectation of negative consequences is valid. There is also some support for the contention that non-refusers did so in order to avoid negative consequences. Specifically, 32% of respondents who did not refuse unsafe did so in order to avoid developing a reputation as a troublemaker, 18% didn't want to cause a problem for their employer, and 14% sought to avoid potential punishment.

Disaggregating the data reveals that respondents who are fearful of retaliation are not randomly distributed. Rather, they are heavily concentrated among respondents who are routinely exposed to seven or more hazards (47%) and disproportionately found among young respondents, respondents who are visible minorities, union members, respondents who had previously refused (51%), injured respondents (34%), and respondents in certain sectors. That half of respondents who had previously refused unsafe work feared reprisal for future refusals may help explain why refusers don't refuse every instance of unsafe work. It also supports the broader contention that respondents' fear of refusals is warranted.

The measure is also associated with higher reporting of injury. The expression of fear of retaliation is linked to higher reporting of injuries on the job.

Reporting an Injury

While it is not directly linked to workers' rights under the IRS, the survey also asked whether workers fear negative consequences for reporting an injury.

Reporting an injury to a supervisor or employer

- Yes: 10%
- No: 85%
- Unsure: 5%

Only 10% of respondents expressed fear of retaliation for reporting an injury to their employer or supervisor. At the aggregate level, this result may be encouraging as most respondents report feeling safe to report an injury.

Again, certain groups are more likely to report a fear of reprisal. Respondents exposed to seven or more hazards (40%), those who have reported serious injury (26%), young workers (19%) and visible minorities (15%) indicate higher fears. The measure is also statistically correlated with incidence of injury. That is to say, those respondents who expressed fear of reporting were more likely to also report experiencing an injury.

Interestingly, the study found that there is a high rate of workplace injury masked by low levels of reporting. Of the 2000 respondents, 21.5% (430) reported experiencing at least one work-related injury or illness in the previous 12 months. Alberta had approximately 1.9 million non-managerial employees in March 2017. Extrapolated to the entire population, this result suggests there were 408,500 workplace injuries and illnesses to Alberta workers in the prior year.

Of this subset of respondents, 41.8% (180) reported experiencing at least one disabling injury. Extrapolated to the whole workforce, this result suggests approximately 170,700 Alberta workers experienced in a disabling injury in the prior 12 months. Correcting for the 7% of the workforce outside the ambit of workers' compensation suggests there should have been 158,700 disabling injury claims filed. This estimate is substantially more than 44,543 disabling injuries accepted by the Alberta WCB in 2016 (Alberta Labour, 2017d).

This discrepancy can mostly be explained by a low claims rate. Among those respondents reporting a disabling injury, only 30.9% (55) filed a claim with the WCB for their most recent injury. Although 69.1% of respondents not reporting a disabling injury sounds high, it closely mirror's Shannon and Lowe's (2002) data, which suggested 71% of workers in Alberta with compensable injuries did not file a claim.

Extrapolated to the whole workforce, our rate of reporting suggests there were 49,000 disabling injuries filed. Correcting an approximately 10% claim rejection rate (Alberta Workers' Compensation Review, 2016), yields approximately 44,100 disabling injuries which closely mirrors the 44,543 disabling-injury claims accepted by the WCB in 2016. It is important to be mindful that this analysis also suggests there were approximately 126,000 disabling injuries that were not accepted by (and thus reported) the WCB.

Workers are often reluctant to report injuries—even serious ones—because they don't think it is worthwhile to do so and because they are scared their employers will punish them for doing so. In our study, 54% of injured respondents who did not file a claim failed to do so because they didn't think the injury was serious enough to warrant doing so and 17% said they feared filing a WCB claim would negatively affect their employment. Among respondents regularly exposed to the most number of hazards (thus the most likely to be injured), 39% reported fearing employer retaliation for filing a WCB claim. While retaliation for filing a WCB claim falls outside of the ambit of the OHS Act or Code, this level and pattern of fear is consistent with fear of retaliation for actions that are protected by the Act or Code.

Overall, this assessment of the true level of injury suggests the operation of Alberta's OHS system (including the IRS) allows a startling level of injury and illness to occur in Alberta workplaces. It also raises the question of whether making decisions on the basis of claims data (e.g., workers' compensation premium rebates, targeting employers for additional enforcement) is appropriate.

Filing a Complaint

State enforcement of OHS rules is a key back-stop of the IRS system. The survey asked all respondents what actions they had taken when they considered their workplace was unsafe and their supervisor or employer didn't take steps to make it safe? Of the respondents who indicated that they had been in that situation, 71.8% indicated that they fixed the problem themselves. Only 8.7% indicate they contacted the government while 5.0% indicated they contacted the media and 14.6% indicated they took other action. Respondents in high-hazard industries were more likely to fix the problem themselves or contact the government than workers in less hazardous industries.

Overall, these results suggest there was reluctance among respondents facing unsafe working conditions to engage with OHS enforcement activities. When those respondents who did not call an OHS officer were asked why they did not do so, 22% said they did not know they could contact an OHS officer, 18% said they did not know how to contact an OHS officer, 15% didn't believe an OHS officer would make the workplace safer, 9% said their employer discourages

workers from contacting OHS, and 22% reported fear that the employer would punish them. Workers who did know how to or that they could contact an OHS officer suggests additional OHS education is required. The 22% of these respondents who feared punishment if they called an OHS officer is a percentage that is broadly consistent with the response of the entire sample to an earlier question that asked respondents whether they expected contacting an OHS enforcement officer would have negative effects on their employment.

> *Filing a complaint about unsafe working conditions with a government occupational health and safety officer.*
>
> - Yes: 23%
> - No: 57%
> - Unsure: 20%

This result suggests a fairly widespread hesitance to bring government enforcement to bear over a safety concern. Certain groups display even more fear than the average. A majority (54%) of respondents exposed to seven or more hazards report fearing negative consequences. Respondents who have experienced a serious injury are also more fearful (40%). Respondents in construction (29%), manufacturing (30%), tourism (28%) and retail (25%) report higher than average levels of fear. The measure is also correlated with the occurrence of injury. That is to say, respondents who expressed fear of filing a complaint were more likely to experience injury in the workplace.

Of those respondents who faced unsafe workplace conditions and who contacted the government about their safety concerns, 33% reported an officer did not come to their workplace, 33% reported the officer came and ordered remedy (which often included a stop-work order), and 30% indicated the officer came but took no action. Of this group, 11% reported their employer punished them for calling the government. It is important to be mindful that this sub-group of respondents is small (61) and their knowledge of what ultimately transpired as a result of their call may be imperfect. It is, however, concerning that a third of enforcement calls triggered no enforcement action whatsoever.

Worker Fear and OHS

As seen in Table 4, the five measures of respondents' fear of negative consequences are strongly correlated to one another and to the incidence of injury. That the measures correlate together is not surprising. Worker fear of reprisal is unlikely to be contained to one or two issues. The range of positive responses, from 10% to almost 25%, also suggests that certain actions are perceived as being more risky than others. Refusing unsafe work and filing a complaint are seen by respondents as being particularly concerning.

More importantly, the measures offer the strongest correlations to injury incidence the survey has found. Regression analysis finds that, together, the measures explain about 10% of the variance around injury. While this is a modest effect, it is stronger than any other measure tested in the survey. Further testing reveals that the measures are mediated by the number of hazards a respondent is exposed to, suggesting the measures' association is more a factor of their link to hazard exposure than occurrence of injury.

However, dismissing the potential of these measures would be premature. They speak to a core aspect of the IRS, namely the willingness of workers to actively engage their employer over safety issues. A worker fearful of reprisal may be less likely to take legal steps to make their

work safer, and thus undermine the purpose of the IRS. The measures assessing respondents' level of fear may serve as a proxy for respondents' inability to exercise their OHS rights.

Caution is required in evaluating these measures. These are self-reported answers and we do not have the data to determine if the respondents' fear accurately reflects a threat of reprisal in the workplace. The one exception is around the right to refuse, wherein 18% of respondents report fear of reprisal and 20% of refusers report reprisal. Similarly we cannot be certain that reporting fear of reprisal causes workers to not use their rights, although this is a logical prediction. The evidence we do have is that, among respondents exposed to unsafe work who did not refuse, 14% said they did not because they feared punishment and 32% indicated they did not want to be known as troublemakers.

Further study is required to determine if fear of reprisal is an appropriate set of measures to evaluate the effectiveness of the IRS. In particular, future study should examine the link between workers' perception of fear and reasonableness of that fear.

Workers' Use of IRS

The structure of the survey allowed for an analysis to determine which respondents are more likely to make use of their rights under the IRS. We created three rights-based scales by converting respondents' answer on each measure to a binary and then tallying each respondent's score for each right. We then tested these scales against a variety of demographic characteristics. The following results were found to be statistically significant ($p<.05$).

- Men are more likely than women to use the right to know and the right to participate.
- Older respondents are more likely to use the right to know.
- Respondents born in Canada more likely to use the right to know and the right to participate.
- Respondents identifying as visible minority were less likely to use the right to know
- Full-time respondents were more likely to use the right to know and the right to participate.
- Respondents in permanent jobs were more likely to use the right to know and participate.
- Longer tenure respondents were more likely to use the right to know and participate.
- Public-sector respondents were more likely to use the right to know and the right to participate.

No significant differences were found regarding the measures related to the right to refuse.

In summary, respondents who can be seen as more vulnerable were less able to use their OHS rights of participation and knowledge. Even though the measures of the IRS rights were not found to be meaningfully associated with injury rates, the uneven access to those rights has a significant policy outcome. Certain groups of workers are better positioned to exercise their safety rights than others, making workers who are already vulnerable for other reasons (e.g., race, gender, age, work precarity) more at risk of becoming injured at work.

ANALYSIS OF ALBERTA'S OHS SYSTEM

The internal responsibility system represents the main way Alberta protects workers from hazardous work and injury. The basic logic of the IRS is that workplace parties are best placed to identify and control hazards and have a common interest in doing do. For this reason, self-regulation is expected to be an effective way to reduce hazard exposures and, ultimately,

injuries. In this approach, legislation provides a basic framework of rights and obligations that bind workplace parties and the state's role is to set standards and to intervene when it becomes clear that the IRS is not working. To help counterbalance employers' traditionally greater power in the workplace, OHS legislation granted workers three specific safety rights (to know, participate, and refuse).

This study found there were approximately 408,500 workplace injuries in Alberta in 2016, of which 170,700 were disabling injuries. Most of these disabling injuries went un-reported. This level of injury suggests that the OHS system is not achieving its goal of making Alberta workplaces safe and healthy. It is difficult to say conclusively why Alberta's OHS system is not functioning effectively but we propose the following explanation:

1. **Employers are not remediating hazards**: The high number of injuries demonstrates the existence of a vast number of un-controlled hazards in Alberta workplaces. This matters because workers in high-hazard workplaces are more likely to report injuries (i.e., hazards exposure is related to injury). Lack of hazard remediation is also consistent with the evidence (and may flow from the fact) that many employers are not complying with basic OHS requirements.
2. **Non-compliance is in employers' economic interests**: The IRS assumes employers and workers share an interest in preventing injury. Research suggests this assumption is, at least sometimes, untrue (Hart 2002, 2010; Dorman 2000; Genn 1993; Grabe 1991). Where operating safety entails higher operational costs, employers are likely to apply a cost-benefit analysis when selecting which hazards to control and how to do so.
3. **Non-reporting changes the economic calculus**: The high-levels of injury non-reporting means injury-related costs can often be externalized onto workers, their families, and the health-care system. This reduces the cost of injuries to employers and, therefore, makes the benefits of hazard control lower (relative to the costs of injury) than would be the case if employers bore the full cost of injuries.
4. **Weak enforcement regime contributes to non-compliance**. Historically OHS enforcement in Alberta has been limited. Employers have faced little risk of being caught violating the rules and even less risk of being punished for doing so. Weak enforcement further reduces the cost of hazardous workplaces (and the injuries that result from them) to employers. This, in turn, makes non-compliance and injuries more likely.
5. **Complaint-based enforcement is ineffective**: Alberta relies upon worker complaints to trigger enforcement activity. The high levels of worker fear of exercising their rights in high-hazard workplaces coupled with workers' low expectation that exercising their rights will improve their situation undermines workers' willingness to trigger enforcement.
6. **Fear impedes worker participation in the IRS**: Workers fear retaliation for exercising safety rights in the workplace. This fear is particularly pronounced in high-hazards workplaces. Fear likely compounds the effect of employers ignoring their obligations to inform workers of hazards and controls, involve them in hazard identification and control, and address unsafe work. The result of worker fear in a less effective IRS. This is particularly concerning because limited government enforcement means the IRS is often the only protection employees have against injury.

The upshot of this analysis is that Alberta's OHS system exhibits multiple points of failure. And these failures create a vicious circle, wherein the effects of one failure intensify the effects of other failures. The result is a high level of workplace injury.

RECOMMENDATIONS

Since this study was completed, the government has made significant changes to the Occupational Health and Safety Act. These legislative changes go some distance toward remedying the issues in injury-prevention identified in this study. Additional changes to policy, practice, and funding are necessary to address non-legislative shortcomings in the current OHS system. These changes fall into three categories:

1. Increasing inspection levels,
2. Introducing meaningful and mandatory consequences for violations, and
3. Improving worker-focused safety education.

Inspection Levels

The ultimate purpose of OHS is to reduce the number of hazards to which workers are exposed and the frequency of their exposure as this reduces the overall level of injury. High levels of injury suggest that many employers do not take hazard-reduction efforts seriously. Research finds that inspections demonstrably reduce injury rates (Levine, Toffel and Johnson, 2012; Baggs, Silverstein and Foley, 2003; Gray and Scholz, 1993).

Three recommendations flow from these findings:

1. **Increase the Number of Government Inspectors**: Alberta currently has about 130 OHS inspectors who manage to inspect fewer than 2% of Alberta employers each year. Quadrupling the inspectorate (~500 OHS inspectors) would significantly increase the potential for employers being caught violating health and safety rules at a cost of about $75 million per year. This cost could be covered by existing surpluses in the WCB accident fund that has otherwise distributed to employers each year. This cost should be partly offset by a reduction in injuries resulting from hazard abatement.
2. **Inspections Should be Targeted and Proactive**: Additional inspectors should focus on employers (1) in high-injury industries, (2) that have a record of occupational injuries as well as (3) industries known to employ vulnerable workers (e.g., migrant workers, youth). While Alberta's injury data is deeply flawed, it remains the best basis upon which to identify hazardous industries and employers. Regular inspections also normalize hazard identification and control processes in these workplaces that, in turn, will make workers more likely to exercise their safety rights.
3. **Allow Inspections by Civil Society Groups**: Empowering and funding civil society groups to perform workplace inspections would increase the frequency of OHS investigations in traditionally under-regulated areas of the labour market (e.g., the service sector and industries reliant upon new immigrants and migrant workers). These areas are underserved because workers are particularly vulnerable and are unlikely to report violations. Many existing civil society groups (e.g., worker centres, community groups, unions) have relationships of trust with workers in these sectors and could serve as advocates for worker rights (Fine, 2014; Fine and Gordon, 2010).

Meaningful and Mandatory Consequences

Research clearly demonstrates that OHS systems only yield reductions in injury rates when inspections are coupled with penalties (Tompa, Trevithick, and McLeod, 2007). Alberta rarely prosecutes or otherwise fines violators, although Alberta did issue 129 low-value tickets in 2016/17 (54 to employers and 75 to workers). Six recommendations flow from these findings:

4. **Orders Must be Public, Tracked, and Enforced**: Bill 30 significantly improves the use of OHS orders when employers are found to be non-compliant. Orders must contain deadlines for compliance, be posted in the workplace, and publicly reported (at least in aggregate). Officers should be encouraged to write orders in order to create more nuanced data to drive targeted enforcement. Orders should also be publicly available in real time for public viewing (much like restaurant inspection reports).
5. **Penalties Should be Mandatory and Escalating**: The latitude given to OHS officers to use education and voluntary compliance tools in lieu of sanctions should be constrained as this approach has proven to be ineffective at controlling hazards or gaining employer compliance with OHS rules. Research clearly demonstrates that employers change their behaviours in response to financial penalties. Non-compliance with orders, repeated non-compliance with OHS rules, or non-compliance causing significant risk of injury should trigger mandatory and escalating monetary penalties, in addition to the employer being ordered to remedy the infraction(s).
6. **Violators Should be Publicly Shamed**: Alberta currently publicizes only a small number of OHS violators (i.e., those convicted of major violations of the Act). Research has established that publicizing OHS violations serves as a deterrent to other employers (Johnson, 2016). Alberta should establish a monthly "sunshine list" that publicly reports which employers were found to have significantly violated OHS rules, especially if these violations have led to injuries or fatalities. Alberta already has the authority in the OHS Act to disclose the names of OHS violators and should commence doing so.
7. **Additional Prosecutions Should Take Place**: Alberta should once again hire dedicated OHS prosecutors to increase its capacity to sanction serious employer non-compliance. Previous experiments with dedicated prosecutors increased the number of prosecutions significantly while their absence has seen prosecutions drop off.
8. **Inspectors Should Stop Ticketing Workers**: Eliminating worker ticketing would prevent the creation of an adversarial relationship between workers and the OHS inspectors they rely upon to enforce their safety rights. Anecdotal evidence suggests Alberta employers use the spectre of ticketing to dissuade workers from reporting injuries (e.g., "if you report the injury, you're going to get a ticket").
9. **Retaliation Should be Prosecuted**: Bill 30 provides additional scope to punish employers who retaliate against workers for exercising safety rights. Informing workers and employers that retaliation is illegal alongside aggressively prosecuting instances of retaliation will alter employer behaviour and, in turn, increase workers' willingness to exercise their safety rights.

Worker-Focused OHS Education

Worker participation is most effective when workers are knowledgeable about their safety rights, how to exercise those rights, and the nature and effect of hazards (Hall et al. 2006). Four recommendations flow from these findings:

10. **OHS Issues Should be Better Integrated into the K-12 Curriculum**: Workplace rights are a component of the Career and Life Management (CALM) course required of Alberta high-school students. There are, however, ways to integrate and reinforce OHS in the social studies and science curriculums, such as introducing OHS-focused examples, problems, and concepts into existing lessons and evaluation materials.
11. **Government Should Develop Worker-Focused OHS Education**: Government-delivered OHS information and training should focus on worker OHS rights. This will heighten employer awareness of workers' rights and their obligations to comply with them. Developing such materials would require the government to consult with workers (and specifically vulnerable workers) in order to build its capacity to discuss worker issues. Such consultation might also begin to build trust in the government among these workers and the communities to which they belong.
12. **Government Should Support Independent OHS Education**: The government should fund worker-focused OHS training for populations in particular need of it (e.g., new Canadians, young workers, worker in specific industries). This training should be delivered through groups that the targeted workers already have trusting relationships with, such as community agencies. This will require building capacity in these agencies to deliver this training.
13. **Independent Training Should be Provided to Worker JHSC Representatives**: Bill 30 made mandatory joint health and safety committees (JHSCs) or health and safety representatives and allowed workers paid time off for training to prepare them for these roles. The government should fund the provision of such training by worker-operated agencies. In addition to orientation training, these agencies should also be funded to provide ongoing advice and access to resources (such as research expertise). These agencies could be funded by an employer levy or through current surpluses generated by the WCB.

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APPENDIX A: Statistical Tables

Table 1

Right to Know Correlations

	M	SD	1	2	3	**4**
1. H.A. Available	.50	.50	1			
2. Access to OHS Doc.	2.01	1.36	-.443**	1		
3. New Worker Training	2.18	1.46	-.490**	.700**	1	
4. Provided Specific Info.	2.49	1.51	-.471**	.646**	.778**	1
5. Experienced Injury	.22	.41	.025	.048*	.025	.047*

**p<.01, *p<.05

Table 2

Right to Participate Correlations

	M	SD	1	2	3	4	5
1. H.A. Participation	.37	.41	1				
2. Control Input	.46	.48	.412**	1			
3. Policy Input	.33	.47	.370**	.669**	1		
4. Joint Committee	.51	.50	.384**	.258**	.228**	1	
5. Meeting Frequency	.39	.49	.428**	.357**	.356**	.416**	
6. Experienced Injury	.22	.41	.070**	-.025	-.030	.009	.031

**p<.01, *p<.05

Table 3

Right to Refuse Correlations

	M	SD	1	2	3
1. Know Refuse Right	.79	.41	1		
2. Used Refuse Right	.49	.50	.051	1	
3. Refuse Outcome	.24	.43	.181	N/A	1
4. Experienced Injury	.22	.41	.-.121**	.195**	-.033

**p<.01, *p<.05

Note: No correlation is possible for refuse outcome and used refuse as refuse outcome is a sub-set of used refuse.

Table 4

Fear of Retaliation Correlations

	M	SD	1	2	3	4	5
1. Fear Asking Info	.10	.30	1				
2. Fear Raise Concern	.12	.33	.679**	1			
3. Fear Refuse	.18	.38	.510**	609**	1		
4. Fear Complaining	.23	.42	.405**	.476**	.523**	1	
5. Fear Report Injury	.10	.30	.604**	.584**	.521**	.423**	1
6. Experienced Injury	.22	.41	.234**	.235**	.223**	.204**	.207**

**p<.01, *p<.05