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Final Report: Testing the predictive validity of the Health and Safety Inspector Checklist (HaSIC): A follow-up study

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Disclaimer

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1. Executive Summary

1.1. Background and aims

Previous research on occupational health and safety (OHS) inspectors has investigated administrative supervision of inspectors in the workplaces that they inspect[1], how OHS agencies inspect and enforce OHS legislation upstream[2] and the extent to which changed work arrangements have affected the views and activities of OHS inspectors.[3] There is very little research, however, examining how inspectors assess health and safety in workplaces.

As a result, OHS researchers have recently called for the development of standardised assessment tools to assist inspectors when undertaking site visits.[4] However, our review of the OHS literature was unable to identify any studies reporting on the development and validation of a tool or checklist for use by inspectors during OHS inspections.

Given this lack of validated tools for health and safety inspectors, our team collaborated with WorkSafe Victoria on an initial development and validation study to construct a brief, generic OHS checklist, the Health and Safety Inspector Checklist (HaSIC), to assist inspectors with their evaluations of worksites. In developing the HaSIC, there was a strong emphasis on including items that assessed leading indicators of OHS as this would allow inspectors to identify safety concerns that may reduce the likelihood of an OHS incident occurring. This aligns with the OHS leading indicators measure, developed by the research team, for use by organizations: Organization Performance Metric – Monash University.[5]

The checklist was validated by correlating HaSIC ratings with enforcement outcomes resulting from 270 workplace inspections conducted by WorkSafe Victoria Inspectors between July 2015 and February 2016 under the HaSIC Development and Validation project.[6]

While the original development and validation study demonstrated that the HaSIC has initial evidence of reliability and validity (e.g., it is correlated with retrospective or current OHS enforcement actions and claims), the critical evidence required for validation of the HaSIC is whether it has predictive validity (i.e., is the HaSIC predictive of future OHS notice and claim outcomes?). Longitudinal data collection was beyond the scope of the original HaSIC Development and Validation project.

In this report, we present the analysis of additional follow-up data from the workplaces that participated in the original study. This analysis enabled us to examine the relationships between the HaSIC and subsequent OHS outcomes. This evidence is important because the purpose of the HaSIC is to assess OHS leading indicators in order to predict outcomes of interest to inspectors and the health and safety regulator.

1.2. Research method

The HaSIC was included in the online Fieldlink system for workplaces (N=270) in the original HaSIC Development and Validation project conducted between 1 July, 2015 and 28 February, 2016. Following completion of each inspection and prior to writing up their usual report, inspectors were asked to rate the workplace using the HaSIC checklist. WorkSafe Victoria have provided matched follow-up inspection outcomes and work-related injury and illness claims data for workplaces in the original HaSIC development and validation sample

that received an inspection or lodged claims after February 2016. As WorkCover claims were recorded at the employee level, these were aggregated by the researchers to the workplace level to yield total claims data for each workplace.

Fourteen percent of workplaces (N=37) in the original sample were visited by WorkSafe Victoria inspectors for a follow-up inspection between 1 March, 2016 and 4 June, 2017 (i.e., following the initial assessment by inspectors using the HaSIC conducted between 1 July, 2015 and 28 February, 2016). Twenty percent of workplaces (N=53) in the original sample submitted at least one WorkCover claim between 1 March, 2016 and 31 May, 2017.

1.3. Key findings

- The HaSIC is a brief, high level tool that can be used by inspectors to assess the potential of workplaces to keep everyone healthy and safe.
- This follow-up study provides important evidence showing that the HaSIC has sound predictive validity as demonstrated by the findings that initial ratings by inspectors using this tool are predictive of a number of subsequent WorkCover claim outcomes.
- Considered together, the findings demonstrate that the HaSIC has very good psychometric properties with the potential to: 1) assist inspectors and the health and safety regulator to identify workplaces most at risk of OHS incidents; 2) standardise the inspection process; and 3) enhance the development of new inspectors with limited tacit knowledge.

1.4. Recommendations

Outlined below are recommendations based on the findings of this follow-up study.

1) The HaSIC could be utilised by inspectors to provide an assessment of the OHS potential of a workplace as it has been shown to be a psychometrically sound tool, capable of predicting future OHS outcomes.

2) The HaSIC could be employed in the training and development of health and safety inspectors. The utilisation of this standardised, generic tool would provide inspectors, particularly inexperienced inspectors, with a consistent evaluation framework and therefore reduce idiosyncratic rater effects during workplace inspections.

3) Continuing longitudinal research examining the predictive validity of the HaSIC using additional prospective OHS outcomes, such as lost time from injury frequency rates (LTIFR) in workplaces.

2. Introduction

This report presents the results of a follow-up validation study of a generic Health and Safety Inspector Checklist (HaSIC), developed by the Monash University research team, to assist inspectors with evaluations of worksites. An initial trial of the HaSIC, involving 270 workplace inspections conducted by WorkSafe Victoria Inspectors between July 2015 and February 2016, provided initial evidence that it is a reliable and valid tool. For details of the initial project, see our report[5] at ohsleadindicators.org. The current project extended the validation of the HaSIC by examining its predictive validity, which is its capacity to predict future occupational health and safety (OHS) outcomes in Victorian workplaces.

2.1. Background

Previous research on OHS inspectors has investigated the administrative supervision of inspectors in the workplaces that they inspect[1], how OHS agencies inspect and enforce OHS legislation upstream[2] and the extent to which changed work arrangements have affected the views and activities of OHS inspectors.[3] There is very little research, however, examining how inspectors assess health and safety in workplaces. The few studies that have been conducted indicate there is considerable variability in how inspectors conduct site visits, for example in terms of the type of records interrogated, the length and nature of discussions with employees and duty-holders, the emphasis placed on enforcement relative to consultation and the amount of time spent on each inspection.[7] While the quality and breadth of training provided for inspectors has increased in recent years, there is no standardised and consistent protocol applied in the field to assess workplace health and safety.[4] This is the case despite the fact that there has been a recent strategic interest among regulatory authorities internationally to achieve greater concentration on measurable outcomes in relation to OHS performance.[2]

As a result, OHS researchers have recently called for the development of standardised assessment tools to assist inspectors when undertaking site visits.[4] However, our review of the OHS literature was unable to identify any studies reporting on the development and validation of a tool or checklist for use by inspectors during OHS inspections.

Given this lack of validated tools for inspectors, our team collaborated with WorkSafe Victoria on an initial development and validation study to construct a brief, generic OHS checklist, the Health and Safety Inspector Checklist (HaSIC), to assist inspectors with their evaluations of worksites. An Expert Reference Group was convened, which comprised four highly experienced senior managers and inspectors to develop the content areas of the HaSIC. The research team then conducted six work shadow inspections and cognitive interviews with three WorkSafe Victoria (WSV) inspectors to further develop the descriptors and examples for each OHS content area.

This process resulted in the HaSIC, a checklist for use by inspectors when conducting workplace visits. In developing the HaSIC, there was a strong emphasis on including items that assessed leading indicators of OHS as this would allow inspectors to identify safety concerns that may reduce the likelihood of an OHS incident occurring. This aligns with the OHS leading indicators measure, developed by the research team, for use by organizations: Organization Performance Metric – Monash University.[5] The checklist was validated by

correlating HaSIC ratings with enforcement outcomes resulting from 270 workplace inspections conducted by WorkSafe Victoria Inspectors between July, 2015 and February, 2016 under the HaSIC Development and Validation project. The validity of the HaSIC was also tested by correlating inspector ratings on the checklist with lost time injury frequency rates (LTIFR) reported by a subsample of workplaces form the original sample as well as Workcover claim outcomes from the original sample between 1 July, 2014 and 29 February, 2016.

Preliminary analysis suggested that the HaSIC is a reliable and valid tool that can assist in workplace inspections. We found that HaSIC ratings were negatively correlated with a range of OHS lagging measures that were measured retrospectively or concurrently. Specifically, HaSIC ratings were negatively correlated with a number of notice, LTIFR and WorkCover claim outcomes. The initial Development and Validation project supported the use of the HaSIC as a standardised, high-level measure that can be used by inspectors to assess the potential of a workplace to keep everyone healthy and safe.

2.2. Research aim

While the original development and validation study demonstrated that the HaSIC is correlated with retrospective or current OHS enforcement actions and WorkCover claims, the critical evidence required for validation of the HaSIC is whether it has predictive validity (i.e., is the HaSIC predictive of future OHS notice and claim outcomes?). Longitudinal data collection was beyond the scope of the original HaSIC Development and Validation project.

In this report, we present the analysis of additional follow-up data from the workplaces that participated in the original study, which enabled us to examine the relationships between the HaSIC and subsequent OHS outcomes. This evidence is important because the purpose of the HaSIC is to assess OHS leading indicators in order to predict outcomes of interest to inspectors and the health and safety regulator.

3. Method

3.1. Procedure and sample

The HaSIC was included in the online Fieldlink system for workplaces (N=270) in the original HaSIC Development and Validation project conducted between 1 July, 2015 and 29 February, 2016. Following completion of each inspection and prior to writing up their usual report, inspectors were asked to rate the workplace using the HaSIC checklist. WorkSafe Victoria have provided the Monash research team with matched follow-up inspection and WorkCover claims for those workplaces, included in the original HaSIC development and validation sample (N=270), that received an inspection or lodged claims after February, 2016. These matched data were extracted from WorkSafe Victoria's Action (notices) and Premium (claims) databases. As WorkCover claims were recorded in the Premium (claims) database at the employee level, these were aggregated by the researchers to the workplace level to yield total claims data for each workplace.

Fourteen percent of workplaces (N=37) in the original sample were visited by WorkSafe Victoria inspectors for a follow-up inspection between 1 March, 2016 and 4 June, 2017. (i.e., following the initial assessment by inspectors using the HaSIC). Twenty percent of workplaces (N=53) in the original sample submitted at least one work-related injury and illness claim between 1 March, 2016 and 31 May, 2017. A flow chart showing the sampling approach and measures as described in this section on the HaSIC initial validation and follow-up studies are presented in summary form in Figure 1.

This study has received Monash University research ethics approval, which had already been granted for ISCRR project #0-14-130. Any issues of confidentiality have been treated as they have been for our previous use of WorkSafe Victoria data in this project.

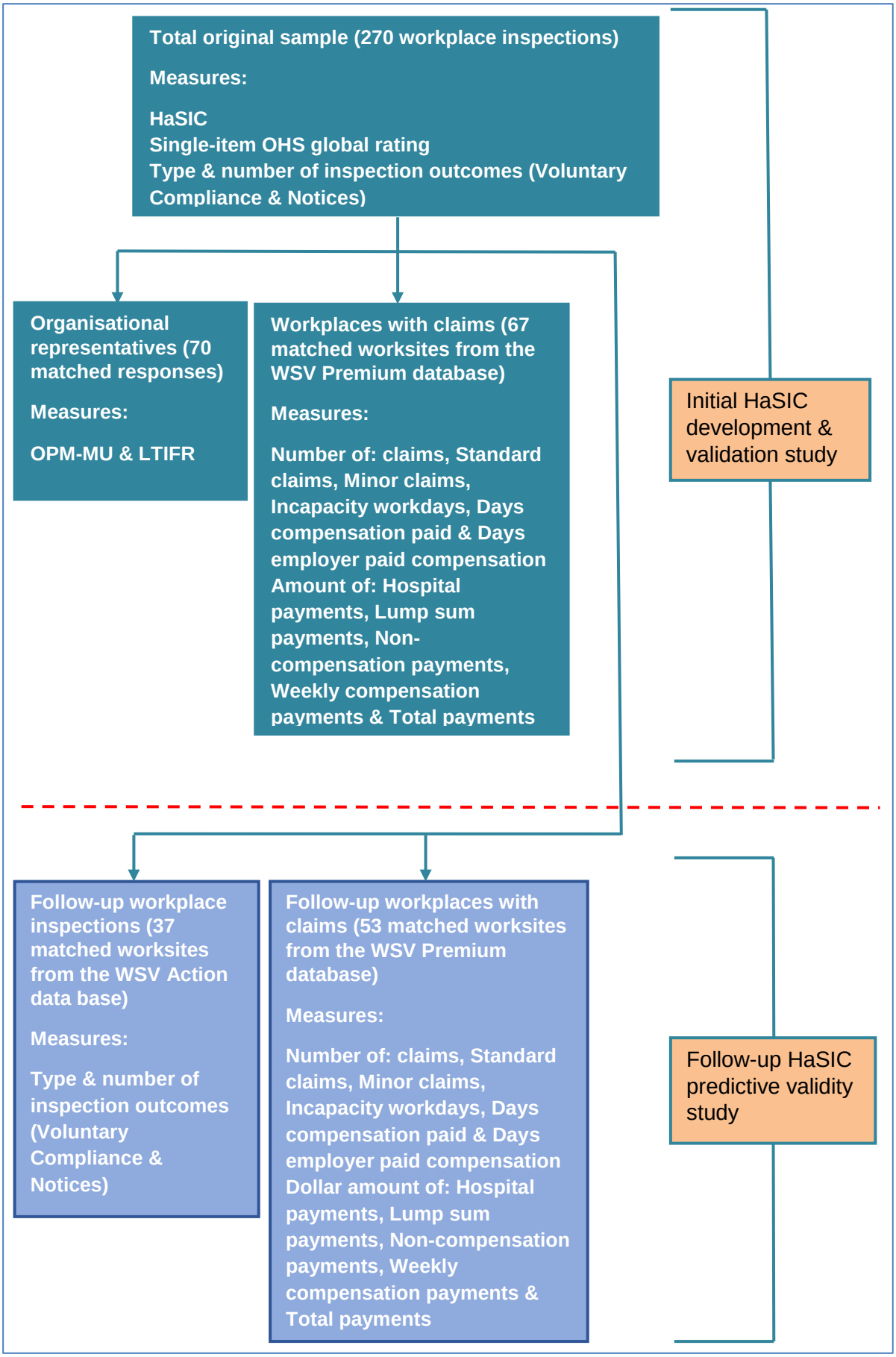

Figure 1: Flow chart showing sampling approach and measures

3.2. Measures

3.2.1. HaSIC

Inspectors completed the 7-item HaSIC rating scale for each workplace they inspected between 1 July, 2015 and 29 February, 2016 under the original HaSIC Development and Validation project. The response format ranged from *0 = very poor (well below minimum standard)* through to *10 = excellent (well above minimum standard)*. The HaSIC is presented in Appendix 1.

3.2.2. Voluntary compliance and notices

The enforcement outcome in terms of the number and type of voluntary compliance and notices for each workplace visited in follow-up inspections between 1 March, 2016 and 4 June, 2017 was recorded by inspectors. Voluntary compliance is when action is taken by a person to immediately remedy a risk or hazard, with no further action taken by the inspector. An improvement notice is a written direction requiring a person to remedy a contravention of the law within a specified time. A prohibition notice is a written direction prohibiting any activity that will, or is likely to, involve immediate risk to the health and safety of any person.[8] These voluntary compliance and notices can be considered as examples of OHS lagging indicators.

3.2.3. WorkCover claims (aggregated to the workplace level)

Table 1 below displays the WorkCover claims measures that were extracted from the WSV claims databases for each workplace in the original sample that submitted at least one WorkCover claim between 1 March, 2016 and 31 May, 2017.[9] These claims measures can be considered as examples of OHS lagging indicators.

Table 1: WorkCover claims measures for each workplace

Measure	Description
Number of minor claims	The number of claims that have not exceeded the employer excess for medical and similar expenses or for weekly payments
Number of standard claims	The number of claims that have exceeded the employer excess for medical and similar expenses or for weekly payments
Total number of claims	The total number of minor and standard claims
Number of incapacity work days	The number of days that a worker did not work due to an incapacity
Number of days compensation paid	The total number of days that a worker received compensation payments
Number of days employer paid compensation	The number of days that the employer has paid compensation to the worker
Dollar amount of hospital payments	The total cost of hospital payments following treatment in hospital for a work-related injury or illness
Dollar amount of non-compensation payments	The sum of payments other than weekly compensation and lump-sum compensation payments. Non-compensation payments may be divided into medical and other non-compensation amounts
Dollar amount of weekly compensation payments	Weekly payments calculated based on a percentage of a worker's pre-injury average weekly wages for a 52 week period prior to the date of his or her injury
Dollar amount of total payments	The sum of hospital, lump sum, weekly and non-compensation payments associated with a claim for a work-related injury or illness

3.3. Analytic technique

We analysed the data using a Tweedie generalised linear model.[10] These parametric models yield robust estimates in the presence of data characterised by excess zeros, over-dispersion and heavy tails. Data such as these are not appropriate for conventional linear regression models as assumptions of normality/equality of variance are significantly violated. Tweedie models are commonly employed in social and physical sciences with claims data (insurance), actuarial data and in other areas, such as meteorological data.

4. Results

In this section we present the results of the HaSIC follow-up validation study as follows:

- a description of the workplace follow-up inspection sample and voluntary compliance and notices issued by inspectors;
- a description of the workplace follow-up WorkCover claims sample and claims data;
- reporting on the predictive validity testing of the HaSIC in terms of its relationships with prospective voluntary compliance/notices and WorkCover claims outcomes.

4.1. Description of workplaces in the follow-up inspection sample

Figure 2 shows the distribution of Australian and New Zealand Standard Industrial Classification ANZSIC codes for the37 workplaces visited for an inspection between 1 March, 2016 and 30 June, 2017. The most common industries represented were Wholesale Trade, Retail Trade, and Transport Postal and Warehousing. The industries with the fewest inspections were Arts and Recreation Services, Manufacturing, and Health Care and Social Assistance. No workplaces were inspected from Information, Media and Telecommunications, Construction, Financial and Insurance Services, Administrative and Support Services and Professional, Scientific and Technical Services.

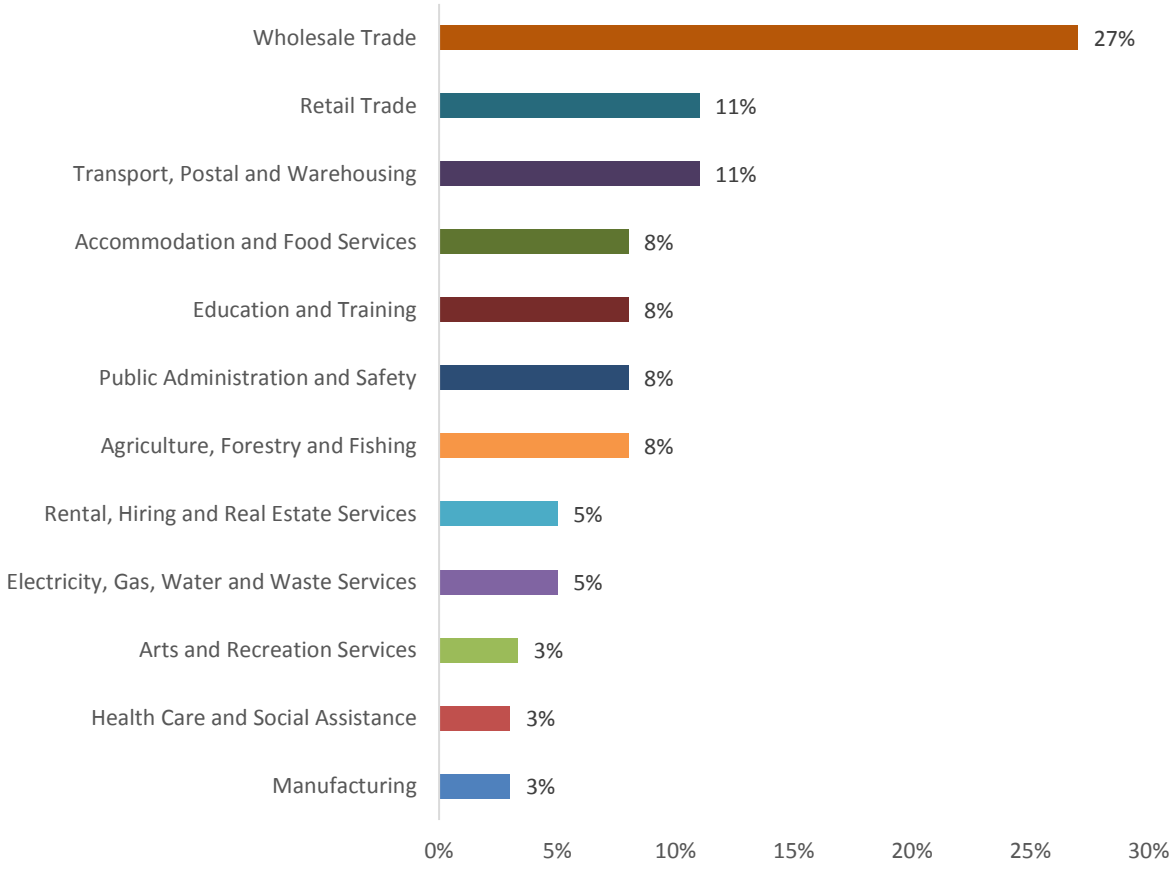

Figure 2: Industry profile of workplaces visited for a follow-up inspection

4.2. Voluntary compliance and notices issued by inspectors

In total, 56 enforcement actions were undertaken by inspectors in workplaces included in the follow-up inspection sample. Review of Figure 3 indicates 48 (86%) of these actions were improvement notices and 8 (14%) were voluntary compliance. No prohibition notices were issued to workplaces in the follow-up sample.

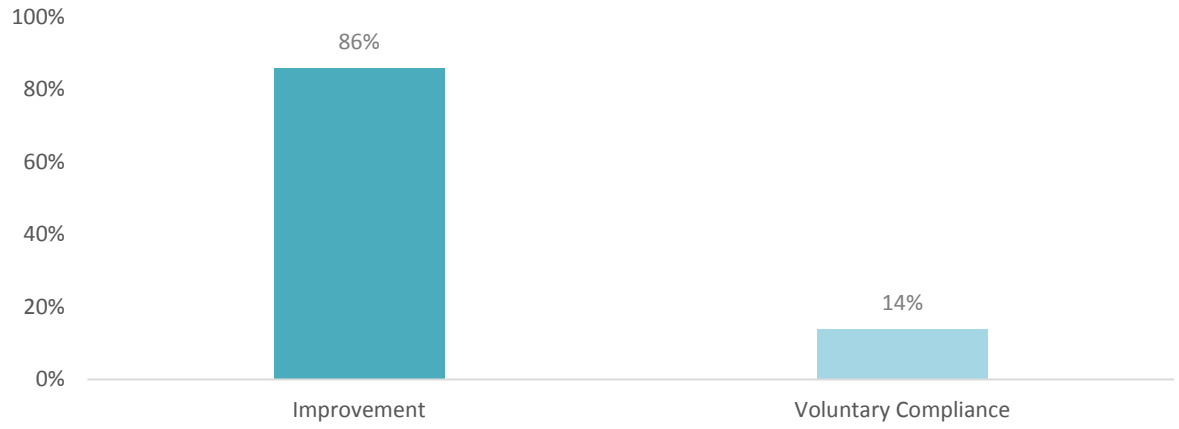

Figure 3: Type of enforcement action taken

Figure 4 presents the distribution of the number of voluntary compliance/enforcement notices issued by inspectors in the 37 follow-up workplace visits. As shown in Figure 4, in 57 percent of workplaces in the follow-up inspection sample no enforcement action was taken. In 16 percent of workplaces, one voluntary compliance/enforcement notice was issued and in 11 percent of workplaces two voluntary compliance/enforcement notices were issued by inspectors. Three or more voluntary compliance/enforcement notices were issued in 16 percent of workplaces in the follow-up inspection sample.

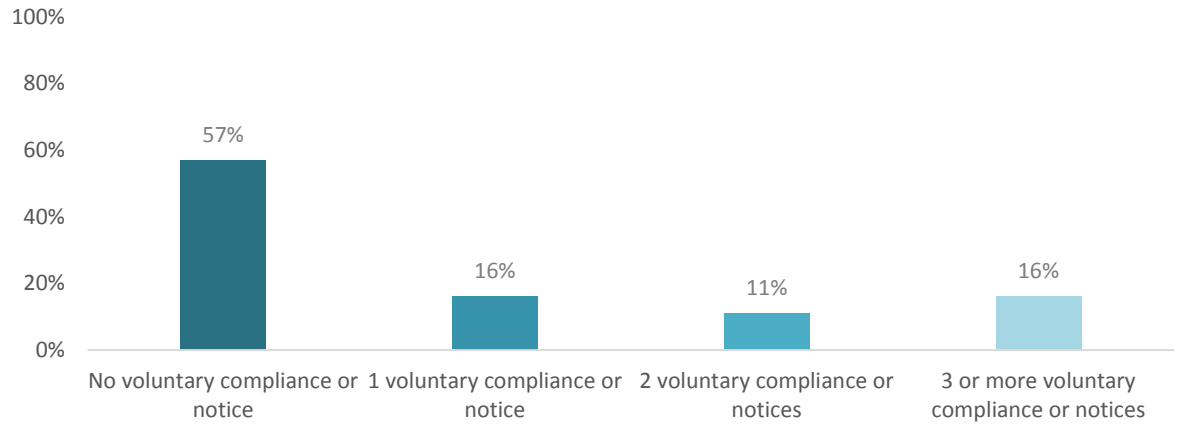

Figure 4 : Number of voluntary compliance or notices issued to workplaces

4.3. Description of workplace with claims sample

The ANZSIC codes for the 53 workplaces from the original sample that submitted at least one WorkCover claim for a work-related illness or injury between 1 March, 2016 and 30 June, 2017 are presented in Figure 5. The most common industries represented were Wholesale Trade, Retail Trade, Education and Training, and Accommodation and Food Services. The least common industries were Public Administration and Safety, Health Care and Social Assistance, and Agriculture, Forestry and Fishing. No claims were submitted by workplaces in the original sample from Rental, Hiring and Real Estate Services, Construction, Mining, Electricity, Gas, Water and Waste Services, Administrative and Support Services, Information, Media and Telecommunications, and Financial and Insurance Services.

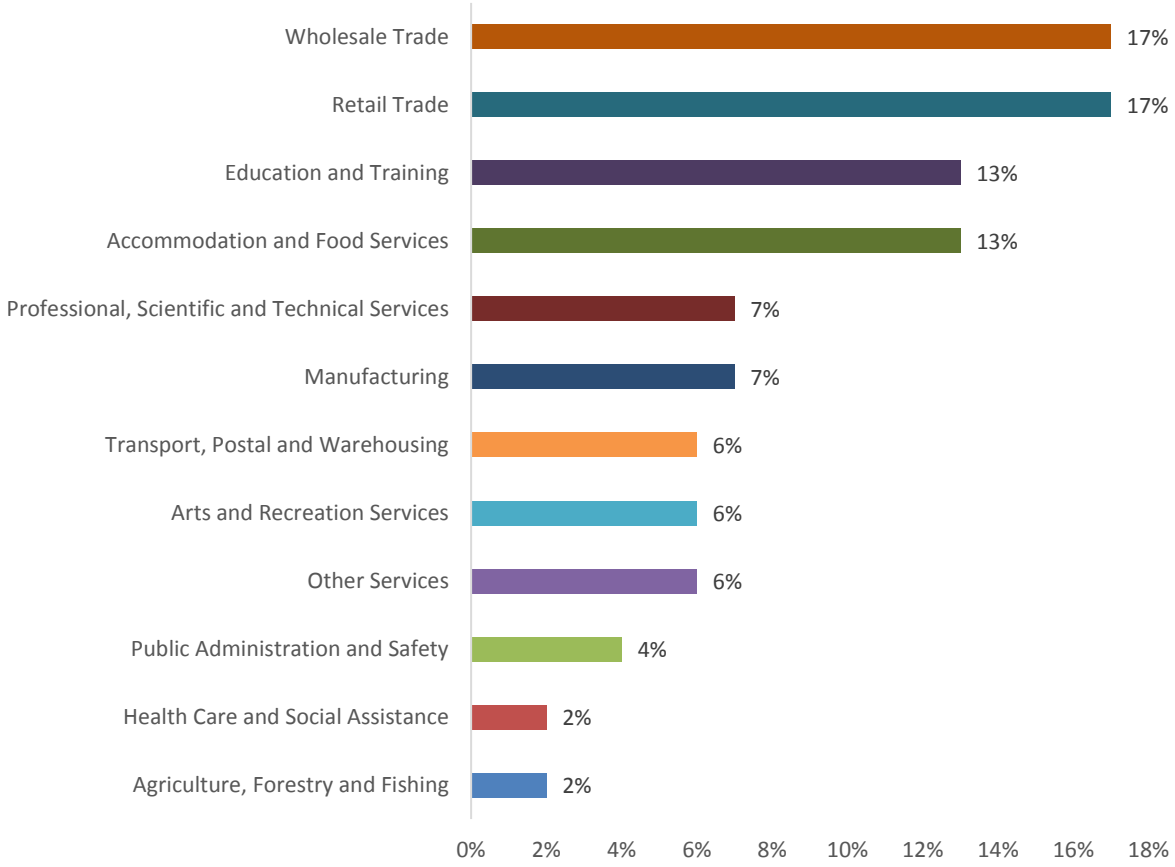

Figure 5: Industry profile of workplaces with claims

As displayed in Figure 6, among 53 workplaces in the follow-up sample that submitted WorkCover claims between 1 March, 2016 and 30 June, 2017, the majority (64%) had submitted one claim and 15 percent had submitted two claims. Seven percent of workplaces submitted three claims, 4 percent submitted 4 claims and 10 percent submitted more than four claims during this period.

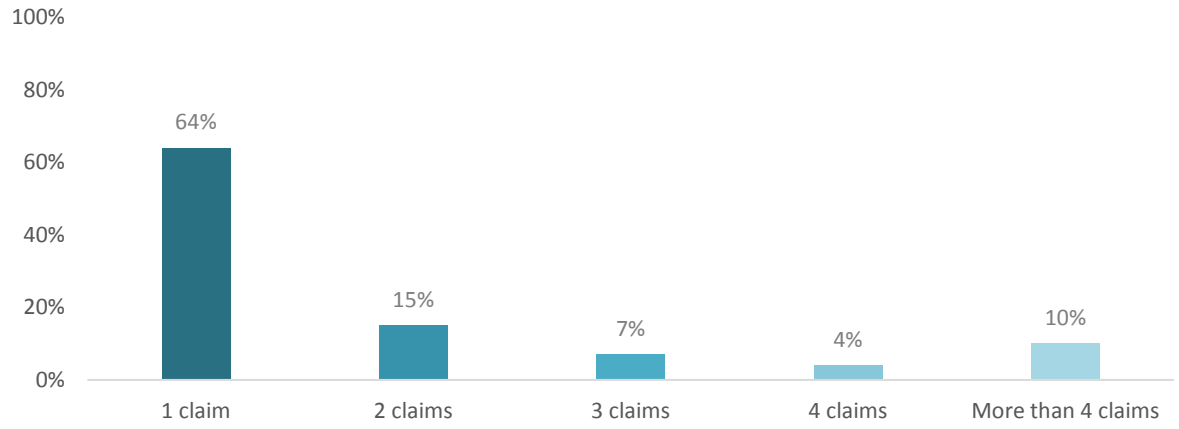

Figure 6: Total number of claims

Figures 7 and 8 show the number of minor and standard WorkCover claims (respectively), submitted by the 53 workplaces in the follow-up sample, between 1 March, 2016 and 30 June, 2017. It can be seen that the majority of workplaces with follow-up claims data had no minor claims (62%) and 28 percent had submitted one minor claim during this period. Approximately half of the workplaces (53%) with follow-up claims data, however, submitted one standard claim between 1 March, 2016 and 30 June, 2017.

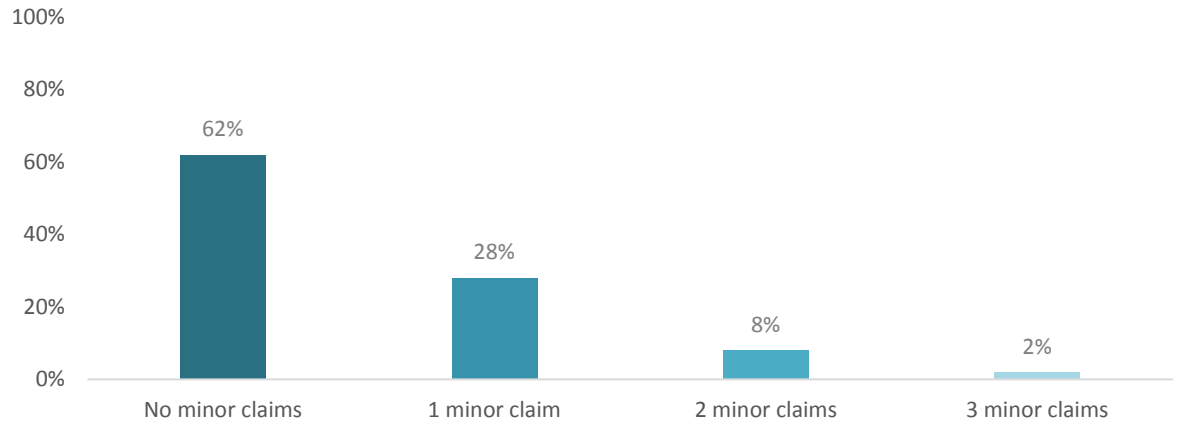

Figure 7: Number of minor claims

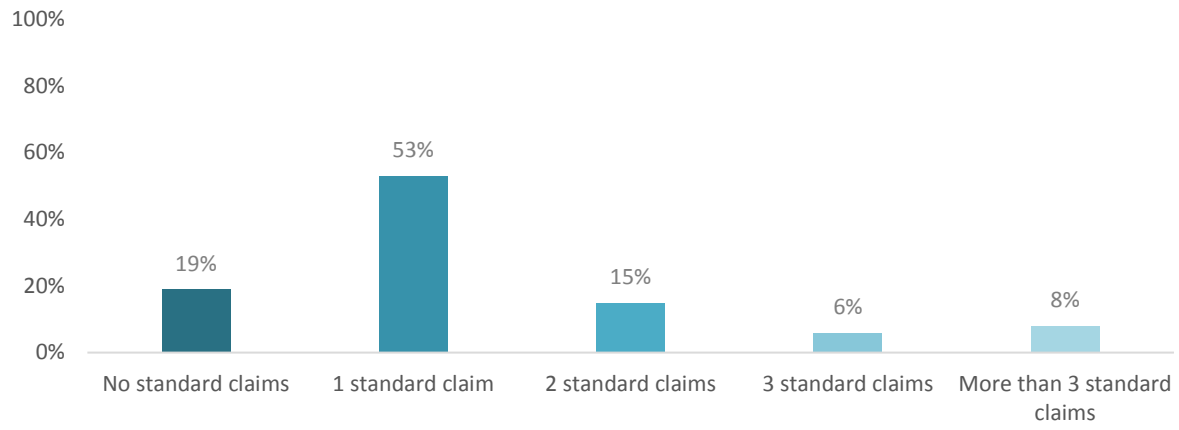

Figure 8: Number of standard claims

The percentage of the 53 workplaces that made at least one WorkCover claim for different types of work-related illness or injury between 1 March, 2016 and 30 June, 2017 is presented in Figure 9. Twenty-four percent of workplaces submitted at least one claim resulting from a traumatic joint/ligament and muscle/tendon injury, 22 percent made a claim resulting from wounds, lacerations and amputations and 21 percent made at least one claim arising from a musculoskeletal injury. Few workplaces made a claim for digestive system or intracranial injuries between 1 March, 2016 and 30 June, 2017.

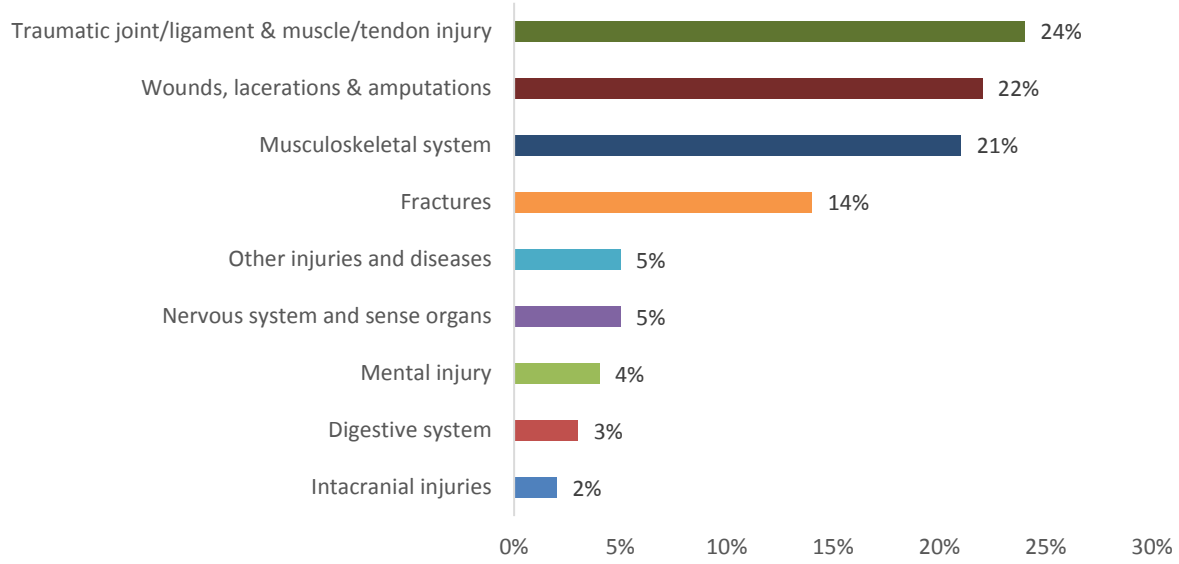

Figure 9: Workplaces that made at least one claim of each type of work-related illness or injury

Figure 10 presents the number of days that the employer paid compensation for a work-related injury or illness claim. Approximately half of workplaces (49%) that submitted a claim between 1 March, 2016 and 30 June, 2017 paid compensation between 10 and 19 days.

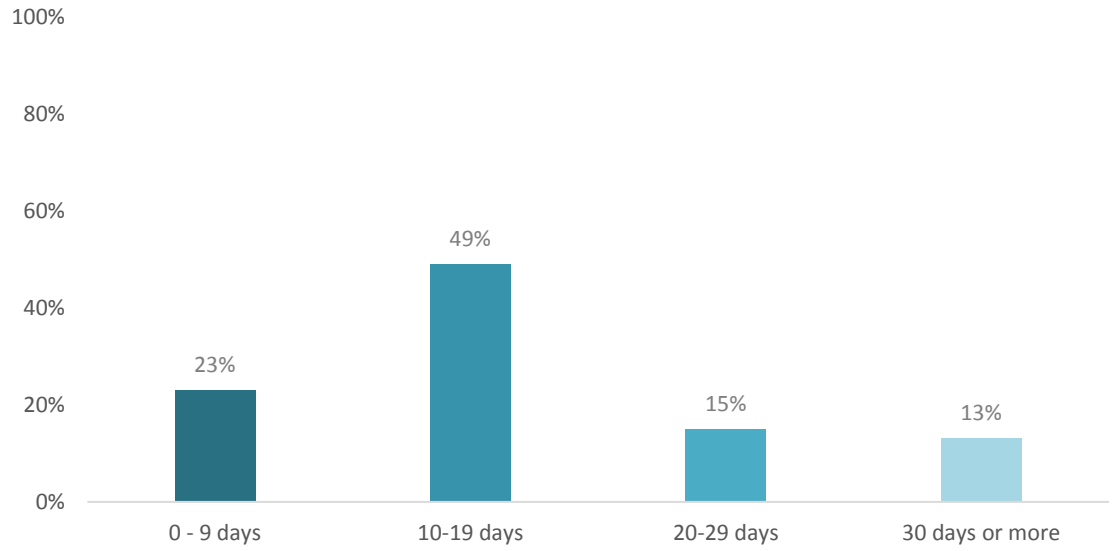

Figure 10: Number of days employer paid compensation

The number of incapacity workdays, accrued by employees between 1 March, 2016 and 30 June, 2017, for each workplace with WorkCover claims is shown in Figure 11. It can be seen that 32 percent of workplaces that submitted a claim during this period recorded no incapacity workdays, while 34 percent of workplaces incurred between 1 and 50 incapacity workdays.

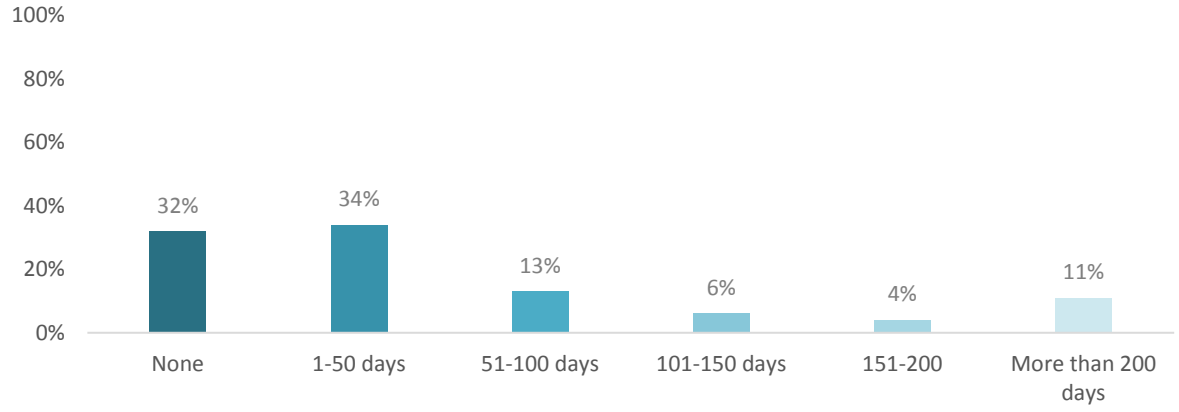

Figure 11: Number of incapacity workdays

Figure 12 displays the number of days that compensation was paid to employees following a WorkCover claim between 1 March, 2016 and 30 June, 2017 for workplaces with claims. A review of Figure 12 indicates that 59 percent of these workplaces recorded no days when employees were paid compensation. Nineteen percent of workplaces with claims had between 1 and 30 days when compensation was paid, while 6 percent recorded between 31 and 60 days.

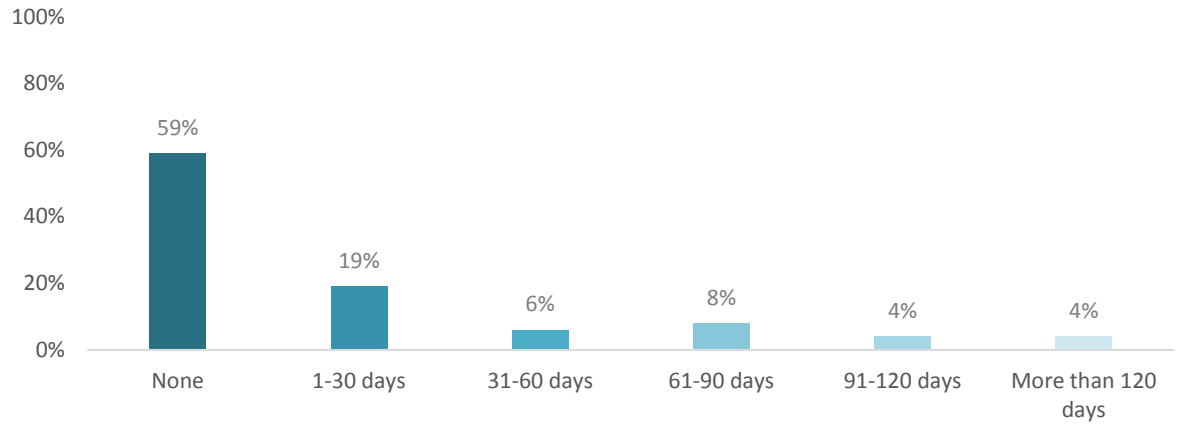

Figure 12: Number of days compensation paid

Figure 13 presents the hospital payments made between 1 March, 2016 and 30 June, 2017 to employees following a work-related illness or injury, aggregated to the workplace level. A review of Figure 13 indicates that more than half of workplaces (64%) reported that they had made no hospital payments during this period. Seventeen percent of workplaces indicated that they made payments ranging from $1 to $5,000 between 1 March, 2016 and 30 June, 2017. Relatively few workplaces with WorkCover claims during this period had employees, in aggregate, who received hospital payments exceeding $10,000.

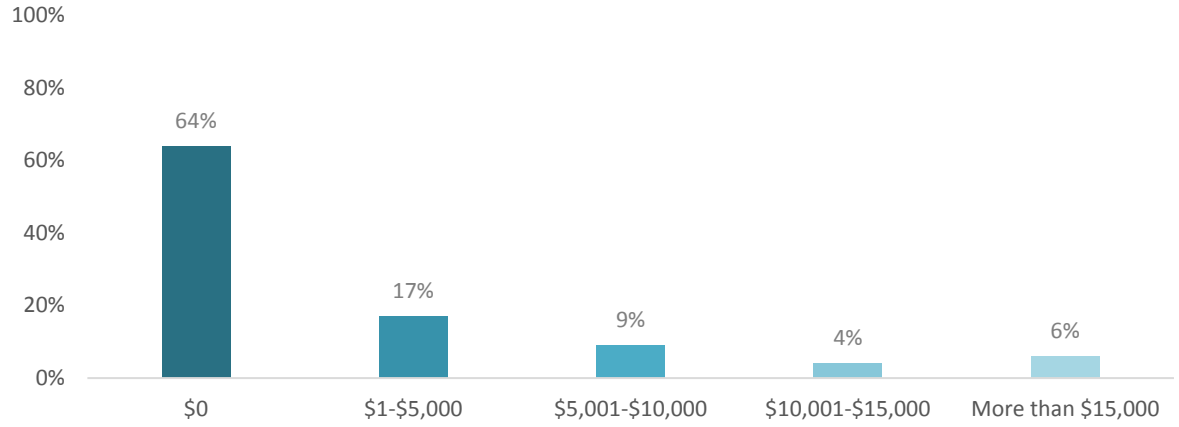

Figure 13: Hospital payments

Non-compensation payments are calculated based on payments made that are exclusive weekly compensation and lump-sum compensation payments. These payments are comprised of medical and other non-compensation amounts. A review of Figure 14 indicates that nearly 40 percent of workplaces that made WorkCover claims between 1 March, 2016 and 30 June, 2017 had no employees who were recipients of non-compensation payments, while approximately 26 percent of workplaces who made claims within this period had employees who received non-compensation payments ranging from $1 and $5,000.

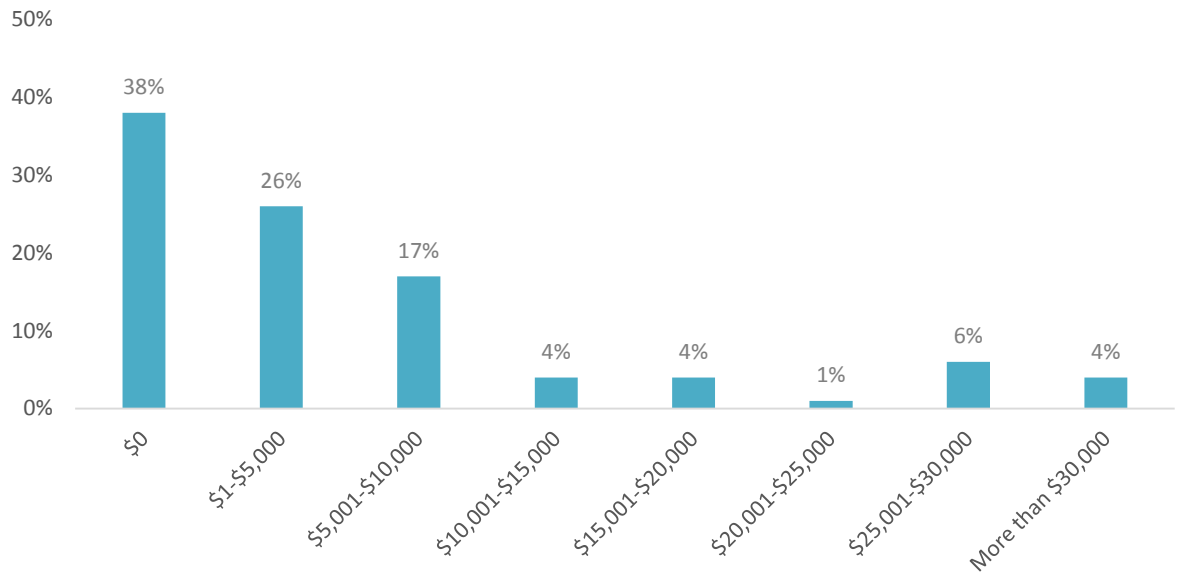

Figure 14: Non-compensation payments

Figure 15 displays the weekly compensation payments made to all employees from workplaces that lodged WorkCover claims between 1 March, 2016 and 30 June, 2017. These payments are determined based on the percentage of a worker's pre-injury average weekly wages for a 52-week period before the date of his or her injury. A review of Figure 15 shows that nearly 60 percent of workplaces recorded no employees in receipt of weekly compensation payments, while one quarter of workplaces had employees, in aggregate, who were paid weekly compensation between $1 and $5,000 during this period.

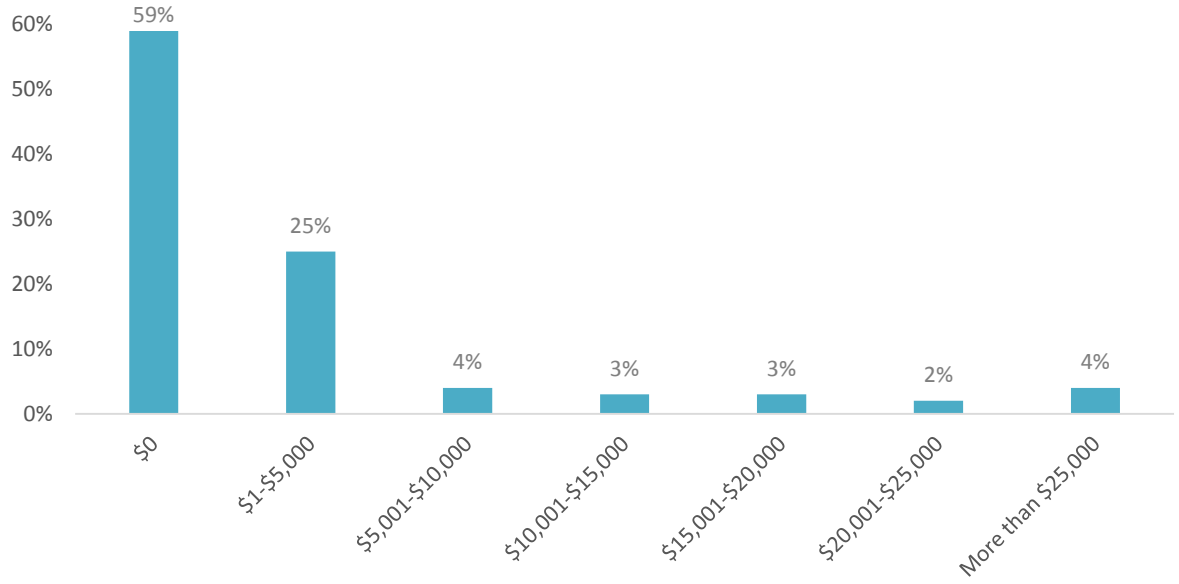

Figure 15: Weekly compensation payments

Figure 16 presents the distribution of total payments, which are calculated based on the aggregate of hospital, lump sum, weekly and non-compensation payments associated with a WorkCover claim for a work-related injury or illness. Examination of Figure 16 indicates that 32 percent of workplaces recorded between 1 March, 2016 and 30 June, 2017 that they had employees who received total payments ranging from $1 to $5,000, while 28 percent indicated that they had no employees who received a payment arising from a claim during this period.

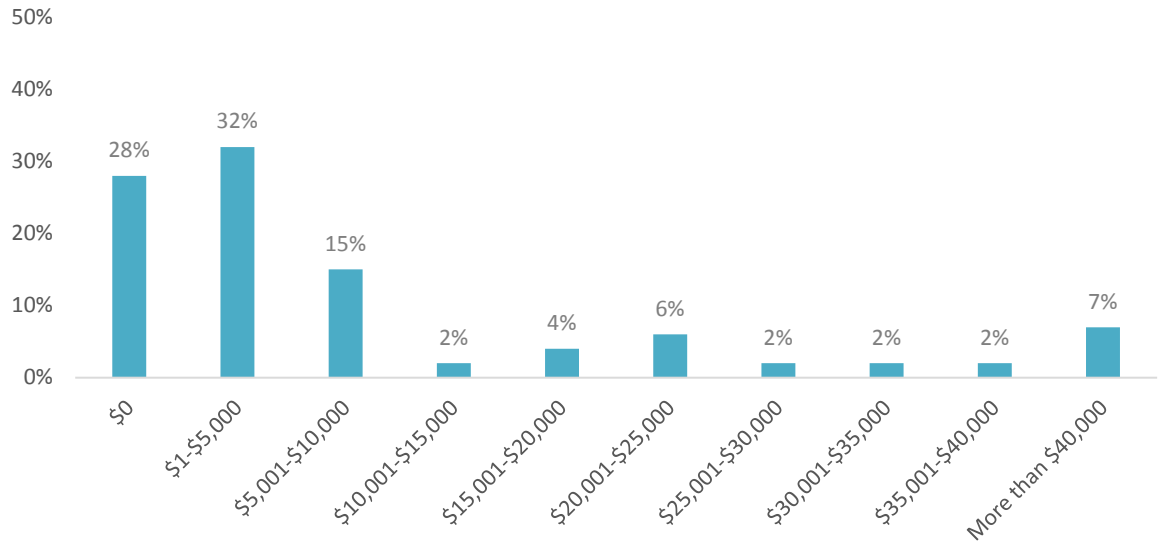

Figure 16: Total payments

4.4. Predictive validity of the HaSIC

As the name implies, predictive validity addresses how well a tool is able to forecast a future outcome. Predictive validity is determined by testing how well ratings on the tool completed during an initial assessment can predict subsequent targeted outcomes. [11] As a consequence, predictive validity of a measure can only be tested using a longitudinal design where ratings on the measure collected at time 1 are used to predict relevant criteria at time 2. Predictive validity provides more rigorous support for a measure, relative to concurrent validity, where the measure and the criterion are collected at the same time. We tested the predictive validity of the HaSIC by examining how well ratings on the HaSIC of workplaces inspected between 1 July, 2015 and 29 February, 2016 could predict enforcement actions at subsequent inspections and workplace-level WorkCover claims submitted after February 2016. Specifically, our analyses show that workplaces that received higher initial HaSIC ratings by inspectors (during visits conducted prior to February 2016), experienced significantly fewer subsequent incapacity workdays (reported post February, 2016) than those workplaces that received lower HaSIC ratings. In addition, our findings indicate that workplaces assigned initial higher HaSIC ratings subsequently had employees who received lower dollar amount non-compensation payments, lower dollar amount weekly compensation payments and lower dollar amount total compensation payments, than workplaces that received lower HaSIC ratings.

Our analysis indicted that workplaces which received higher initial HaSIC ratings by inspectors did not differ significantly from those that received lower initial HaSIC ratings in terms of the number of days compensation was paid, number of days that employers paid

compensation, dollar amount of hospital payments, number of total claims, number of standard claims or number of minor claims.

The results of our analysis showed that initial HaSIC ratings of workplaces were not predictive of subsequent enforcement outcomes. These nonsignificant findings in relation to voluntary compliance and notice outcomes may be due to insufficient statistical power associated with the relatively small sample size for the voluntary compliance and notices data (N=37). However, it is the case that voluntary compliance issues are addressed immediately and improvement notice issues are remedied within a relatively circumscribed time period. Thus, as voluntary compliance and improvement notices occur in relation to largely discrete events that are addressed relatively soon after being identified by the inspector, it may be difficult to predict these from a HaSIC rating conducted at a much earlier inspection. It is also the case that, while the HaSIC measures explicit risks and hazards, the majority of the items assess leading indicators and safety management system factors (i.e., quality of safety leadership, evaluation of process and consultation and safety communication). These leading indicators and safety management systems issue take time to improve and therefore they are unlikely to be remediated following a single inspection. In addition, research indicates that, in general, major accidents and injuries (i.e., those resulting in WorkCover claims) do not arise from single operator error or discrete hazards. Typically, they occur as a result of a chain of factors that interact and have their roots in inadequate safety management systems.[12]

The findings of our tests of the predictive validity of the HaSIC are summarised below.

4.4.1. WorkCover claims from WSV database (aggregated to the workplace level)

HaSIC ratings were negatively related to the

- number of incapacity workdays ($p < .001$);
- dollar amount of non-compensation payments ($p < .001$);
- dollar amount of weekly compensation payments ($p < .001$); and
- dollar amount of total payments ($p < .01$).

HaSIC ratings were not significantly related to the

- number of days compensation was paid;
- number of days that employers paid compensation;
- dollar amount of hospital payments;
- total number of claims;
- number of standard claims; and
- number of minor claims.

4.4.2. Voluntary compliance and notices

HaSIC ratings were not significantly related to the

- total number of voluntary compliance and enforcement notices issued;
- number of voluntary compliance notices issued; and
- number of improvement notices issued.

4.5. Conditions of use

5. Recommendations

Outlined below are recommendations based on the findings of this follow-up study.

1) The HaSIC could be utilised by inspectors to provide an assessment of the occupational health and safety (OHS) potential of a workplace as it has been shown to be a psychometrically sound tool, capable of predicting future OHS outcomes.

2) The HaSIC could be employed in the training and development of health and safety inspectors. The utilisation of this standardised, generic tool would provide inspectors, particularly inexperienced inspectors, with a consistent evaluation framework and therefore reduce idiosyncratic rater effects during workplace inspections.

3) Continuing longitudinal research is advised to examine the predictive validity of the HaSIC using additional prospective OHS outcomes, such as lost time from injury frequency rates (LTIFR) in workplaces.

4) The approach used in the current research could be applied to develop and validate a checklist for use by health and safety inspectors to assess psychosocial hazards in the workplace. Despite the increasing requirement for health and safety regulators to assess and mitigate psychosocial risks, research indicates that inspectors lack the necessary training and measures to assess these typically unobservable risks. [4]

6. Conclusion

The assessment of workplace risks by health and safety regulators to reduce accidents and injuries is a complex process. We have developed and validated the HaSIC: a 7-item, generic and easy to use tool that has substantial potential for implementation by health and safety regulators and inspectors. The purpose of the HaSIC is to support inspectors in this process, because it provides a standardised method to more easily identify specific domains requiring attention, as well as an overall assessment of the OHS performance of a workplace.

Our initial study examining the HaSIC indicated that this tool is unidimensional, with excellent reliability and very good concurrent, convergent and discriminant validity. Our findings in the follow-up study that initial ratings on the HaSIC were predictive of a number of subsequent WorkCover claim outcomes provides good evidence for the predictive validity of this tool. Considered together, the findings demonstrate that the HaSIC has favourable psychometric properties with the potential to: 1) assist inspectors and the health and safety regulator to identify workplaces most at risk of OHS incidents; 2) standardise the inspection process; and 3) enhance the development of new inspectors with limited tacit knowledge.

This study complements the large national study that has been completed by the same research team to validate the OPM-MU.[5, 13] The OPM-MU and the HaSIC are short, practical tools for measuring OHS leading indicators and are complementary as they are both instruments for assessing an OHS climate, however from different perspectives (i.e., inspectors and organizational representatives).

Overall, this research has contributed to a better understanding of inspectors' approaches to OHS leading indicators and the relationship between leading and lagging indicators.

7. References

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Appendix 1: Health and Safety Inspector Checklist (HaSIC)

		Very poor (well below minimum standard)		Poor (moderately below minimum standard)			Adequate (meets minimum standard)	Good (moderately above minimum standard)			Excellent (well above minimum standard)	
1.	Housekeeping	• External appearance of the site is poor. • Site is untidy. • Access & exits are poor.					• Acceptable external appearance of the site. • Site is reasonably tidy. • Access & exits are adequate.	• Good external appearance of the site. • Site is very tidy. • Access and exits are good.				
		0	1	2	3	4	5	6	7	8	9	10
2.	Evaluation of Processes	• Work methods rely on verbal instructions. • Inadequate supervision of high-risk activities. • Unrestricted access to hazardous areas. • Tasks are not performed safely.					• Safe work procedures have been documented. • Supervisors enforce health and safety rules. • Tasks are performed with adequate safety.	• Safe work procedures are regularly reviewed and updated. • Safe work procedures, job safety assessments (etc.) are task specific. • A systematic process is in place for the maintenance of plant and equipment. • Tasks are performed with a high degree of safety.				
		0	1	2	3	4	5	6	7	8	9	10
3.	Hazard identification and control	• Slip, trip & fall hazards are managed poorly. • Traffic management is poor. • No program in place for health and safety inspections or monitoring in the workplace. • Inadequate process for identifying and assessing hazardous manual handling activities.					• Slip, trip & fall hazards are managed adequately. • Traffic management is acceptable. • Regular workplace inspections are conducted. • Adequate process for identifying and assessing hazardous manual handling activities.	• Slip, trip & fall hazards are managed well. • Traffic management is good. • Inspection results are recorded and identified issues are actioned. • A systematic process is in place to identify, assess, control/eliminate, and review hazards within the working environment. • Comprehensive process for identifying and assessing hazardous manual handling activities.				
		0	1	2	3	4	5	6	7	8	9	10

<table>
<tr><th colspan="2"></th><th colspan="5">Very poor (well below minimum standard)</th><th colspan="5">Poor (moderately below minimum standard)</th><th colspan="5">Adequate (meets minimum standard)</th><th colspan="5">Good (moderately above minimum standard)</th><th colspan="5">Excellent (well above minimum standard)</th></tr>
<tr><td rowspan="2">4.</td><td rowspan="2">Quality of safety leadership</td><td colspan="15">• Tone of opening conversation with worksite representative suggested safety is not a priority.
• Management proactivity in areas such as cultural, linguistic, literacy & numeracy diversity is low.
• Inadequate supervision of high risk tasks or inexperienced workers.
• Management response to previous OHS incidents is poor.</td><td colspan="5">• Tone of opening conversation with worksite representative suggested safety is moderately prioritised.
• Management proactivity in areas such as cultural, linguistic, literacy & numeracy diversity is adequate.
• Adequate supervision of high risk tasks or inexperienced workers.
• Management response to previous OHS incidents is acceptable.</td><td colspan="5">• Tone of opening conversation with worksite representative suggested safety is highly prioritised.
• Management proactivity in areas such as cultural, linguistic, literacy & numeracy diversity is high.
• Good supervision of high risk tasks or inexperienced workers.
• Management response to previous OHS incidents is good.
• Systems ensure that all levels of management are accountable for health and safety outcomes.</td></tr>
<tr><td colspan="3">0</td><td colspan="3">1</td><td colspan="3">2</td><td colspan="3">3</td><td colspan="3">4</td><td colspan="5">5</td><td colspan="3">6</td><td colspan="3">7</td><td colspan="3">8</td><td colspan="3">9</td><td colspan="3">10</td></tr>
<tr><td rowspan="2">5.</td><td rowspan="2">Quality of Documentation & OHS Record Keeping</td><td colspan="15">• No, or inadequate, published health and safety policy statement.
• No, or poor system for, reporting hazards or near misses.
• No, or inadequate, reporting or investigation of accidents or incidents.
• No, or poor use of, compliance documentation.
• Poor audit/inspection regime.</td><td colspan="5">• Adequate published health and safety policy statement.
• Adequate system for reporting hazards or near misses.
• Acceptable reporting or investigation of accidents or incidents.
• Adequate use of compliance documentation.
• Adequate audit/inspection regime.</td><td colspan="5">• Good published health and safety policy statement.
• Effective system for reporting hazards or near misses.
• Good reporting or investigation of accidents or incidents.
• Good use of compliance documentation.
• Comprehensive audit/inspection regime.</td></tr>
<tr><td colspan="3">0</td><td colspan="3">1</td><td colspan="3">2</td><td colspan="3">3</td><td colspan="3">4</td><td colspan="5">5</td><td colspan="3">6</td><td colspan="3">7</td><td colspan="3">8</td><td colspan="3">9</td><td colspan="3">10</td></tr>
</table>

		Very poor (well below minimum standard)		Poor (moderately below minimum standard)			Adequate (meets minimum standard)	Good (moderately above minimum standard)			Excellent (well above minimum standard)	
6.	Consultation and Safety Communication	• Informal induction and verbal safety training. • Employees have limited access to OHS information. • No, or poorly performing, OHS committees. • Employee involvement in health and safety is poor. • OHS consultative processes for workers are poor. • Communication of safety or OHS issues directly affecting workers is inadequate.					• An adequate formal induction process covers health and safety. • Employees have reasonable access to OHS information. • Adequately performing OHS committees. • Employee involvement in health and safety is adequate. • OHS consultative processes for workers are acceptable. • Communication of safety or OHS issues directly affecting workers is adequate.	• A high quality formal induction process covers health and safety. • Employees have good access to OHS information. • High performing OHS committees. • Employee involvement in health and safety is high. • OHS consultative processes for workers are good. • Communication of safety or OHS issues directly affecting workers is good.				
		0	1	2	3	4	5	6	7	8	9	10
7.	Chemical Management	• Health and safety is not considered in handling and storage of materials and hazardous substances. • Inadequate identification system of materials. • Waste disposal of materials does not consider health and safety factors.					• Hazardous substances are stored in controlled areas and transported safely. • Material Safety Data Sheets are available. • Approved waste disposal systems are in place and used for materials.	• The inventory of all hazardous substances is up to date. • All materials are clearly identified and labelled. • Documented storage, handling and transport procedures for all substances have been implemented.				
		0	1	2	3	4	5	6	7	8	9	10