

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Does time off work after injury vary by jurisdiction? A comparative study of eight Australian workers' compensation systems.
AUTHORS	Collie, Alex; Lane, Tyler; Hassani-Mahmooui, Behrooz; Thompson, Jason; McLeod, Christopher

VERSION 1 - REVIEW

REVIEWER	Hung-Yi Chuang Kaohsiung Medical University, Kaohsiung City, Taiwan
REVIEW RETURNED	18-Jan-2016

GENERAL COMMENTS	<p>The study used National Dataset of Compensation-based Statistics (NDS) in calendar year 2010, and followed up a maximum 4.5 year period. The authors sought to determine whether the Australian state or territory in which an injured worker receives compensation affects RTW outcomes and how the magnitude of this effect.</p> <ol style="list-style-type: none">1. The dataset from NDS had a total of 345,220 cases of compensated work injury in the calendar year 2010 when the analysis began, but only 94,675 (27.4%) included due to exclusive and inclusive criteria (page 5). How many cases and percentage were excluded by what criteria? If duplication cases were more than some percentage, statistical methods for repeated measurements should be used. I will suggest a specialist statistical review.2. Instead of logistic regressions, using time milestones (4, 13, 26, 52, 104 weeks) as dependent variables, since the dependent variable was a duration time, I will suggest why not proportional hazard model (Cox regressions) used? So, I think the manuscript need a specialist statistical review.3. The discussion lack of clarity as title stated "policy influence return to work". As a readers not be an Australian, I am not familiar to the difference of 8 jurisdictions, thus the purpose of this research as title, "comparative effectiveness", did not reflect in the discussion.4. Limitation did not clarify in the discussion.5. I am curious that any difference between 2011 (or 2009) and 2010? Using the same data resource and period of follow-up.
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REVIEWER	Sara Heins Johns Hopkins School of Public Health, United States of America
REVIEW RETURNED	19-Jan-2016

GENERAL COMMENTS	This is an interesting research question and data set, but ultimately I do not think the study was designed to answer the stated research question and contains some major methodological weaknesses. In my view, the biggest weakness is that differences in policy between
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the jurisdictions are not defined or adequately discussed, which I believe prevents the authors from addressing their stated research question. Methodologically, I do not think that the issues of censoring and missing data were adequately addressed. The authors may also want to consider using survival analysis techniques for their main analysis. Further specialist statistical review could be considered. Detailed comments are below.

Methods

Pg. 5 Line 50: The sentence "To ensure comparable jurisdictional level cohorts were established, cases with two weeks or less working time loss were removed to account for jurisdictional variation in compensation system criterion for claim acceptance (both Victoria and South Australia have employer excess periods of two weeks, during which employers typically cover income replacement payments)" is a little confusing for someone not familiar with the Australian system. The employers cover income replacement as opposed to whom? Workers compensation? What is the policy in the rest of the country?

How were the categories of weeks lost selected?

Instead of just using jurisdiction, it might be useful to categorize aspects of policies in each jurisdiction. Saying that workers with in jurisdictions with Policy X have longer RTW would be much more meaningful to readers than simply saying that workers in one state have longer RTW than workers in another state.

A little more information on how injuries were originally classified and how they were categorized in your analysis would be helpful. In particular, the "other trauma" and "other diseases" category is very broad and there is no indication what percentage of workers fall into those categories.

Analysis

How was data censoring accounted for? It is not clear in the analysis.

Given the large percentage of missing data, complete case deletion is not recommended. Consider using an imputation method.

The authors should consider using survival analysis instead of logistic regression.

Results

Table 3: Ranking the covariates in descending order of odds ratio is somewhat misleading as covariates with high estimates often have wide confidence intervals and non-significant results. I think that including a more standard presentation of regression results in the body of the paper, such as what you've included as your supplementary table, would be much more accessible to the reader.

There is a distinction between returning to work and ceasing to receive compensated time off. This is somewhat addressed in the Methods section and is addressed in the limitations, but you seem to conflate the two when you discuss them in your results.

	<p>Discussion</p> <p>I think it might be going a little too far to say that differences in policy improve outcomes among injured workers. Because of the way you defined your outcome, it is unclear whether workers are actually recovering faster and getting back to work faster or if they are just being compensated for a shorter time.</p> <p>You do not say enough about which specific differences in policy might account for differences in outcome. For example, what are the policy differences between Queensland and Victoria that might account for your results? The stated objective is to determine whether policy affects outcome, but this is never really addressed.</p>
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REVIEWER	J. David Cassidy University of Toronto, Canada
REVIEW RETURNED	25-Jan-2016

GENERAL COMMENTS	<p>Congratulations on an important paper with big policy potential. I have two points for you to consider:</p> <ol style="list-style-type: none"> 1. Figure 1 shows clear separation between some states, but you don't comment on any potential policy differences that might account for this. Are there big policy differences between Victoria and say Queensland, for example? As you state in your discussion, the study can't necessarily address individual policies, but it does leave the reader wondering what they might be. Can you speculate a little about this in the discussion? 2. Your analysis is not very efficient. You have time-to-event data that could be subjected to multilevel discrete-time event history analysis, rather than multiple logistic regression analyses at each follow-up time. This would result in a single model with more accurate estimates of the jurisdictional effect. A major assumption of logistic regression is that observations are independent. However, in this case they are not, and the data has a hierarchal structure in that observations are correlated over time periods and perhaps even jurisdictions. Although such re-analysis would not likely change your results, it could affect your confidence intervals and give a better estimate of the jurisdictional effect over the follow-up period. I would suggest that you get some statistical advice in this respect. 3. On page 9, line 5, there is an error that needs to be fixed.
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Hung-Yi Chuang

Institution and Country: Kaohsiung Medical University, Kaohsiung City, Taiwan

The study used National Dataset of Compensation-based Statistics (NDS) in calendar year 2010, and followed up a maximum 4.5 year period. The authors sought to determine whether the Australian state or territory in which an injured worker receives compensation affects RTW outcomes and how the magnitude of this effect.

1. The dataset from NDS had a total of 345,220 cases of compensated work injury in the calendar year 2010 when the analysis began, but only 94,675 (27.4%) included due to exclusive and inclusive criteria (page 5). How many cases and percentage were excluded by what criteria? If duplication

cases were more than some percentage, statistical methods for repeated measurements should be used. I will suggest a specialist statistical review.

Response: The methods section has been updated to include specific information on the number of cases excluded due to the inclusion/exclusion criteria. The majority of cases were excluded by the removal of claims with less than 10 days total duration. There were only a small number of duplicate cases (N=39).

2. Instead of logistic regressions, using time milestones (4, 13, 26, 52, 104 weeks) as dependent variables, since the dependent variable was a duration time, I will suggest why not proportional hazard model (Cox regressions) used? So, I think the manuscript need a specialist statistical review.

Response: Thank you to this reviewer and the other reviewers for suggesting an alternative statistical approach. The revised manuscript includes the results of a Cox proportional hazards regression with data censored at 104 weeks of time loss. We agree with all three reviewers that this is a more appropriate analytical technique for the dataset, and it is also consistent with previous analyses we have reported using very similar data from Australian workers compensation systems. We have also referenced some of these previous studies in the revision.

3. The discussion lack of clarity as title stated "policy influence return to work". As a readers not be an Australian, I am not familiar to the difference of 8 jurisdictions, thus the purpose of this research as title, "comparative effectiveness", did not reflect in the discussion.

Response: We have revised the title of the manuscript, and clarified the objective of the analyses as being to determine whether jurisdiction of claim is an independent predictor of duration of time off work. We have also clarified in the introduction and the discussion that this study is the first in a series of planned analyses using this database. Future studies will examine specific policy settings and their impact on duration of time off work. We have included more discussion of the limited published literature examining the impact of specific workers compensation policy settings on duration of time loss. Finally, we have provided more information on the similarities and differences between the Australian workers compensation jurisdictions. This appears mainly in the methods section and provides additional context to assist the reader with interpretation of the study objectives and findings.

4. Limitation did not clarify in the discussion.

Response: There is a paragraph on study strengths and limitations in the discussion in which we describe multiple potential limitations of the study. We draw the reviewers attention to this.

5. I am curious that any difference between 2011 (or 2009) and 2010? Using the same data resource and period of follow-up.

Response: We believe the reviewer is suggesting that analyses of changes over time within jurisdictions may also be a valuable analytic technique. If so we concur, but consider this to be outside the scope of the current manuscript. There are periodic changes in policy settings in the jurisdictions included in our dataset (for example major policy changes in New South Wales in 2012 and in South Australia in 2014) but these are not the focus of this study. We chose the 2010 calendar year partly because that year, as well as the immediate prior and following years had been relatively stable in terms of policy change (i.e., there had been no major policy change in the included jurisdictions over this period) but also because it provided a sufficient period of follow-up.

Reviewer: 2

Reviewer Name: Sara Heins

Institution and Country: Johns Hopkins School of Public Health, United States of America

This is an interesting research question and data set, but ultimately I do not think the study was designed to answer the stated research question and contains some major methodological weaknesses. In my view, the biggest weakness is that differences in policy between the jurisdictions are not defined or adequately discussed, which I believe prevents the authors from addressing their stated research question.

Response: We have clarified the research question as described in response to reviewer 1. We agree that the question as originally proposed was not consistent with the analyses conducted.

Methodologically, I do not think that the issues of censoring and missing data were adequately addressed. The authors may also want to consider using survival analysis techniques for their main analysis. Further specialist statistical review could be considered. Detailed comments are below.

Response: As per response to reviewer 1, we now report cases of excluded data and the number and cases of missing data. In the revised Cox models, data is censored at 104 weeks maximum time loss.

Methods

Pg. 5 Line 50: The sentence "To ensure comparable jurisdictional level cohorts were established, cases with two weeks or less working time loss were removed to account for jurisdictional variation in compensation system criterion for claim acceptance (both Victoria and South Australia have employer excess periods of two weeks, during which employers typically cover income replacement payments)" is a little confusing for someone not familiar with the Australian system. The employers cover income replacement as opposed to whom? Workers compensation? What is the policy in the rest of the country?

Response: We have included substantially more information on policy settings across the various Australian jurisdictions in the methods section. We also now clarify the differences in the employer excess period between Victoria and South Australia (10 days) and the rest of the country (0 or 1 day). We have attempted to provide a much greater level of detail regarding the Australian system of compensation to provide context for the analyses, including a description of the consistent aspects of the systems (see methods section).

How were the categories of weeks lost selected?

Response: We believe this relates to the previous logistic regression analyses with outcomes at 4, 13, 26, 52 and 104 weeks. These were chosen to be consistent with milestones in the claims management process commonly used by Australian workers compensation systems (e.g., some systems have changes in the level of income replacement at 13 or 26 weeks). The revised analyses obviates the need for selection of these time-points.

Instead of just using jurisdiction, it might be useful to categorize aspects of policies in each jurisdiction. Saying that workers with in jurisdictions with Policy X have longer RTW would be much more meaningful to readers than simply saying that workers in one state have longer RTW than workers in another state.

Response: We agree that this would be a very useful analyses, and we intend to conduct such analyses in future. However as clarified in the revised manuscript, the purpose of this analyses was first to determine if jurisdiction of claim was an independent predictor of duration.

A little more information on how injuries were originally classified and how they were categorized in your analysis would be helpful. In particular, the "other trauma" and "other diseases" category is very broad and there is no indication what percentage of workers fall into those categories.

Response: We have provide more information on this in the updated manuscript, including some further information in the methods section. On closer examination of the injury coding across the jurisdictions involved, we identified some apparent inconsistencies in coding between states and territories, and as such have modified our approach to injury coding in the revised analyses. This is described in the method section.

Analysis

How was data censoring accounted for? It is not clear in the analysis.

Response: Data was right censored at 104 weeks maximum time loss, in the revised analyses.

Given the large percentage of missing data, complete case deletion is not recommended. Consider using an imputation method.

Response: The percentage of missing data is 14%, of those cases eligible for inclusion in the final analyses. These data were excluded as they did not have postcode information necessary for calculation of remoteness or socioeconomic status, which were included as independent factors in the model. Upon inspection these missing cases were relatively evenly distributed across the participating jurisdictions and as such we have not imputed data in the revised analyses.

The authors should consider using survival analysis instead of logistic regression.

Response: We agree and have conducted and report Cox analyses in the revision.

Results

Table 3: Ranking the covariates in descending order of odds ratio is somewhat misleading as covariates with high estimates often have wide confidence intervals and non-significant results. I think that including a more standard presentation of regression results in the body of the paper, such as what you've included as your supplementary table, would be much more accessible to the reader.

Response: The 'rank' table has been removed from the manuscript. We have included the regression results in the body of the manuscript.

There is a distinction between returning to work and ceasing to receive compensated time off. This is somewhat addressed in the Methods section and is addressed in the limitations, but you seem to conflate the two when you discuss them in your results.

Response: We have sought to clarify the language throughout the manuscript. We now refer to duration of work disability or duration of work time loss and limit references to return to work, to minimise confusion of these two related by distinct terms.

Discussion

I think it might be going a little too far to say that differences in policy improve outcomes among injured workers. Because of the way you defined your outcome, it is unclear whether workers are actually recovering faster and getting back to work faster or if they are just being compensated for a shorter time.

Response: We have revised the discussion to focus on duration of time loss not on return to work.

You do not say enough about which specific differences in policy might account for differences in outcome. For example, what are the policy differences between Queensland and Victoria that might account for your results? The stated objective is to determine whether policy affects outcome, but this is never really addressed.

Response: We have included a longer section in the methods describing the differences between jurisdictions, and as per the request of review 3, we have provided some commentary on the potential impact of some of these settings on the observed results. This is, however speculation and we also clarify that further analyses examining specific policy settings is required for more definitive statements to be made.

Reviewer: 3

Reviewer Name: J. David Cassidy

Institution and Country: University of Toronto, Canada

Congratulations on an important paper with big policy potential. I have two points for you to consider:

1. Figure 1 shows clear separation between some states, but you don't comment on any potential policy differences that might account for this. Are there big policy differences between Victoria and say Queensland, for example? As you state in your discussion, the study can't necessarily address individual policies, but it does leave the reader wondering what they might be. Can you speculate a little about this in the discussion?

Response: We have included a paragraph reflecting on some potential policy settings that may be influencing the observed results, and also some that in our view are probably not influencing the results. The methods section now describes some of the major policy differences between the jurisdictions.

2. Your analysis is not very efficient. You have time-to-event data that could be subjected to multilevel discrete-time event history analysis, rather than multiple logistic regression analyses at each follow-up time. This would result in a single model with more accurate estimates of the jurisdictional effect. A major assumption of logistic regression is that observations are independent. However, in this case they are not, and the data has a hierarchal structure in that observations are correlated over time periods and perhaps even jurisdictions. Although such re-analysis would not likely change your results, it could affect your confidence intervals and give a better estimate of the jurisdictional effect over the follow-up period. I would suggest that you get some statistical advice in this respect.

Response: We have re-analysed the data using Cox regression as per comments above.

3. On page 9, line 5, there is an error that needs to be fixed.

Response: Thank you this has been addressed.

VERSION 2 – REVIEW

REVIEWER	Hung-Yi Chuang Kaohsiung Medical University, Kaohsiung City, Taiwan
REVIEW RETURNED	07-Mar-2016

GENERAL COMMENTS	I have no other inadditional comments
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REVIEWER	Sara Heins Johns Hopkins Bloomberg School of Public Health
REVIEW RETURNED	04-Mar-2016

GENERAL COMMENTS	This manuscript is greatly improved from the first version. The objectives are appropriately stated, the discussion of differences in jurisdiction are excellent, and the figure of survival curves provides easy interpretation of results. I'm still a bit concerned about excluding 14% of your data based on missing postal code. I would recommend using multiple imputation or at least a missing data category for the two variables you aren't able to calculate, even if just as a sensitivity analysis not presented in the main results. Other than that, my suggestions for improvement are very minor. First, please explain how the SES variable was operationalized. Was this a person level or a jurisdiction level variable? What is the reference group? Second, it might make more sense to interpret your results as "longer time to return to work" as opposed to "longer duration" because this fits better with the idea that return to work is your event.
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VERSION 2 – AUTHOR RESPONSE

In response to the further comments from reviewer 2 we have made the following additional revisions to the manuscript:

1. Conducted multiple imputation to replace missing values in postcode-derived variables and conducted a Cox Regression analysis on the pooled data. This is now the analyses reported in the main document. We have included as a supplementary table the original Complete Case analysis, and we have added a brief section in the results noting the differences in results from the two approaches. Overall these do not affect the main conclusions drawn from the analyses. We have changed the Hazard ratios and confidence intervals reported in the results section to reflect the updated analyses.
2. Added more information in the methods section about the post-code derived variables, including socio-economic status.
3. A few other minor corrections for the sake of internal consistency and to correct misspellings etc...

We have chosen not to interpret results as "longer time to return to work" as this does not accurately represent the data. We are presenting the cessation of income benefits as the event in the time series. As noted in the discussion, this does not necessary reflect return to work, as other factors may influence cessation of benefits.

VERSION 3 - REVIEW

REVIEWER	Sara Heins Johns Hopkins University, United States
REVIEW RETURNED	10-Apr-2016

GENERAL COMMENTS	All my comments have been addressed and I have no further suggestions for improvement.
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