Factors associated with sickness certification of injured workers by General Practitioners in Victoria, Australia

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Abstract

Background: Work-related injuries resulting in long-term sickness certification can have serious consequences for injured workers, their families, society, compensation schemes, employers and healthcare service providers. The aim of this study was to establish what factors potentially are associated with the type of sickness certification that General Practitioners (GPs) provide to injured workers following work-related injury in Victoria, Australia.

Methods: This was a retrospective population-based cohort study conducted for compensation claims lodged by adults from 2003 to 2010. A logistic regression analysis was performed to assess the impact of various factors on the likelihood that an injured worker would receive an alternate/modified duties (ALT, \(n = 28,174\)) vs. Unfit for work (UFW, \(n = 91,726\)) certificate from their GP.

Results: A total of 119,900 claims were analysed. The majority of the injured workers were males, mostly age of 45-54 years. Nearly half of the workers (49.9\%) with UFW and 36.9\% with ALT certificates had musculoskeletal injuries. The multivariate regression analysis revealed that for most occupations older men (55-64 years) were less likely to receive an ALT certificate, (OR = 0.86, (95\%CI, 0.81 - 0.91)). Workers suffering musculoskeletal injuries or occupational diseases were nearly twice or three times at higher odds of receiving an ALT certificate when compared to fractures. Being seen by a GP experienced with workers’ compensation increased the odds of receiving ALT certificate (OR = 1.16, (95\%CI, 1.11 - 1.20)). Occupation and industry types were also important factors determining the type of certificate issued to the injured worker.

Conclusions: This study suggests that specific groups of injured workers (i.e. older age, workers with mental health issues, in rural areas) are less likely to receive ALT certificates.

Keywords: General practice, Work injury, Certification, Return to work
collar workers and those with previous long-term (mean 9.3 months, SD = 3.4) sick leave had a lower probability for RTW amongst workers with mental and musculo-skeletal problems.

Although many studies have investigated factors that predict disability after work-related injuries, it is not yet known if the same factors determine the type of sickness certificate issued to injured workers by their General Practitioners (GPs). It is important to understand if these same factors apply to GP certification practices because GPs play a significant role in the RTW process in Australia, being the first point of contact with the healthcare system for many injured workers and the main “gatekeepers” to workers compensation and disability benefits [16].

In Australia injured workers are issued three types of certificates: unfit for work (UFW), alternate or modified duties (ALT) and fit for work [17]. A medical certificate should be original, contain the worker’s name, employer details, precise diagnosis, dates on which the examination took place and when it was issued, and also dates on which the worker was unfit [18]. If the worker is recommended ALT duties, the GP will then tick an appropriate box with opportunity for comment and further consultation outside the certificate itself.

Our recent analysis [16, 19] of administrative sickness certification data in the state of Victoria showed that the majority of workers receive UFW certificates, while only one third are certified as being able to RTW on alternate duties. To understand this discrepancy, we conducted a cohort analysis of administrative claims data to compare and contrast UFW versus ALT certificates. The aim of the present analysis was to establish whether demographic, occupational, industry, medical (GP caseload of injured workers), injury and socio-economic factors can be associated with the type of sickness certificate issued by a GP to a worker following a work-related injury or disease.

Methods

Study design and Settings

The state of Victoria in Australia had a working population of approximately 2.8 million as at June 2011 [20]. Employers in the state are required to maintain workers’ compensation insurance through the WorkSafe Victoria (WSV) unless they are able to self-insure, obtain insurance through the national workers’ compensation scheme, or if they are a sole trader. The WSV system provides coverage for approximately 85% of the Victorian labour force. All injuries and illnesses that exceed the pecuniary threshold for healthcare expenses or have required more than 10 days work absence are required to be lodged with the WSV via one of six private insurers.

The Victorian workers compensation system requires production of a medical certificate in order to accept a compensation claim. Certificates can be submitted by GPs and physical therapists or by hospital-based medical practitioners. The medical certificate contains information that include the practitioner’s recommendation regarding fitness to work (UFW, ALT, fit for work) and the start and end date of the certificate [16]. There are statutory limits for the duration of UFW certificates defined in the state’s workers compensation regulations. Initial medical certification for a workers compensation claim can be of up to 14 days duration whilst subsequent certificates can be of up to 28 days duration.

This study was a retrospective population-based cohort study, for which the authors accessed the Compensation Research Database (CRD) established at the Institute for Safety Compensation and Recovery Research (ISCRR) at Monash University, Melbourne, Australia. The CRD contains de-identified case-level administrative data received from the WSV between years 1986-2012 [21, 22]. The CRD only contains details of sickness certificates issued for injuries sustained in the workplace, as periods of sick leave caused by pre-existing non-work related health problems are not recorded.

More detailed information on this dataset is provided elsewhere [16].

Study sample

All data for accepted compensation claims lodged by working age adults (15 - 65 years) with a date of injury between 1 Jan 2003 and 31 Dec 2010 were extracted from the database (n = 217,076). Claims were excluded if:

- The claim was accepted prior to 2003, as there were no adequate data on sickness certificates available.
- The claim was for healthcare expenses only (i.e., the claim did not meet the 10 day work absence threshold, therefore no sickness certificate was issued) (n = 78,086, 35.6 %);
- The initial sickness certificate was written by a health practitioner other than a GP (n = 5439, 2.5 %);
- The information on duration of certificates contained logical errors, such as certification date prior to injury date and similar (n = 82, 0.04 %).
- Claims that had no sickness certificates associated with it (n = 9654, 4.4 %);
- Worker was issued a “fit for work” certificate or recommended a full RTW (n = 3915, 1.8 %). More specific and detailed inclusion/exclusion details are published elsewhere [16, 19].

In this study only the initial sickness certificates were included in the analysis, since in this database information recorded about subsequent certificates may be incorrect or missing. Sickness certificates of all individual
claimants were organised into two pre-defined categories: (1) UFW certificates where GPs recommended a complete absence from work \((n = 91,726)\) and (2) certificates where the GP recommended a RTW with ALT duties \((n = 28,174)\).

Following several consultations within the research team, which included GPs, six categories of the most frequent worker conditions (injuries and diseases described by the Type of Occurrence Classification System (TOOCS) Third Edition (http://www.safeworkaustralia.gov.au/sites/SWA) to code injury and disease types) for issuing sickness certificates were included in the analysis: (1) fractures, (2) musculoskeletal diseases (MSD), (3) other traumatic injuries, (4) back pains and strains, (5) mental health conditions (MHC) including work-related stress and post-traumatic stress disorders, and (6) other diseases [16]. The TOOCS system is designed to code both injuries and diseases, and identifies the most serious injury or disease reported on the initial claim for workers’ compensation and allocates an appropriate code from the Nature of Injury/Disease Classification. If more than one injury or disease is reported, the most serious injury or disease that is likely to have the most adverse effect on the worker’s life is selected [16].

**Statistical analysis**

Both univariate and multivariate logistic regression analysis was performed to assess the impact of a number of factors on the likelihood that an injured worker would receive an ALT certificate from their GP. In the present study, the model predicted ALT (i.e. ALT certificate was set as 1 and UFW as 0). The model consisted of demographic (age group, gender, residential location), occupational (occupation group and employer segment size), industry type, medical (GP caseload of injured workers), injury type and socio-economic factors each with two or more levels (see Table 1). Employer segment size is based on the employer’s annualised remuneration and is grouped into small - < $1 M, medium $1 M - $20 M, large - > $20 M and government.

All factors had statistically significant contributions and were added to the multivariate model (Table 3). For the univariate analyses, all cases were included except for the Socio-Economic Indexes for Areas (SEIFA) [23] variable, which was missing for 241 cases. In the multivariate model these 241 (0.2 %) cases from the SEIFA variable were removed. The final sample for the multivariate model included 91,541 UFW cases and 28,118 ALT cases.

Cox and Snell [24] and Nagelkerke [25] pseudo \(R^2\) provides an indication of how well the fit of the model is relative to a ‘null’ model with no risk factors. The Nagelkerke \(R^2\) allows for the \(R^2\) to potentially reach 1.0, a correction to Cox and Snell that do not allow this [26].

All statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS v.21). All statistical tests were conducted at the two-sided \(p < 0.05\) level of significance. Study approval was obtained from Monash University Human Research Ethics Committee.

**Results**

**General findings**

A total of 119,900 claims with initial sickness certificates were included in this study. A descriptive summary of

| Table 1 Risk factors investigated in the present study | Description |
|--------------------------------------------------------|-------------|
| Variable                                              | Description |
| Age group                                             | Age groups in 10 year age bands as per the Australian Bureau of Statistics (www.abs.gov.au); |
| Gender                                                | Male/Female |
| Worker condition                                      | Worker condition at the initiation of claim |
| Postcode                                               | Local government area postcode transformed to the residential location: metro, rural, interstate, missing or unknown. |
| GP caseload                                            | The GP caseload was calculated by adding the number of claims for each GP provider and dividing into four groups based on consultation with GPs on what was considered low and high caseloads for a provider. Group 1 with 13 claims per provider (c/p) were considered low, group 2 with 14 – 26 c/p was low-medium, group 3 with 27 – 48 c/p was high-medium and group 4 with 49+ c/p was considered a high caseload (over the eight year period from 2003-2010). |
| Occupation group                                      | The major occupation group for the claimant based on the Australian and New Zealand Standard Classification of Occupations (ANZSCO). |
| Employer segment size                                 | This variable reflects the size of the employer where the injury took place. The segment size is classified into four groups determined by the organisation’s annual remuneration; <$1 M (Small); $1 M - $20 M (Medium); >$20 M (Large); Government (Government). |
| Industry group                                         | The major workplace industry group code based on the Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 codes. |
| Socio-economic Index (SEIFA)                          | The “Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) - 2011 State Score”, refers to a classification by the Australian Bureau of Statistics that ranks areas in Australia according to relative socio-economic advantage and disadvantage based on information from the five-yearly Census. All areas are ordered from the lowest (10 % assigned 1) to the highest (10 % assigned 10) decile number. Each area is divided into 10 groups and assigned a decile number, each decile subsequently then have an equal number of areas not necessarily people |
the variables is provided in Table 2 which outlines the number and proportion (%) of sickness certificates within each risk factor. The majority of the injured workers in both ALT and UFW categories were men, mostly between 45-54 years of age. Nearly half (49.9 %) of injured workers with UFW and 36.9 % of ALT certificates suffered from MSD. The most common occupation in the study sample was labourer, the most common industry – manufacturing, and the most common location of all injured workers was the metropolitan area of the state capital city.

**Individual variable Univariate and Multivariate analysis**

Table 3 summarizes the contributions of each risk factor in the univariate and multivariate model. Univariate analysis (step 1) for all nine category variables was conducted to identify significant individual predictors. The nine category variables were then added into the multivariate model (step 2).

The full multivariate model containing all nine category variables (inclusive of the variables within each category) was statistically significant, $X^2 (52, N = 120,186) = 8636.976$, indicating ability to distinguish between injured workers who receive an ALT and UFW certificate. The model explained between 7 % (Cox and Snell R Square) and 10.5 % (Nagelkerke R Square) of the variance in certificate type.

Compared to younger workers aged 15-24, there was a significantly reduced likelihood of workers in the 55-64 age-category receiving an ALT certificate from their GP OR = 0.86 (by 14 %), (95%CI, 0.81 – 0.91). Compared to men, women were at a slightly increased (0.62 %) chance of being issued ALT certificates, OR = 1.06 (95%CI, 1.02 – 1.10).

Taking other variables into account, worker condition was a significant risk factor. Table 3 shows that workers with MSD, OR = 1.89, (95%CI 1.79 – 1.99), and other diseases, OR = 3.32, (95%CI, 3.11 – 3.54), were three times more likely to receive an ALT certificate than those with fractures, whereas workers with MHC, OR = 0.25, (95%CI, 0.22 – 0.27), were less likely to receive an ALT certificate than those with fractures, MSDs and other diseases.

Worker’s area of residence was also an important risk factor. Compared to workers from metropolitan areas, there was a significantly reduced likelihood of injured workers from a rural area, OR = 0.91, (95%CI, 0.87 – 0.94), and interstate, OR = 0.95, (95% CI, 0.91-1.01) receiving an ALT certificate from their GP.

An analysis of GP caseloads showed that GPs with the highest case load (i.e. 49 and more claims per provider over the eight year period), OR = 1.16, (95%CI, 1.11 – 1.20), were more likely (by ~16 %) to issue an ALT certificate to an injured worker than those GPs who saw less than 13 injured workers over eight years.

In terms of worker occupation, compared to managers, only professionals, OR = 0.83, (95%CI, 0.76 – 0.91) and community and personal service workers, OR = 0.80, (95%CI, 0.73 – 0.87) were significantly less likely (by 17 and 20 %) to receive an ALT certificate.

Employer segment size was a significant risk factor associated with an ALT certificate. Workers from medium (OR = 1.38 by ~38 %), (95%CI, 1.33- 1.43), large (OR = 1.86 (by ~86 %), 95 % CI, 1.78-1.94) and government size organizations (OR = 1.24 (by ~24 %), 95 % CI, 1.14-1.34) were more likely to receive ALT certificates than those from small organizations.

When considering industry, injured workers from mining, OR = 1.53, (95%CI, 1.18 – 1.97), manufacturing, OR = 1.54, (95%CI, 1.39 – 1.71), wholesale trade, OR = 1.49, (95%CI, 1.33 – 1.66), professional scientific and technical services, OR = 1.37, (95%CI, 1.19 -1.58) and other not elsewhere classified industries, OR = 1.34, (95%CI, 1.20- 1.51) were significantly more likely (by ~40 % - 50 %) to receive an ALT certificate compared to injured workers from the agriculture, forestry and fishing industry. Taking other variables into account, SEIFA was not associated with ALT certificate at all (Table 3).

**Discussion**

**General findings**

The results of the current study clearly indicate that older workers, those with MHCs and those living rurally are more likely to receive UFW certificates than workers with physical injuries, workers living in metropolitan areas and workers visiting GPs with a higher injured worker case load. The latter are more likely to receive an ALT certificate. It is yet unknown why certain factors are associated with ALT certificates; however assumptions can be made based on existing literature, which show that older workers are less likely to RTW because they may have childcare and family responsibilities, are closer to retirement and may recover more slowly from an injury because of age and other existing health issues [27–29]. Older workers (between the age of 55 and 64 years) also seem to have more difficulty adapting to modified duties [11, 30]. In contrast, younger adults have been shown to have more favourable employment outcomes after injury [4, 12, 31].

We also found that workers suffering from physical injuries and other diseases were more likely to receive ALT certificates than workers with MHCs. It could be that GPs are more inclined to recommend modified duties and earlier RTW to such workers with physical conditions because they are familiar with interventions and type of modified duties available at workplaces that would be appropriate for such conditions [32]. Moreover, there is
| Factors                        | Alternate duties certificates | Unfit for work certificates | Total Certificates |
|-------------------------------|-------------------------------|-----------------------------|--------------------|
|                               | N    | Row % | N    | Row % | N    | Row % |
| Total Claims                  | 28,174 | 23.5  | 91,726 | 76.5  | 119,900 | 100   |
| Age Group                     |      |      |      |      |      |       |
| 15 – 24 years                 | 2827  | 22.4  | 9793  | 77.6  | 12,620 | 100   |
| 25 – 34 years                 | 5551  | 24.7  | 16,956 | 75.3  | 22,507 | 100   |
| 35 – 44 years                 | 7279  | 23.5  | 23,643 | 76.5  | 30,922 | 100   |
| 45 – 54 years                 | 8307  | 23.7  | 26,714 | 76.3  | 35,021 | 100   |
| 55 – 64 years                 | 4210  | 22.4  | 14,611 | 77.6  | 18,821 | 100   |
| Gender                        |      |      |      |      |      |       |
| Male                          | 18,950 | 24.3  | 58,891 | 75.7  | 77,841 | 100   |
| Female                        | 9224  | 21.9  | 32,835 | 78.1  | 42,059 | 100   |
| Worker Condition              |      |      |      |      |      |       |
| Fractures                     | 2040  | 17.3  | 9756  | 82.7  | 11,796 | 100   |
| MSD                           | 14,062 | 29.3  | 33,884 | 70.7  | 47,946 | 100   |
| Other traumatic injuries      | 3402  | 18.2  | 15,320 | 81.8  | 18,722 | 100   |
| Back pains & strains          | 4200  | 21.0  | 15,765 | 79.0  | 19,965 | 100   |
| MHC                           | 608   | 4.9   | 11,871 | 95.1  | 12,479 | 100   |
| Other diseases                | 3862  | 42.9  | 5130  | 57.1  | 8992  | 100   |
| Local Government Area         |      |      |      |      |      |       |
| Metro                         | 18,686 | 24.6  | 57,367 | 75.4  | 76,053 | 100   |
| Rural                         | 7214  | 20.9  | 27,233 | 79.1  | 34,447 | 100   |
| Interstate                    | 2274  | 24.2  | 7126  | 75.8  | 9400  | 100   |
| GP caseload                   |      |      |      |      |      |       |
| 1 – 13 Claims/provider        | 6622  | 22.4  | 22,941 | 77.6  | 29,563 | 100   |
| 14 – 26 Claims/provider       | 6654  | 22.1  | 23,389 | 77.9  | 30,043 | 100   |
| 27 – 48 Claims/provider       | 6763  | 22.1  | 23,824 | 77.9  | 30,587 | 100   |
| 49 + Claims/provider          | 8135  | 27.4  | 21,572 | 72.6  | 29,707 | 100   |
| Occupation                    |      |      |      |      |      |       |
| Managers                      | 1428  | 22.5  | 4909  | 77.5  | 6337  | 100   |
| Professionals                 | 2393  | 19.0  | 10,205 | 81.0  | 12,598 | 100   |
| Technicians & trades          | 6473  | 24.7  | 19,688 | 75.3  | 26,161 | 100   |
| Community & personal service  | 2792  | 17.1  | 13,532 | 82.9  | 16,324 | 100   |
| Clerical & admin              | 978   | 21.4  | 3593  | 78.6  | 4571  | 100   |
| Sales workers                 | 926   | 23.6  | 2997  | 76.4  | 3923  | 100   |
| Machinery operators & drivers | 5625  | 26.7  | 15,463 | 73.3  | 21,088 | 100   |
| Labourers                     | 7559  | 26.2  | 21,339 | 73.8  | 28,898 | 100   |
| Employer Segment Size         |      |      |      |      |      |       |
| Small                         | 6190  | 19.3  | 25,016 | 80.7  | 32,106 | 100   |
| Medium                        | 12,576 | 25.4  | 36,876 | 74.6  | 49,452 | 100   |
| Large                         | 7851  | 28.6  | 19,570 | 71.4  | 27,421 | 100   |
| Government                    | 1557  | 14.3  | 9364  | 85.7  | 10,921 | 100   |
| Industry                      |      |      |      |      |      |       |
| Manufacturing                 | 7733  | 31.0  | 17,232 | 69.0  | 24,965 | 100   |
| Wholesale trade               | 2261  | 29.4  | 5442  | 70.6  | 7703  | 100   |
still a stigma associated with MHC and health professionals may perceive injured workers with mental illness as having poorer health outcomes than they really have [16, 33]. Studies also show that when it comes to MHC claims GPs grapple with issues such as diagnostic uncertainty, conflicting medical opinions, poor communication between professionals and secondary concerns related to pain management, lack of motivation by the injured worker to RTW and sourcing appropriate care services [34–36]. It is also possible that accommodations for MHC are absent in workplaces and as such GPs may be reluctant to suggest a return to work.

In terms of occupation, manual workers are less likely to receive ALT certificates than managers. This suggests that working on alternate or restricted duty appears to be a viable option mainly in managerial positions, whereas manual labour occupations have been associated with more severe disabilities of longer duration, probably associated with UFW rather with modified duties [37, 38]. On the other hand, research also shows that occupation does not determine the type of sickness certificate [39], and that may be why the odds of receiving ALT certificate across other occupations are very similar (Table 3).

As opposed to the findings reported by Shiel et al [15], demonstrating that GP and general practice factors had no significant impact on likelihood of a ‘may be fit’ note being issued, we found that those workers who see GPs with a higher caseload of injured workers are more likely to receive ALT certificates. This suggests that GPs with a higher caseload of injured workers are familiar with the workers’ compensation system, have a positive attitude towards RTW and modified tasks and therefore more likely to recommend ALT duties [40–42]. This finding also suggests that in order to achieve improved certification (i.e. higher proportion of ALT certificates) systems

| Table 2 Profile of alternate duties and unfit for work certificates by category in Victoria, 2003-2010 (Continued) |
|-------------------------|----------|--------|--------|----------|-------|
| Mining                  | 105      | 28.3   | 266    | 71.7     | 371   |
| Electricity, gas, water & waste | 296     | 26.8   | 808    | 73.2     | 1104  |
| Professional scientific & technical services | 581     | 25.4   | 1705   | 74.6     | 2286  |
| Information media & telecommunications | 207     | 24.8   | 628    | 75.2     | 835   |
| Retail trade            | 1588     | 24.3   | 4957   | 75.7     | 6545  |
| Transport, postal & warehousing | 2166    | 22.5   | 7481   | 77.5     | 9647  |
| Construction            | 2775     | 21.5   | 10,115 | 78.5     | 12,890|
| Administrative & support services | 818      | 21.3   | 3027   | 78.7     | 3845  |
| Rental hiring & real estate services | 221     | 20.9   | 835    | 79.1     | 1056  |
| Arts & recreation services | 618     | 20.8   | 2356   | 79.2     | 2974  |
| Accommodation & food services | 765      | 20.3   | 3004   | 79.7     | 3769  |
| Financial & insurance services | 127     | 18.9   | 544    | 81.1     | 671   |
| Healthcare & social assistance | 3358    | 18.8   | 14,497 | 81.2     | 17,855|
| Education & training    | 1156     | 18.0   | 5261   | 82.0     | 6417  |
| Agriculture, forestry & fishing | 541     | 17.4   | 2577   | 82.6     | 3118  |
| Public administration & safety | 1297    | 16.7   | 6451   | 83.3     | 7748  |
| Other services          | 11,561   | 25.6   | 4540   | 74.4     | 16,101|

| Socio-Economic Index    |
|-------------------------|----------|
| Lowest 10 % (0-10 %)    | 3232     |
| Lowest 11-20 %          | 1626     |
| Lowest 21-30 %          | 2064     |
| Lowest 31-40 %          | 2853     |
| Lowest 41-50 %          | 2982     |
| Highest 51-60 %         | 3396     |
| Highest 61-70 %         | 4208     |
| Highest 71-80 %         | 2827     |
| Highest 81-90 %         | 3717     |
| Highest 10 % (91-100 %) | 1213     |

| MSD musculoskeletal disorders, MHC mental health conditions |

Ruseckaite et al. BMC Public Health (2016) 16:298 | Page 6 of 10
### Table 3  Odds ratio and significance of factors associated with the type of GP certificate being issued (Unfit for work vs. Alternate duties, where Alternate duties is the outcome)

| Factors                        | Univariate model |                      |                      | Multivariate model |                      |                      |
|--------------------------------|------------------|----------------------|----------------------|--------------------|----------------------|----------------------|
|                                | Odds Ratio       | CI at 95 %           | Odds Ratio           | CI at 95 %         | Odds Ratio           | CI at 95 %           |
| Age Group                      |                  |                      |                      |                    |                      |                      |
| 15 – 24 years [REF]            | 1                |                      | 1                    |                    |                      |                      |
| 25 – 34 years                  | 1.13a            | 1.07 – 1.19          | 1.03                 | 0.97 – 1.09        |                      |                      |
| 35 – 44 years                  | 1.06             | 1.01 – 1.12          | 0.95                 | 0.91 – 1.00        |                      |                      |
| 45 – 54 years                  | 1.39a            | 1.02 – 1.13          | 0.96                 | 0.91 – 1.01        |                      |                      |
| 55 – 64 years                  | 1.32             | 0.94 – 1.05          | 0.86a                | 0.81 – 0.91        |                      |                      |
| Gender                         |                  |                      |                      |                    |                      |                      |
| Male [REF]                     | 1                |                      | 1                    |                    |                      |                      |
| Female                         | 0.87a            | 0.84 – 0.89          | 1.06a                | 1.02 – 1.10        |                      |                      |
| Worker Condition               |                  |                      |                      |                    |                      |                      |
| Fractures [REF]                | 1                |                      | 1                    |                    |                      |                      |
| MSD                            | 1.95a            | 1.88 – 2.09          | 1.89a                | 1.79 – 1.99        |                      |                      |
| Other traumatic injuries       | 1.06             | 1.00 – 1.12          | 0.99                 | 0.93 – 1.05        |                      |                      |
| Back pains and strains         | 1.27a            | 1.20 – 1.35          | 1.19a                | 1.12 – 1.27        |                      |                      |
| MHC                            | 0.24a            | 0.22 – 0.26          | 0.25a                | 0.22 – 0.27        |                      |                      |
| Other diseases                 | 3.60a            | 3.37 – 3.83          | 3.32a                | 3.11 – 3.54        |                      |                      |
| Local Government Area          |                  |                      |                      |                    |                      |                      |
| Metro [REF]                    | 1                |                      | 1                    |                    |                      |                      |
| Rural                          | 0.81a            | 0.78 – 0.83          | 0.91a                | 0.87 – 0.94        |                      |                      |
| Interstate                     | 0.98             | 0.93 – 1.00          | 0.95                 | 0.91 – 1.01        |                      |                      |
| GP caseload                    |                  |                      |                      |                    |                      |                      |
| 1 – 13 Claims/provider [REF]   | 1                |                      | 1                    |                    |                      |                      |
| 14 – 48 Claims/provider        | 0.98             | 0.94 – 1.02          | 0.93a                | 0.90 – 0.97        |                      |                      |
| 49 + Claims/provider           | 0.98             | 0.94 – 1.02          | 0.89a                | 0.85 – 0.92        |                      |                      |
| Occupation                     |                  |                      |                      |                    |                      |                      |
| Managers [REF]                 | 1                |                      | 1                    |                    |                      |                      |
| Professionals                  | 0.80a            | 0.74 – 0.86          | 0.83a                | 0.76 – 0.91        |                      |                      |
| Technicians & trades           | 1.13a            | 1.05 – 1.21          | 0.91                 | 0.84 – 0.97        |                      |                      |
| Community & personal service   | 0.71a            | 0.66 – 0.76          | 0.80a                | 0.73 – 0.87        |                      |                      |
| Clerical & admin               | 0.93             | 0.85 – 1.02          | 0.96                 | 0.87 – 1.07        |                      |                      |
| Sales workers                  | 1.06             | 0.96 – 1.16          | 0.92                 | 0.83 – 1.02        |                      |                      |
| Machinery operators & drivers  | 1.25a            | 1.17 – 1.33          | 0.91                 | 0.84 – 0.97        |                      |                      |
| Labourers                      | 1.21a            | 1.14 – 1.29          | 0.91                 | 0.85 – 0.97        |                      |                      |
| Employer Segment Size [REF]    |                  |                      |                      |                    |                      |                      |
| Small                          | 1                |                      | 1                    |                    |                      |                      |
| Medium                         | 1.42a            | 1.38 – 1.47          | 1.38a                | 1.33 – 1.43        |                      |                      |
| Large                          | 1.68a            | 1.68 – 1.74          | 1.86a                | 1.78 – 1.94        |                      |                      |
| Government                     | 0.69a            | 0.65 – 0.73          | 1.24a                | 1.14 – 1.34        |                      |                      |
| Industry                       |                  |                      |                      |                    |                      |                      |
| Agriculture, forestry & fishing [REF] | 1      |                      | 1                    |                    |                      |                      |
| Mining                         | 1.88a            | 1.47 – 2.40          | 1.53a                | 1.18 – 1.97        |                      |                      |
may want to steer injured workers towards more “experienced” GPs.

Employer segment size stood out as an important risk factor associated with ALT certificate. Injured workers from large enterprises were nearly twice as likely to receive ALT certificates as those who work for small size organizations. This corresponds to previous findings [12, 37] that showed working for larger companies was positively associated with return to work. Larger organisations are able to employ specialists in disability management [43], provide more information about modified duties and RTW and have greater flexibility in allowing workers to return to modified jobs [37]. Larger workplace size has been associated with a shorter duration of absence following a physical work injury because of an increased ability of larger workplaces to offer accommodations or alternate duties [44].

In terms of industry, workers from mining, manufacturing, electricity, gas, water and waste as well as wholesale trade industries are more likely (up to 50 %) to receive ALT certificates than workers from agriculture, forestry and fishing. Literature on industry as a predictor of RTW is scarce; however it is known that being a blue collar worker (i.e. performing manual labour) is associated with longer duration off work when compared to those workers who perform professional jobs [11]. While physically demanding occupations and employment in goods producing industries have been associated with slower RTW for physical injuries [45], studies on mental health claims have reported longer duration off work in

### Table 3 Odds ratio and significance of factors associated with the type of GP certificate being issued (Unfit for work vs. Alternate duties, where Alternate duties is the outcome) (Continued)

| Industry                        | Odds Ratio | 95% CI       | p-value  |
|---------------------------------|------------|--------------|----------|
| Manufacturing                   | 2.13ª      | 1.94 – 2.35  | 1.54ª    | 1.39 – 1.71 |
| Electricity, gas, water & waste | 1.74ª      | 1.48 – 2.05  | 1.31ª    | 1.11 – 1.55 |
| Construction                    | 1.30ª      | 1.18 – 1.44  | 1.08     | 0.97 – 1.20 |
| Wholesale trade                 | 1.97ª      | 1.78 – 2.19  | 1.49ª    | 1.33 – 1.66 |
| Retail trade                    | 1.52ª      | 1.36 – 1.70  | 1.21ª    | 1.07 – 1.36 |
| Accommodation & food services   | 1.21ª      | 1.07 – 1.37  | 1.05     | 0.92 – 1.19 |
| Transport, postal & warehousing | 1.37ª      | 1.24 – 1.53  | 1.06     | 0.95 – 1.19 |
| Information media & telecommunications | 1.57ª | 1.30 – 1.88  | 1.15     | 0.95 – 1.40 |
| Financial & insurance services  | 1.11       | 0.89 – 1.97  | 0.93     | 0.73 – 1.17 |
| Rental hiring & real estate services | 1.26ª | 1.05 – 1.50  | 1.19     | 0.99 – 1.43 |
| Professional scientific & technical services | 1.62ª | 1.42 – 1.85  | 1.37ª    | 1.19 – 1.58 |
| Administrative & support services | 1.28ª     | 1.14 – 1.45  | 1.06     | 0.93 – 1.20 |
| Public administration & safety  | 0.95       | 0.85 – 1.06  | 1.00     | 0.88 – 1.14 |
| Education & training            | 1.04       | 0.93 – 1.17  | 1.12     | 0.98 – 1.27 |
| Healthcare & social assistance  | 1.10       | 0.99 – 1.21  | 0.86     | 0.77 – 0.97 |
| Arts & recreation services      | 1.24ª      | 1.09 – 1.42  | 0.99     | 0.86 – 1.13 |
| Other services                  | 1.63ª      | 1.46 – 1.82  | 1.34ª    | 1.20 – 1.51 |

| Socio-Economic Index          | Odds Ratio | 95% CI       | p-value  |
|-------------------------------|------------|--------------|----------|
| Lowest 10 % (0-10 %) [REF]    | 1          |              | 1        |
| Lowest 11-20 %                | 0.77ª      | 0.72 – 0.82  | 0.96     | 0.90 – 1.04 |
| Lowest 21-30 %                | 0.88ª      | 0.83 – 0.94  | 0.99     | 0.93 – 1.06 |
| Lowest 31-40 %                | 0.86ª      | 0.81 – 0.91  | 0.97     | 0.91 – 1.03 |
| Lowest 41-50 %                | 0.89ª      | 0.84 – 0.94  | 1.00     | 0.94 – 1.07 |
| Highest 51-60 %               | 0.89ª      | 0.84 – 0.94  | 0.98     | 0.93 – 1.04 |
| Highest 61-70 %               | 0.93       | 0.88 – 0.98  | 1.04     | 0.98 – 1.10 |
| Highest 71-80 %               | 0.87ª      | 0.82 – 0.93  | 1.02     | 0.96 – 1.09 |
| Highest 81-90 %               | 0.88ª      | 0.84 – 0.93  | 1.05     | 0.98 – 1.11 |
| Highest 10 % (91-100 %)       | 0.76ª      | 0.71 – 0.82  | 0.95     | 0.88 – 1.03 |

MSD: musculoskeletal disorders, MHC: mental health conditions
ª denotes p < 0.05
ª per eight year period
government and educational industries compared to other industry sectors [46].

**Study limitations and strengths**

To the best of our knowledge, this is the first study that explores the factors associated with the type of sickness certificate issued by a GP in Australia. In this study we were able to examine almost all the predicting factors previously reported in the literature.

There are several limitations to our analyses. First, in this study we analysed the initial sickness certificates only. Consequently, we could not ascertain for how long UFW certificates were issued and when (and/or if) the changeover to ALT certificates occurred, thus facilitating RTW. Second, we were unable to analyse other important factors, such as comorbidities, a previous history of sickness certification, expectations of sickness absence and motivation as this information was not available from the data collected. The opportunity to include these explanatory variables would have increased the robustness of the model. Finally, data from administrative datasets are subject to entry errors, miscoding and misclassification, which we could not control for.

**Practical applications**

It is known that extended periods of sickness can negatively affect injured workers, their family, employers and lead to increased compensation schemes. Workers might have poorer health outcomes and require an increased number of health interventions, which are associated with higher compensation costs [47-49]. From a policy perspective, this study suggests that efforts to target specific groups of injured workers (i.e. older age, workers with MHCs in rural areas) and employers (e.g. smaller companies) could increase the awareness of benefits of modified and alternate duties and facilitate RTW for groups that are otherwise less likely to RTW.

**Conclusions**

The findings of this study suggest that seeing a GP with MHCs in rural areas) and employers (e.g. smaller companies) could increase the awareness of benefits of modified and alternate duties and facilitate RTW for groups that are otherwise less likely to RTW.

**Ethics approval**

Monash University Human Research Ethics Committee, Melbourne, Australia.

**Availability of data and materials**

Access to the CRD is publicly available for researchers to use, under strict guidelines approved by the compensation authorities and the Monash University Human Research Ethics Committee. Information about the CRD data can be found at http://www.iscrr.com.au/evidence-data-and-research/using-data/compensation-research-database-crd. For further information on this database, or to request a data extract for research, please review the ISCRR data access policy and email CRD@iscrr.com.au.

**Competing interests**

BB and DM have received funding from ISCRR for subsequent research studies, RR and AC were employed by ISCRR at the time the study was conducted.

**Authors’ contributions**

RR designed the study, conducted data analysis and wrote the manuscript. AC, MS and BB participated in its design, helped with the preparation of the dataset and coordination and helped to draft the manuscript. BB, AK and DM provided conceptual advice. DM and AC conceived the study, and also were the principal investigators. All authors read and approved the final manuscript.

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