HEALTH AND SAFETY AUTHORITY

Transport and Storage Sector

Analysis of Work-related Injury and Illness, 2001 to 2014

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Transport and Storage Sector

Sectoral Analysis No. 5: Transport Sector
by O. Kenny, B. Maître and H. Russell (April 2018)

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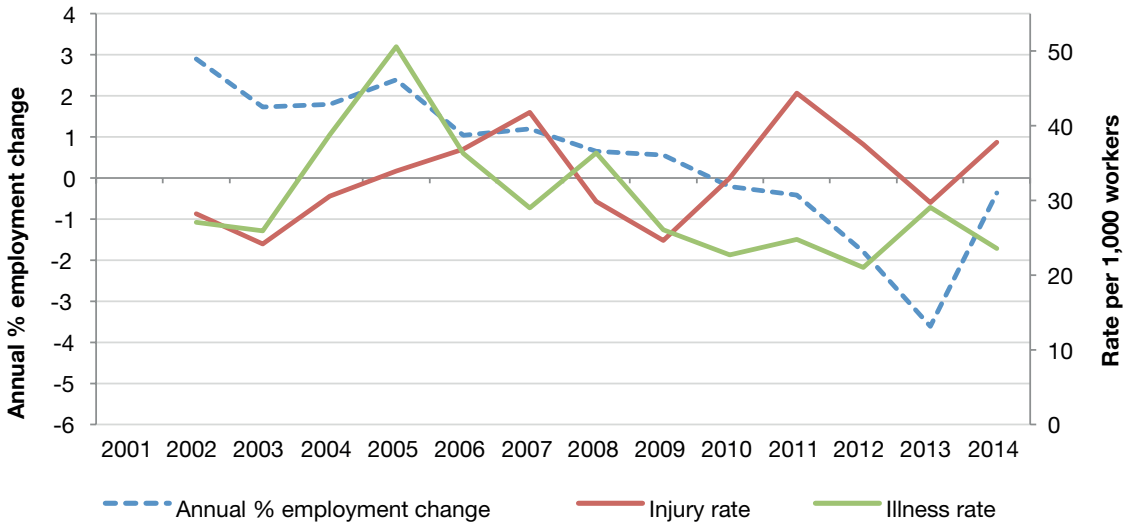
The following analysis draws on the Central Statistics Office's (CSO) Quarterly National Household Survey (QNHS) to explore work-related accidents and illnesses in the transport and storage sector over the period 2001 to 2014 (see Box 1 for details on data source and measures). The results are based on workers' self-reports of work-related illness and injury. All injuries and illnesses are included, up to those requiring lengthy work absences, and regardless of whether or not there was no absence or only a short absence from work, as many people continue to work while sick or injured. Findings across the economy as a whole are explored in Russell *et al.* (2015 and 2016).[i] This research briefing provides a within-sector picture of the transport and storage sector over the period 2001–2014.[ii]

Employment in the transport sector has been increasing since the 1990s and, despite yearly fluctuation, has remained relatively constant across the recent economic cycle of boom, bust and recovery. Notwithstanding a tendency towards more positive values during the boom and negative values during the recession, change in annual percentage employment, which ranges from +3.0% to -5.1%, represents a fairly stable trend compared to other sectors (Figure 1). The number employed in this sector in 2014 (about 89,400 workers) accounts for about 4.7% of total employment.

Figure 1: Rates of work-related injury and illness, and annual percentage change in employment in the transport and storage sector (two-year moving averages), 2001–2014



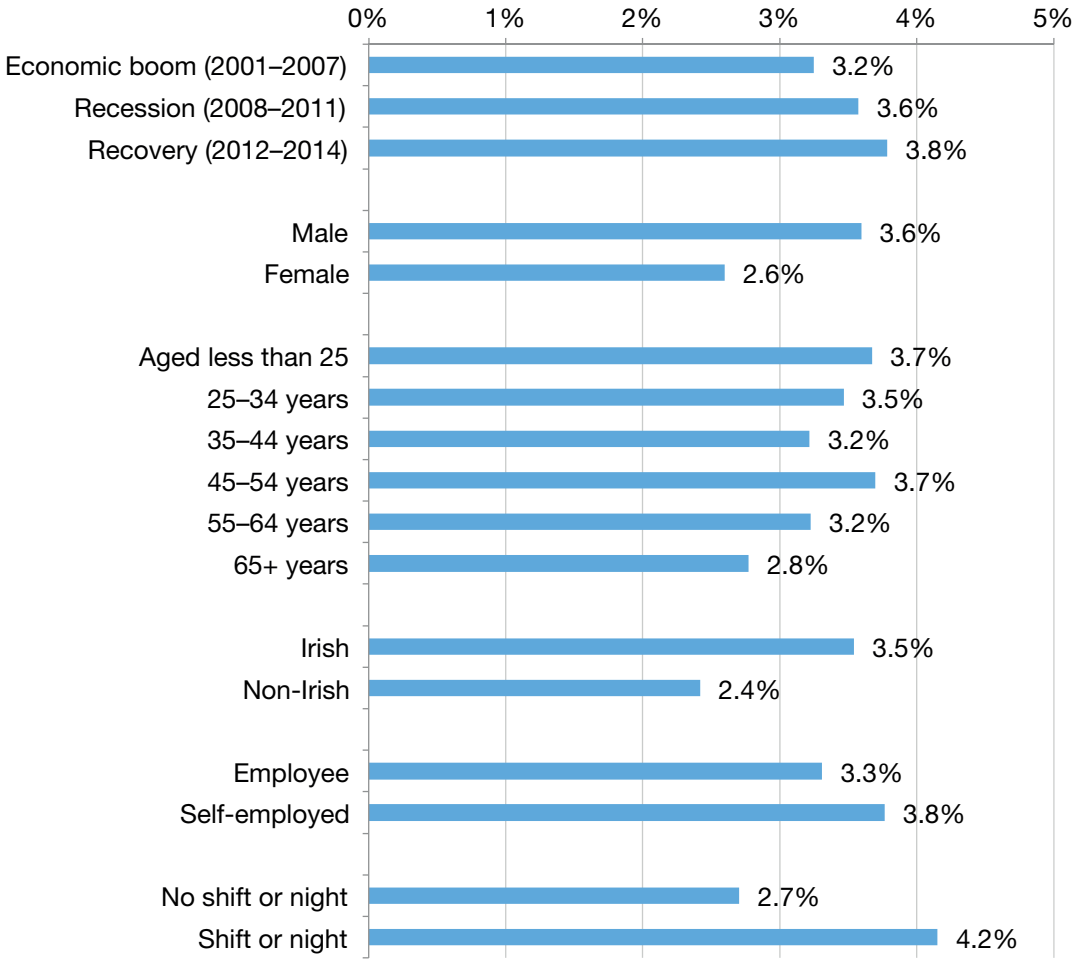
Source: QNHS modules on work-related accidents and illnesses, authors' analysis (rates are two-year moving averages).
Note: The illness rate in 2011 is not directly comparable to adjacent years due to changes in question wording in 2012.

Annual rates of both illness and injury per 1,000 workers in the transport sector fluctuate dramatically, so Figure 1 shows the two-year moving average rates over the period 2001 to 2014. The two-year moving average of annual percentage employment change is also shown but any pattern between these rates is difficult to distinguish. Rates of illness peaked in 2004–2005, at just over 50 per 1,000 workers, and while there was much variation year on year, no subsequent high points have exceeded a rate of 36 per 1,000 workers. The 2013–2014 rate was relatively low, at 24 reports of illness per 1,000 workers. Rates of injury tended to be higher than those for illness during the late recession and early recovery period, peaking at 42 per 1,000 workers in 2006–2007 and again in 2010–2011, at 44 per 1,000 workers. After falling in 2012–2013, injury rates rose again to a rate of 38 per 1,000 workers in 2013–2014.

Worker and job characteristics and risk of injury

Figure 2 outlines the relationship between the risks of injury among transport sector workers and a range of factors such as personal and job characteristics.

Figure 2: Modelled percentage experiencing injury in the transport sector, 2001–2014

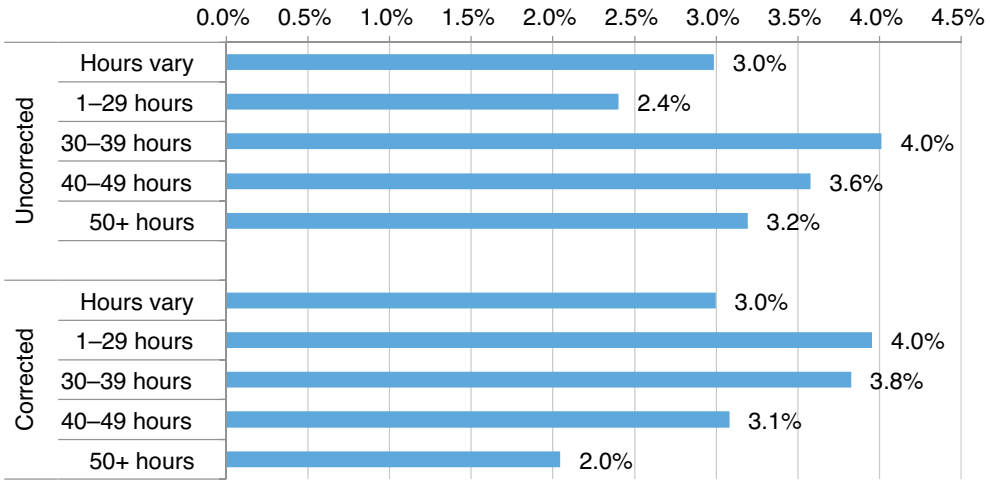


Source: QNHS modules on work-related accidents and illnesses, authors' analysis.
Note: Results are taken from a logit model, in which job tenure and hours of work are also included (see Russell *et al.*, 2015, for an explanation and description of the modelling strategy).

The probabilities are calculated using a logit regression model, which allows us to compare 'like with like'.[iii] Figure 2 indicates that while there is some variation in the proportion of reported injuries between subgroups, these are not statistically different except for a higher proportion among those working shift or night hours (4.2%) compared to those not working these hours (2.7%).

Hours, as well as patterns, of work were influential in the economy-wide analysis (Russell *et al.*, 2015). Figure 3 shows that before we make any adjustment for exposure to risk, those working the fewest hours per week report proportionately fewer injuries. However, we adjust for the fact that those working longer hours are exposed to work-related hazards for a longer time.[iv] Following this correction, we find that *per hour worked*, the pattern reverses and those working fewer hours per week report the highest injury risk (4.0%), although these differences are not significant.

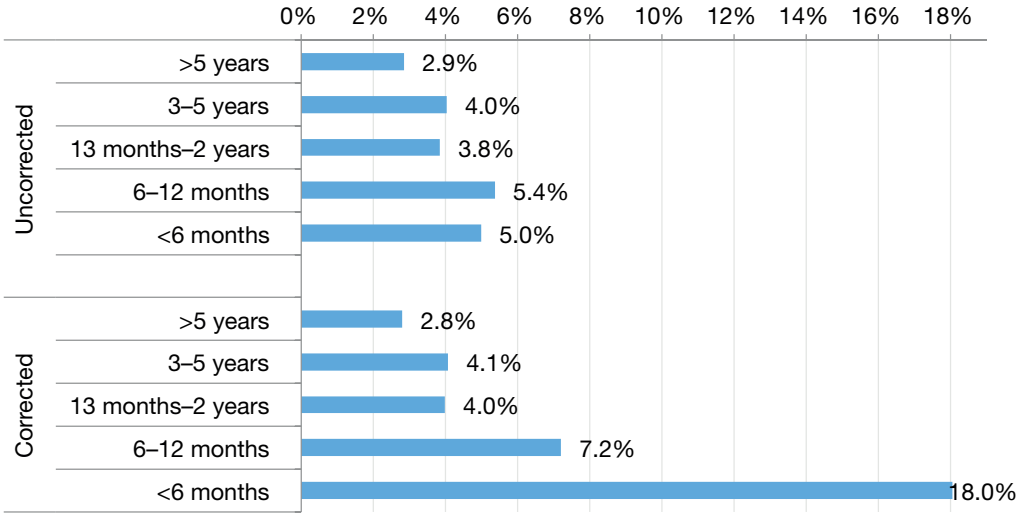
Figure 3: Modelled percentage experiencing injury in the transport sector by working hours, with and without corrections for exposure (per hour worked)



Source: QNHS modules on work-related accidents and illnesses, authors' analysis.
Note: Models include the full set of controls outlined in Figure 2.

Figure 4 examines the risk of injury depending on how long workers have been in the job. This shows that those with the shortest tenure report the highest injury risk before we adjust for longer exposure to work-related hazards.[v] When we correct for this exposure, we see that injury risk is highest for those with tenures of less than six months (18.0%), and that this is significantly different to those with tenures of 13 months or more (2.8% to 4.0%).[vi]

Figure 4: Modelled percentage experiencing injury in the transport and storage sector by job tenure, with and without corrections for exposure (per month worked)

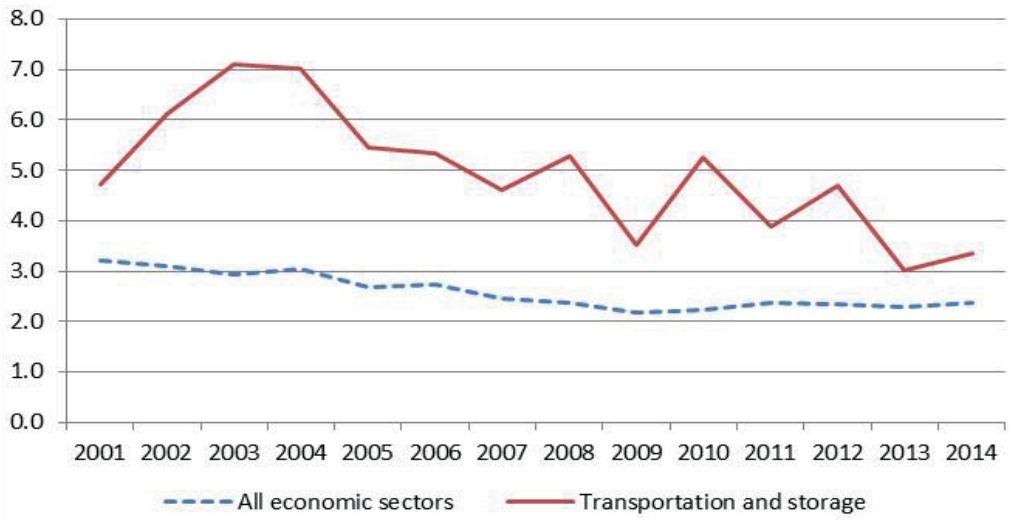


Source: QNHS modules on work-related accidents and illnesses, authors' analysis.
Note: Models include the full set of controls outlined in Figure 2.

Worker fatalities in the transport and storage sector

This section looks at worker fatalities in the transport and storage sector for the period 2001 to 2014. Figure 5 shows that, across all economic sectors, the three-year rolling fatality rate declined from 3.2 per 100,000 workers in 2001 to 2.4 per 100,000 workers in 2014. The transport and storage sector has one of the highest worker fatality rates, after the agriculture, forestry and fishing sector and the construction sector. While there was an increase in the fatality rate in the transport and storage sector between 2001 and 2004, there is a longer term downward trend for the whole period of 2001–2014.

Figure 5: Three-year rolling rate of worker fatalities per 100,000 workers in the transport and storage sector and all sectors, 2001–2014



Source: HSA data.

The four sectors shown in Figure 6 accounted for 85% of all worker fatalities in 2014. In the transport and storage sector, there were 38 worker fatalities during the seven-year boom period (2001–2007) falling to 26 fatalities in the later seven-year period (2008–2014).

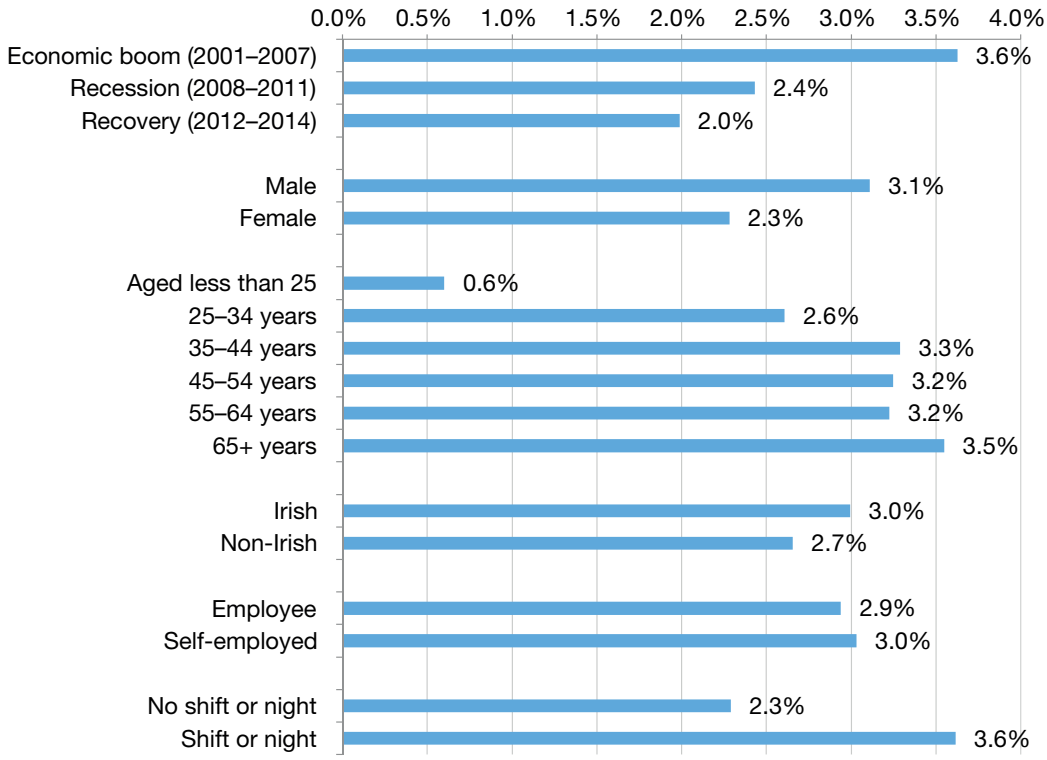
Figure 6: Number of worker fatalities by sector, 2001–2014

Source: HSA data.

Work-related illness in the transport and storage sector

This section explores the association between illness and time period, the characteristics of those working in the transport sector and their job structure. Figure 7 shows that the risk of illness in the transport sector was significantly lower in the recovery (2.0%) and recession (2.4%) periods compared to the boom period (3.6%). We also see a significantly lower illness rate among those aged under 25 years (0.6%) compared to all other age groups (from 2.6% to 3.5%), as well as a higher illness rate for shift or night workers (3.6%) compared to those who do not work shift or night hours (2.3%).

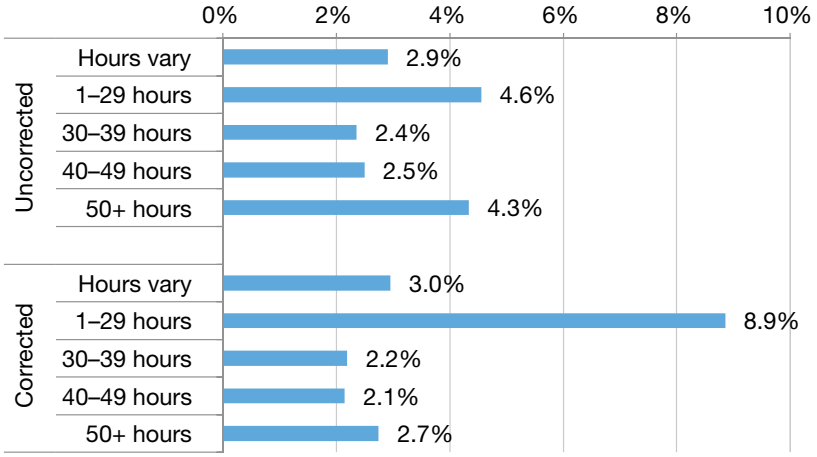
Figure 7: Modelled percentage experiencing illness in the transport sector, 2001–2014



Source: QNHS modules on work-related accidents and illnesses, authors' analysis.
Note: Results are taken from a logit model, in which job tenure and hours of work are also included (see Russell *et al.*, 2015, for an explanation and description of the modelling strategy).

Figure 8 shows the proportion of work-related illness reported by those working different weekly hours. Before adjusting for exposure to risk, those working the fewest hours (one to 29 hours per week) report the highest risk (4.6%), though this is significantly different only to those working between 30 and 49 hours per week (2.4% to 2.5%). However, once adjustment for exposure is made, the risk of illness for those working the fewest hours (one to 29 hours per week) nearly doubles to 8.9%, and this is significantly higher than the rate for those working 30 or more hours per week (between 2.1% and 2.7%) and those working variable hours (3.0%). This suggests that higher illness rates may be associated with working part time, perhaps because of the unavailability of full-time hours or because those with an illness may work fewer hours.

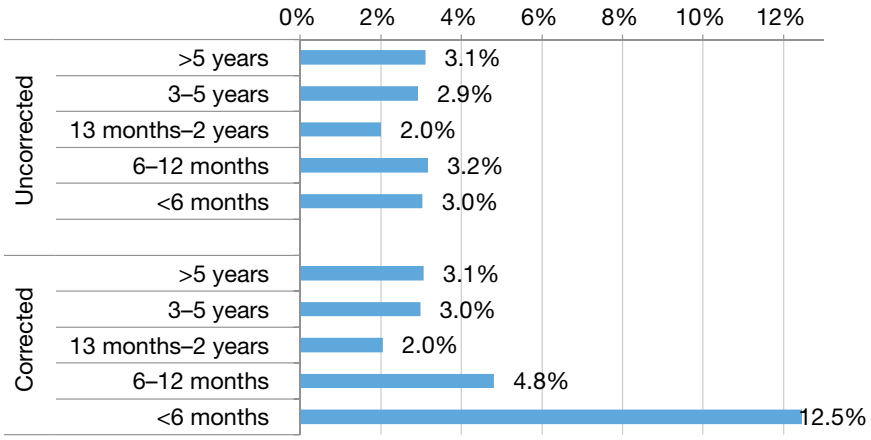
Figure 8: Modelled percentage experiencing illness in the transport and storage sector by working hours, with and without corrections for exposure (per hour worked)



Source: QNHS modules on work-related accidents and illnesses, authors' analysis.
Note: Models include the full set of controls outlined in Figure 7.

Finally, in Figure 9 we examine the relationship between job tenure and work-related illness. We might expect a higher risk of musculoskeletal disorders among those with longer job tenures, due to cumulative years of physically demanding work, or among new recruits due to lower levels of training and experience (see Russell *et al.*, 2016, for more detail on types of work-related illnesses).

Figure 9: Modelled percentage experiencing illness in the transport and storage sector by job tenure, with and without corrections for exposure (per month worked)



Source: QNHS modules on work-related accidents and illnesses, authors' analysis.
Note: Models include the full set of controls outlined in Figure 7.

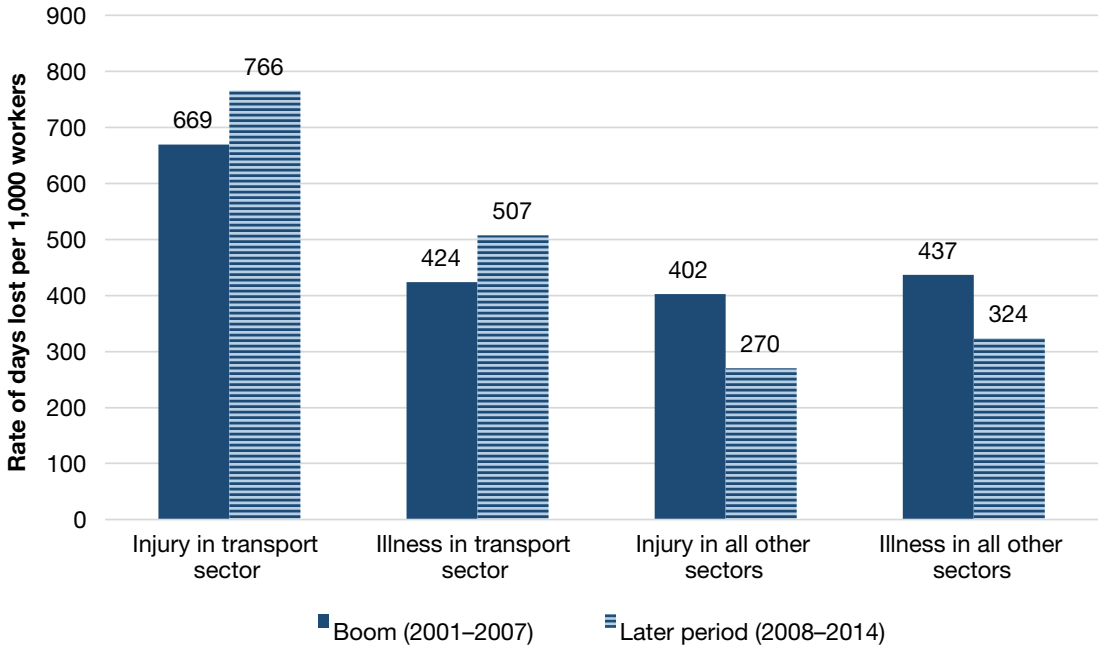
The findings shown in Figure 9 suggest that, before adjusting for risk exposure among workers who are in employment for under one year, there are no significant differences in the rates of illness depending on tenure. After correcting for annual equivalent employment, those with less than six months' job experience had more than twice the risk of work-related illness (12.5%) compared to those with longer tenures. This was significantly higher than the proportion for those with any more than 13 months' experience in their current role (from 2.0% to 3.1%) but it was not significantly higher than for those between 6 and 12 months (4.8%). Such significantly higher rates of both illness and injury (see Figure 4) among new recruits suggests that lack of experience could be a contributing factor and that more on-the-job training may be necessary.

Days lost due to illness and injury

The number of days lost in the transport sector due to injury and illness over 2001–2014 fluctuated significantly. The annual average number of days lost due to injury in the sector rose from more than 60,000 in the boom (2001–2007) to just over 82,000 in 2008–2014, making it the sector with the second highest number of days lost to injury in the second period.[vi] Regarding illness, annual days lost on average increased from about 38,000 during the boom to just over 54,500 in 2008–2014. The pattern across the economy-wide analysis showed that the annual average number of days lost for both illness and injury declined during the recession before rising again in the recovery period to overtake the number of days lost in the boom.

Some of this increase in days lost to injury and illness may be a result of fluctuating employment rates in the transport sector, as outlined above. To account for this, Figure 10 shows the annual average number of days lost to injury and illness per 1,000 workers in the transport sector, for both time periods.

Figure 10: Annual average number of days lost to injury and illness per 1,000 workers in the transport sector and all other sectors for two time periods, 2001–2007 and 2008–2014



Source: QNHS modules on work-related accidents and illnesses, authors' analysis.
Note: 'All other sectors' excludes the transport sector for total number of injury and illness days lost and for numbers employ

In the boom period (2001–2007), the average rate of days lost to injury per 1,000 workers in the transport sector was 669, which is much higher than the rate of 402 across all other sectors excluding transport. Furthermore, while this rate decreased between the boom and later 2008–2014 period in all other sectors to 270 per 1,000 workers, it increased in the transport sector to 766 per 1,000 workers. The rate of days lost to illness in the transport sector during the boom, at 424 per 1,000 workers, was slightly lower than that which occurred across all other sectors (437 per 1,000 workers). However, this figure also increased between the boom and later period (to 507 per 1,000 workers), while it decreased in all other sectors (to 324 per 1000 workers), so that by 2008–2014 the number of days lost to illness in transport was higher than that which occurred across other sectors.

Inspections

Table 1 outlines the number, and rate per 1,000 workers, of health and safety inspections carried out in the transport sector between 2003 and 2015.

Table 1: Health and safety inspections in the transport sector, 2003–2015

Year	Inspections in transport sector	Employed in transport sector ('000s)	Inspection rate per 1,000 workers	Inspection rate all sectors
2003	1,077	88.2	12.2	5.9
2004	988	90.9	10.9	6.1
2005	918	92.5	9.9	6.9
2006	1,090	92.8	11.8	7.5
2007	1,042	94.7	11.0	6.4
2008	922	94.0	9.8	7.5
2009	1,596	95.7	16.7	9.4
2010	1,174	93.5	12.6	8.9
2011	1,323	94.9	13.9	8.3
2012	937	90.1	10.4	7.5
2013	799	88.2	9.1	6.5
2014	694	89.4	7.8	5.6
2015	515	91.8	5.6	5.5

Source: Number of inspections taken from HSA annual reports (these are only available from 2003 onwards). Numbers employed taken from QNHS, averaged across four quarters.

Inspection rates in this sector have generally been higher than those across all sectors, though in recent years this gap has narrowed. Rates peaked in 2009, at 16.7 inspections per 1,000 workers, when the number of inspections almost doubled from the previous year with relatively little change in employment figures. They have been falling since, with the 2015 rate at 5.6 per 1,000 workers, much more in line with inspection rates in all sectors.

In the overall economy-wide research, it was found that higher inspection rates were associated with a lower risk of work-related injury and illness. When we add inspection rates to the models that also control for the period (boom, recession, recovery), we find that higher inspection rates in the transport sector are associated with a significantly lower risk of work-related illness but no such significant effect is found for injuries (analysis available from authors).[vii]

Summary

- Rates of work-related injury fluctuated greatly over 2001–2014 and since 2008–2009 they have tended to be higher than illness rates. Illness rates also varied greatly year on year but have been trending downwards since 2004–2005, except for a spike in 2012–2013.
- Controlling for period and worker characteristics, those working shift or night work had a higher risk of injury (4.1%) compared to those not working such hours (2.7%).
- After correcting for exposure to hazards, there was a higher injury risk for new recruits with less than six months' job experience (18.0%) compared to those with more than 13 months' experience (2.8% to 4.0%).
- The transport sector has the third highest fatality rate and, in spite of a downward trend, still has a high number of fatalities, with 26 cases between 2008 and 2014.
- Controlling for other factors, rates of illness were higher in the boom (3.6%) compared to both the recession and recovery periods (2.4% and 2.0% respectively). Those aged under 25 years had a lower illness risk (0.6%) compared to older workers (from 2.6% to 3.5%) while shift or night workers had a higher risk (3.6%) compared to non-shift/night workers (2.3%).
- After adjusting for exposure, illness rates were significantly higher for workers on less than 30 hours a week (8.9%) compared to those working any other hours (2.1% to 3.0%) and for new recruits (12.5%) compared to those with more than 13 months' job experience (2.0% to 3.1%).
- Days lost per 1,000 workers in the transport sector, due to injury and illness, increased between the boom period (2001–2007) and 2008–2014, while this fell across all other sectors excluding transport.
- Analysis of HSA inspection data shows that, while inspection rates per 1,000 workers were high during the boom and recession, the rates have fallen more recently and are currently much the same as those across all sectors.
- Higher inspection rates were associated with lower work-related illness but not injury when other factors, including time period, were controlled for.

Box 1: Description of data sources and measures

Data sources

The main data source for these sectoral analyses is the annual special modules on work-related accidents and illnesses that form part of the QNHS carried out by the CSO. It is carried out in private households and the responses are unconnected to any workplace reporting. The module is restricted to those who are employed at the time of the survey or who are not currently employed but worked during the 12-month reference period. For example, in 2015, in the case of injuries, respondents were asked:

'How many, if any, injuries did you incur at work (excluding commuting) during the period January 2014 to December 2014?'

For illnesses, the following question was asked:

'How many, if any, illnesses or disabilities have you experienced during the 12 months January 2014 to December 2014, that you believe were caused or made worse by your work?'

Respondents were also asked how many days they had taken off work as a result of these injuries or illnesses.

In 2013, the module was part of a European-wide labour force survey and a number of changes were introduced, including a change in question wording to allow the data to be harmonised across the EU (see Russell, 2016, for details). This means that caution is needed when interpreting trends over time in the injury and illness rates based on the QNHS data.

While the QNHS provides the best randomised national sample of work-related injuries and illnesses, a number of limitations should be borne in mind. One is the 'healthy worker effect' whereby the least healthy or most seriously injured workers leave the labour market, while the healthier workers remain. The likelihood of 'unhealthy' workers leaving the labour market depends both upon the extent to which employers accommodate those with disabilities or illness, which may vary by sector, and the level of compensation available through the welfare system. A further limitation is that those who have not worked in the previous 12 months are excluded from the QNHS module, leading to an underestimation of the extent of work-related illnesses and injuries.

An additional difficulty with the illness statistics arises from the fact that there may be a significant time lapse between exposure to a workplace hazard and the emergence of an illness. This is particularly the case for many cancers and musculoskeletal problems (Drummond, 2007). The tendency of workers with a chronic illness or a disability to change to a less demanding job may also influence the association between work-related illness and sector or hours of work found in the data.

A final caveat concerning the QNHS module data is that, despite a large number of respondents, work-related injuries and illnesses are uncommon and therefore the actual case numbers are relatively small. This is especially true when the figures are broken down by sector or other characteristics such as nationality or shift work status. The statistical models take this issue into account but descriptive tables, for example on the number of days lost, should be treated with caution.

Employment rates

As the recorded accidents, illnesses and days lost occur over a 12-month period and because employment levels fluctuate seasonally, employment rates were calculated using the average employment level across the four quarters of the relevant year. This provides a better basis for calculating the incidence rate than any one particular quarter. Rates of injury, illness and days lost are derived from the numbers experiencing injury and illness in each sector divided by the number employed in that sector and multiplied by 1,000 to give an incidence rate per 1,000 workers.

Endnotes

[i] Russell, H., B. Maître and D. Watson (2015). *Trends and patterns in occupational health and safety in Ireland*. Dublin: ESRI; Russell, H., B. Maître and D. Watson (2016). *Work-related musculoskeletal disorders and stress, anxiety and depression in Ireland: Evidence from the QNHS 2002–2013*. Dublin: ESRI. Please see full reports for further details and reference lists.

[ii] For the purpose of brevity, this sector is shortened to 'the transport sector' for the remainder of this report.

[iii] Where relevant, all the results in the charts have been tested for statistically significant difference. Any in-text references to statistically significant (or not) differences in results can be taken to mean that statistical models were applied to reach such conclusions.

[iv] Following methods used by Davies and Jones (2005, p. 54), we constructed full-time equivalent (FTE) injury rates using annual average working hours per week (overall sample mean of 35.5 hours per week). A full list of references can be found in Russell *et al*. (2015 and 2016).

[v] We adjust the rates for those employed for less than one year to produce an annual equivalent rate. These adjusted figures should be seen as illustrative as they assume that the monthly/hourly risk and other factors remain stable.

[vi] Due to a smaller number of unweighted cases where any days were lost in the transport sector, figures cannot be presented for the recession (2008–2011) and recovery (2012–2014) periods separately. In addition, there is no information for 2012 due to a change in question wording.

[vii] As there is only one observation of the inspection rate per year, it is difficult to disentangle this effect from other changes that have followed the same pattern. In some sectors, the inspection rate is too strongly correlated with the boom/recession/recovery period to allow an estimation. The economy-wide models include a continuous variable that records annual employment change within sectors; this within-year variation allows us to apply a more robust test of the inspection rates.

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