

Occupational injuries

Long work hours and occupational injuries: new evidence on upstream causes

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Commentary on the paper by Dembe *et al* (see page 588)

Epidemiological research on the causes of occupational traumatic injuries presents interesting practical and conceptual challenges. On a superficial level, the causation of injuries seems deceptively simple, because the agent of injury—energy—is already known. One of the problems researchers face, however, is that the transfer of potentially harmful energy to a human host is difficult to observe because it takes place very quickly and is rarely recorded or documented in databases. New studies are beginning to take up these challenges with innovative approaches like the case-crossover design.¹ Another challenge, perhaps conceptually more difficult, is that because the agent of injury is known, its discovery is not an important research problem. Instead, it is the “upstream” causes² of injury—the events and circumstances that bring people into contact with the agent—that are of interest. Some studies published recently in this journal have investigated potential causes upstream of the injured worker, ranging in proximity from the organisation of workplaces³ to the structure of the national economies.⁴

In this issue, Dembe and colleagues⁵ use individual-level data from a national longitudinal survey in the United States to investigate another upstream risk factor for occupational injury: extended work time. The authors' analyses of this large database show the rate of injury increasing quantitatively with the number of hours worked on a daily or weekly basis. Among people who worked more than 12 hours per day or more than 60 hours per week, the rate of injury and illness was roughly 30–40% higher than among those working fewer hours. Working overtime was associated with a still higher rate of injury, about 60–80% greater than among people who did not work overtime. These associations were statistically significant and remained

after adjustment for age, gender, occupation, industry, and region.

These findings draw attention to the potential importance of a pervasive trend in the current labour market. In the United States, the average number of hours worked by all employed people and the average number of overtime hours for manufacturing workers have been on the increase since the 1970s.⁶ American workers—and many others around the world—have been working longer as global competition has intensified. If the findings of this new study represent the US experience, the implications would be alarming: the combination of lengthening work weeks and injury rates that increase with extended time on the job could result in an increase in the rate of injury for the entire workforce. Such an increase has not been observed, however. Instead, as Dembe *et al* show in fig 2, the overall rates of occupational injury and illness have been declining with time.⁶

Ecological trends in working hours and injury rates make a good starting point for looking upstream, but they clearly do not tell the whole story and the potential adverse effects of longer work schedules are far-reaching enough to motivate more research. One possible explanation for the apparent conflict between national trends and the findings Dembe *et al* report is that longer hours may only result in greater risk for a subset of workers—perhaps those with greater potential exposure to the agent of injury. Studies investigating the effects of extended work hours by occupation and industry might lead to insights about who is at risk when working hours increase. It is also possible that the reported results do not generalise to the entire labour force. The survey on which the study is based was designed to be statistically representative of people living in the United States in 1979 who were born between 1957 and 1964—a large group in absolute

numbers, but a small proportion of the workforce at the time of the study, whose jobs and health experience may not be typical. It would be useful to learn whether similar relationships are seen in other cohorts, for US workers generally, and in other countries. The current paper also leaves unanswered questions about time related aspects of the relationship between injury risk and work schedules. The data shown in fig 2 of the paper suggest that the greatest differences in risk between workers exposed and not exposed to extended hours occurred in the 1980s, but in later years injury rates for exposed workers declined more rapidly, erasing much of the difference by 2000. However, the analysis simply compares average rates during the entire study period and does not account for this potential interaction between calendar time and exposure. Future studies might analyse temporal trends in both injury rates and working hours in the hope of learning whether the effect of longer work hours still exists and whether it is likely to persist in the future.

Good research tends to raise questions as well as answer them, and in this respect Dembe and his colleagues have succeeded admirably. Their paper on the impact of overtime and long work hours presents provocative findings and should stimulate further investigation of this important issue, looking both upstream at the factors that drive the trends towards longer work schedules and downstream toward possible mechanisms of injury.

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