The importance of observational methods for evaluation of interventions to prevent occupational injuries

H J Lipscomb

Commentary on the paper by Mancini et al (see page 830)

As a public health problem, work related eye injuries are responsible for significant morbidity. While many eye injuries are of a minor nature, serious injuries occur, and even injuries of a more minor nature can have significant consequences without appropriate care. Impaired sight can profoundly affect the ability of workers to do their jobs. Individuals requiring depth perception in their work, such as workers in skilled trades, are at risk of significant occupational impairment from loss of binocular vision. Needless to say, loss of site is a devastating injury, to the individual as a breadwinner and in private life, with significant impact on quality of life. Despite all of these things, the prevention of work related eye injuries has not received much occupational safety research attention.

This is not meant to imply a lack of empirical guidelines for prevention of occupational eye injuries, including use of appropriate eye protection with written workplace policies for eye safety and enforcement of those policies. Over 50 years ago, meeting minimum standards for eye protection was required of government contractors in the USA under the Walsh-Healy Public Contracts Act. However, there is limited scientific evidence to support the effectiveness of programmes designed to prevent eye injuries, as well as a mixed literature regarding the frequency with which injuries occur despite the use of eye protection.

Research support for injury control has not matched the public health burden, and injury epidemiology as a field of scientific inquiry has lagged behind infectious and chronic disease epidemiology. As recently as 1991, the British Medical Journal banned the use of the word “accidents”, which implies that injuries are unforeseen, perhaps even random events, marking their prevention as a somewhat futile goal. In this broad context, it is not surprising that the prevention of non-fatal injuries, particularly those thought of as less serious, has not received much attention.

The lack of attention to the evaluation of interventions is a failure of injury prevention as a science; specifically, the evaluation of occupational injury interventions has been described as an area “in the greatest need of more attention and effort”. In this issue, Mancini and colleagues describe the long term evaluation of a population-based intervention designed to prevent work related eye injuries. The intervention they present was based on a clearly defined occupational health problem of importance in the district of Imola, Italy. Workers who are exposed to high speed flying particles are at particular risk of work related eye injuries, such as the metal workers who are the focus of their work.

While the intervention had a number of educational components, it incorporated the public health hierarchy of controls, including equipment modifications to decrease actual exposure and the protection of workers from exposures; unannounced official inspections focused on both the details of choice and use of personal protective equipment and protective systems for machinery. A comprehensive needs assessment guided the development of the tailored intervention and key representatives representing labour and management were involved. The investigators show a significant effect of the intervention over a 10 year period of time, providing evidence that a thoughtfully designed intervention can have a significant impact on this common, but poorly addressed, occupational safety problem that can have life altering consequences for workers.

However, the contributions of these investigators go beyond this particular subject matter or health concern. They show that a public health approach can be effective in preventing occupational injuries. Their community based approach focuses on small business operations that provide logistic challenges to interventions, and are perhaps even more difficult to evaluate. Consequently, they are often neglected in occupational safety and health efforts. The work documents the importance of developing good surveillance systems that can be used to identify problems and assess the impact of interventions. Too frequently our surveillance efforts are used to document hazards, but fail to come full circle to include planning and evaluation of interventions. Lastly, the investigators show the important use of observational methods to evaluate the effectiveness of an injury intervention, and they show the complexity of rigorous evaluation.

The authors end their presentation with a call for the conclusive demonstration of effectiveness through controlled trials, the gold standard we have been taught as scientists. In the current work, it is impossible for us to determine which elements of the programme were essential or what gains might have been achieved with different pieces of the intervention compared to the broad “best practices” approach of this research team. This question is not unfounded as growing needs to protect workers create competing demands for use of scarce resources. A controlled trial with multiple arms could address these issues from a scientific standpoint. However, randomised control trials can be difficult, and at times impossible, to actualise for many reasons. In this case the authors cite ethical concerns. Policy changes and regulations that affect working populations change in ways that do not allow investigators to conduct their evaluations in controlled circumstances. In addition, long term effectiveness can be difficult to measure in a randomised trial. Increasingly, and appropriately, there are calls for data monitoring to assure that research participants are not exposed to harmful interventions or denied more beneficial treatments.

The importance of evaluating long term effects of interventions should not be ignored, and this is an area well suited to use of good surveillance systems and observational methods. Worksites are dynamic. The workforce changes, including supervisors or other key personnel who may be essential to sustaining change. After a successful intervention has been implemented, the essential components must be maintained through workplace norms or policies in order to remain effective. There are changes in work tasks and processes over time that potentially affect hazards, and our surveillance systems could be improved by incorporating measures that capture these types of changes.

There are challenges, and limitations, to evaluating the effectiveness of interventions using observational methods,
but it is a science worthy of development. For example, techniques that evaluate latency are commonly used in chronic disease epidemiology, but we have, in large part, failed to embrace analogous methods in the evaluation of injury prevention efforts. These methods could be useful in determining when interventions are most effective and when their effects lapse.

The science of injury epidemiology is built around the recognition that injuries are not unfortunate, random events—and that if we approach the problems in a scientific manner we can identify events leading to injury, design interventions to abate hazards, and evaluate the effectiveness of these interventions. As shown here, there are important opportunities for us to move injury epidemiology forward—without randomised trials. Mancini et al are to be applauded; they should emphasise the importance of their work and not apologise for what it is not.

REFERENCES
authorities about these risks and hazards. Publication in scientific journals is a good first step in the effort to convince official authorities and the world about the living conditions of this subpopulation.

The most important tasks are to convince the target group that they are at risk for illness and to distribute protective and safety materials. Another, perhaps more effective, manner is to educate children and young adults about the hazards of working under these conditions and the risks of short term and long term health complaints. In cooperation with the ILO (International Labor Organisation) and ICOH (International Commission on Occupational Health), the WHO (World Health Organisation) has already decided to focus more on child labour and latent health in adulthood.1,2 Education (more specifically, education concerning occupational safety and health) and the implementation of knowledge among the target groups is an essential factor in changing the working behaviour of these vulnerable groups. It is our hope that this and other publications about waste collection will not go to waste!


Correspondence to: Prof. Dr M H W Frings-Dresen, Academic Medical Center, Universiteit van Amsterdam, Coronel Institute for Occupational and Environmental Health, PO Box 22700, 1100 DE Amsterdam, Netherlands; m.frings@amc.uva.nl

Competing interests: none declared

REFERENCES


8 Kuijer PPFM. Effectiveness of interventions to reduce workload in refuse collectors. PhD thesis. Coronel Institute for Occupational and Environmental Health, AmCOGG: Center for Research into Health and Health Care, Academic Medical Center/Universiteit van Amsterdam, 2002


10 Kassouf AL, McKee M, Mossialos E. Early entrance to the job market and its effects on adult health: evidence from Brazil. Health Policy and Planning 2001;16:21–8


The importance of observational methods for evaluation of interventions to prevent occupational injuries

H J Lipscomb

*Occup Environ Med* 2005 62: 819-820
doi: 10.1136/oem.2005.022228

Updated information and services can be found at:
http://oem.bmj.com/content/62/12/819.1

These include:

**References**
This article cites 8 articles, 5 of which you can access for free at:
http://oem.bmj.com/content/62/12/819.1#BIBL

**Email alerting service**
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

**Notes**

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/