*Opinion*

# Establishing National Priorities for Australian Occupational Health and Safety Research

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**Abstract: Establishing National Priorities for Australian Occupational Health and Safety Research: Derek R. Smith. WorkCover New South Wales Research Centre of Excellence, School of Health Sciences, Faculty of Health, University of Newcastle, Australia—Objectives:** This study aimed to identify current and emerging issues relevant to Occupational Health & Safety (OHS) research in Australia, and to formulate strategic research directions and strategies for the future. **Methods:** A national research forum was held which included leading OHS academics, employer and employee representative groups, as well as executives from state (New South Wales) and national (Safe Work Australia) representative bodies. A modified Delphi technique was used for collecting data in three phases. **Results:** When ranked according to group consensus, the top three priorities for future OHS research in Australia were identified as being psychosocial and soft tissue injury hazards, work / life issues, and the impact of multiple, long-term exposures. Strategies to enhance collaboration despite limited research funding included the need to focus on complementary skills, to make the best use of Safe Work Australia's role (particularly to link with strategic and operational plans), and to foster closer engagement with research communities. **Conclusions:** While certain research priorities appear to be similar to those of other countries, the current study did identify some unique characteristics within an Australian context. High quality investigations of these issues should now be considered, in conjunction with greater cooperation between governments, regulators, employers and employee groups for the more effective facilitation of applied OHS research in the coming years.
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Given that Occupational Health & Safety (OHS) is a multidisciplinary field requiring collaboration between numerous stakeholders from a wide variety of backgrounds, it is important that consensus is achieved when establishing research priorities[1]. Research funding is inherently finite[2], however, and both public and private sector sponsors understandably expect the maximum return from any resources they provide[3]. As the scale and breadth of OHS research has grown over time, so too has the need for systematic research policy[3]. Involving stakeholders at a national level is useful for helping to focus resources on key areas with the highest likelihood of successfully addressing serious OHS issues[4]. In the United States (US), this type of collaboration has been termed "a model of broad stakeholder input into priority setting[5]". In recent years there have been more frequent calls for the more rational use of resources[6], and as a result, various studies have sought to identify OHS research priorities across a variety of countries[7].

One of the earliest national exercises was conducted in the United Kingdom (UK) during the late 1980s, when the Society of Occupational Medicine held a symposium on occupational health research[3]. National OHS research priorities have subsequently been identified in the UK[8, 9], the US[5], the Netherlands[2], Italy[6], Japan[10], Malaysia[1] and many other countries. The Delphi Technique and modifications thereof has comprised one of the most common methodologies previously used to identify OHS research priorities. The Delphi technique is essentially a series of questionnaires beginning with broad questions, and ending when consensus is reached at a level sufficient to crystallise the main issues[8]. A previous review found that this method has been widely and successfully used as a reliable method to establish OHS research priorities across a broad range of qualified participants from a variety of backgrounds[7]. Australia has been moving

**Table 1.** Emerging issues for Australian OHS research

· Transition from "simple" issues to systems issues such as multiple, long-term exposures:
    Nanotechnology, pesticides, Electromagnetic Fields (EMF), noise, etc
    Community exposures to these hazards
· The impact of changing technologies and lifestyles, including:
    The "third wave" of sedentary workers
    The ageing population and workforce
    The increasing obesity epidemic
· The need to focus on youth workers and those just starting work
· The need to combine promotion and workplace health protection
· The drive to move from research to improved practice
· The need for early prevention strategies in the workplace
· Evaluation of intervention strategies—targeting research funding accordingly
· The need for coordinated, collaborative research, and capacity building
· The need to better connect regulators and the research community
· The need for the further study of psychosocial issues
· Further enhancement of data linkages and information sharing
· The potential emerging focus on Small and Medium Size Enterprises (SMEs)

towards a national OHS agenda for some time. While the National OHS Strategy 2002–2012 helped set goals for OHS in this country[11], it was formulated over 7 yr ago and is due to expire within three years. The purpose of the forum therefore, was to identify current and emerging issues relevant to OHS research in Australia, formulate strategic directions for OHS research, injury management and return to work over the next five years, and to help foster collaborative links between OHS researchers and research centres.

## Methods

In June 2009 the WorkCover NSW Research Centre of Excellence (WRCE), a joint venture between WorkCover New South Wales (NSW) and the University of Newcastle, hosted a national research directions forum to consider the future direction of occupational health and safety research in Australia, including injury management and return to work. Leading OHS academics from each state and territory in Australia were invited, along with employer and employee representative groups, as well as executives from WorkCover New South Wales (NSW) and the national regulatory body, Safe Work Australia. WorkCover NSW is a statutory government authority whose primary objective is to work in partnership with the NSW community to achieve safe workplaces, effective return to work and security for injured workers[12]. NSW is Australia's most populous state, being home to approximately one-third (7 million) of the national population[13]. Safe Work Australia is a national body inaugurated in 2009 to support cooperation between the Commonwealth, state and territory governments in Australia for the harmonisation of OHS legislation[14]. The final multidisciplinary group included

8 academics, 9 executives from WorkCover NSW, one executive from Safe Work Australia, one occupational physician, one industry representative and one employee representative.

A modified Delphi technique was used for collecting data. The forum was professionally facilitated and comprised three phases. Firstly, in *Phase One*, each academic participant delivered a presentation on their current and previous OHS research, to establish what emerging issues are on the horizon for Australian OHS research. For *Phase Two*, participants were divided into small groups to synthesise and summarise research priorities for the next 5 yr. Following group discussions, all groups reconvened and presented a summary of their findings to the main group for discussion. At this point, the group debated the issue of given limited funding, how can research collaboration be better achieved? For *Phase Three*, the key points from *Phase Two* were simplified into a list of 11 broad potential priority areas. These priority areas were then allocated scores by each of the four groups, with medians used to rank the top 10 areas from highest to lowest priority.

## Results

*Emerging issues in OHS research*

A number of items were identified as emerging issues currently on the horizon for Australian OHS research, as indicated on Table 1. The most frequent and salient features were discussed.

Firstly, it was noted how the move from "simple" OHS issues and hazards has now evolved into more complicated systems issues relating to multiple, long-term exposures from emerging industries. For example: nanotechnology, pesticides, Electromagnetic Fields
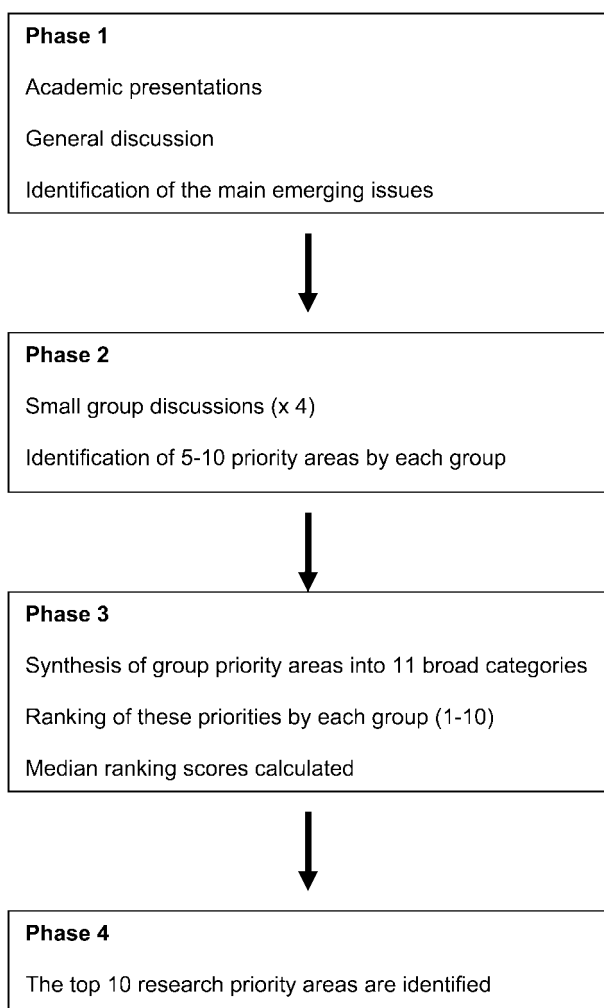
**Phase 1**

Academic presentations

General discussion

Identification of the main emerging issues

↓

**Phase 2**

Small group discussions (x 4)

Identification of 5-10 priority areas by each group

↓

**Phase 3**

Synthesis of group priority areas into 11 broad categories

Ranking of these priorities by each group (1-10)

Median ranking scores calculated

↓

**Phase 4**

The top 10 research priority areas are identified

**Fig. 1.** Flow chart of the research prioritisation process

(EMF), noise, etc; including community exposures. This was seen as complex, subtle work requiring new approaches, including multi-disciplinary research. Secondly, the impact of changing technologies and lifestyles was raised, with issues manifesting in a variety of areas such as the "third wave" of sedentary workers, the ageing population and increasing obesity. Other emerging issues included a greater need to focus on youth issues, a need to combine promotion and workplace health protection, the drive to move from basic reactive research to improved practice that addresses the issues of early prevention, the evaluation of intervention strategies, and strategies to target funding applications accordingly. The need for coordinated, collaborative research, requiring capacity building was also raised (e.g. developing the new methodologies required), as were the needs to better connect regulators and the research community, particularly to conduct studies of psychosocial issues, data linkages and information sharing. A potential emerging focus on Small and Medium Scale Enterprises (SME) was also noted.

*Broad OHS research priorities*

A number of research priority areas were identified during individual group discussion in response to the directive "Synthesise or summarise OHS research priorities for next 5 yr". Refer to Table 2. Group 1 identified the changing nature of work (particularly with relation to technological changes), sedentary work, soft tissue injuries (and the psychosocial aspects thereof), shift work, psychosocial aspects of work, occupational disease recognition and prevention (particularly subtle long-term

**Table 2.** Research priority areas identified during individual group discussion

| Group 1 | Group 2 |
|---|---|
| · Changing nature of work / technology changes | · Multiple, long term exposures |
| · Occupational disease recognition and prevention | · Soft tissue injury / psychosocial injury |
| · MSDs interventions / mental / psychosocial aspects | · Evaluation of intervention strategies |
| · Lifestyle factors | · Research into things that are currently "in the books" |
| · Early prevention—youth focus | · Research on "Return to Work" |
| · OHS marketing | · Data linkages |

| Group 3 | Group 4 |
|---|---|
| · Work / life issues, third wave (how we work / where we work) | · Multiple, long-term exposures |
| · Influencing sustainable change, in appropriate targets (large versus small / medium business) | · Changing lifestyle / technology |
| · Psychosocial hazards and their reduction, an alternative hierarchy for control | · Early (pre-work) prevention |
| · Qualitative methodologies that can be applied to small groups | · Nanotechnology |
| · Research informing policy and practice | · Psychosocial factors |
| | · Risk with IR practices |
| | · Home / work interface |
| | · Musculoskeletal problems |
| | · Collaboration |

**Table 3.**  Enhancing research collaboration despite limited funding

- Enhance the focus on complementary skills
- Make better use of national bodies and link with strategic / operational plans
- Enable closer engagement with the research community
- Hold ongoing national research directions forums
- Identify populations and databases which could provide information
- Help cross-governmental and jurisdictional boundaries
- Promote and encourage enhanced collaboration with industry
- Create a national register at Safe Work Australia
- Revise the national strategic research plan
- Create social networking sites to facilitate research collaboration
- Make information viewable by agencies and other stakeholders
- Make information useable for policy developers
- Create and develop an OHS Wikipedia website

exposures), occupational dermatitis, occupational asthma, interventions for MSD (including mental health and psychosocial aspects), lifestyle factors such as alcohol / tobacco and drug use and its effects in the workplace, the issue of early prevention (with a focus on youth), and finally, OHS marketing.

The second group identified the issue of multiple and long term hazard exposures (both current and emerging), soft tissue injury and psychosocially-related injury. It was also noted that many government jurisdictions already collect data about such things as when the injury occurred, the cost, the types of injury, and so on. It was felt that, generally speaking, compensation data of this nature is currently an untapped and underutilised resource. The group noted that a general climate of data sharing has emerged recently, although there is still a need to further break down the barriers to enable clinical trials data to be shared. On the other hand, data regarding traumatic injury at work is not being adequately shared among interested parties. The evaluation of intervention strategies was raised, that is, what works, in what combination, and how effective are the strategies. The group considered there was a need to finance research that is useful for WorkCover, and a need to finance issues that are currently "in the books", but have not yet been subject to applied research in the workplace. It was also felt that there needs to be more research on "Return to Work", particularly best practice, to help get people back to work and to help them stay employed. In this regard it was noted that while there has been a significant drop in incidents, there have been increases in the provision of rehabilitation services and the length of rehabilitation. Given that the group was not sure why this phenomenon has occurred, a need for more research was indicated. Ideally, such research would aim to identify measures to address the significant cost of rehabilitation and why people stay off work for long periods of time. A final area of interest was the need for increased data linkage,

particularly data on soft tissue and psychological injuries, workplace culture and management systems.

Research priority areas identified by the third group included work / life issues, particularly the "third wave", how people work and where, and the issue of external contributing factors and co-morbidities. The issue of how to influence sustainable change in appropriate target groups was also raised, particularly when considering large versus small and medium size enterprises. Psychosocial hazards, their reduction and an alternative hierarchy for control were identified as future priorities, along with the need for qualitative methodologies that can be applied to small groups in the workplace, and more research that can specifically inform policy and practice. The fourth group identified a number of research priority areas including the issues of multiple and long-term exposures, changing lifestyles and work technologies, and early (pre-work) prevention of occupational diseases. Issues relating to nanotechnology and psychosocial risk factors were raised, as were with risks relating to Industrial Relations (IR) practices, home / work issues (particularly regarding family commitments), musculoskeletal problems and collaboration between stakeholders.

*Enhancing research collaboration despite limited funding*

Following small group discussion, all participants were asked: "Given limited funding, how can we better collaborate?" The main responses agreed to by the entire group are summarised in Table 3. Responses included the need to focus on complementary skills, to make the best use of Safe Work Australia's role (particularly to link with strategic and operational plans), and to foster closer engagement with research communities. Other responses were holding ongoing national research forums, identifying populations and databases which could provide information, enhancing collaboration between government departments and jurisdictions, and with

**Table 4.** Prioritisation ranking for Australian OHS research

| Rank | Priority Areas | Score* |
|---|---|---|
| 1 | Psychosocial and soft tissue injury hazards | 1.5 |
| 2 | Work / life issues: changing lifestyles and technologies | 2.5 |
| 3 | Multiple, long-term exposures | 4.5 |
| 4 | Return to work issues: getting back to, and staying at work | 5.0 |
| 5 | Early intervention and prevention programmes | 5.5 |
| 6 | Evaluation of intervention strategies | 6.0 |
| 7 | Moving from research to policy and practice | 7.0 |
| 8 | Positively influencing sustainable change | 7.5 |
| 9 | Improving data linkages for research | 8.0 |
| 10 | An enhanced focus on the nanotechnology industry | 9.0 |

*Median of ranking scores given by each participant and agreed on during whole group discussion.

industry, creating a national register at Safe Work Australia, revising the national strategic research plan, establishing social networking sites for researchers to collaborate, making OHS-related information and statistics viewable by government agencies and other stakeholders as well as making such information more useable for policy developers. A final suggestion by the group was to create an online website for the dissemination of OHS-related information, such as an "OHS Wikipedia".

*Ranking OHS research priorities*

The key points from group discussions were distilled into a list of broad potential priority areas for the groups to rank on a scale of one to ten (with one being the top priority). When ranked according to group consensus, the top ten research priorities were identified as follows: (1) Psychosocial and soft tissue injury hazards, (2) Work / life issues: changing lifestyles and technologies, (3) Multiple, long-term exposures, (4) Return to work issues, (5) Early intervention and prevention programmes, (6) Evaluation of intervention strategies, (7) Moving from research to policy and practice, (8) Positively influencing sustainable change, (9) Improving data linkages for research, and (10) An enhanced focus on the nanotechnology industry. Refer to Table 4. Interestingly, although "psychosocial and soft tissue hazards" was ranked highest overall, there was disagreement as to whether soft tissue hazards should be the central focus. Two groups felt this to be the case, whereas the other two did not. As a general rule, there was a tendency to prioritise issues which had a "topical" rather than "methodological" nature to their articulation. While the prioritisation was not intended to be conclusive, it nevertheless provided the team with a good basis for a further development and refinement of likely research priorities.

**Discussion**

This study represents one of the most recent attempts to define national OHS research priorities in Australia by means of a multidisciplinary group comprising academics, government regulatory bodies, employer and employee groups. Similar to previous investigations[9], the current study sought to establish where new research initiatives are needed and where OHS research ought to focus, rather than just identifying the most common OHS issues already in existence. When these issues were ranked using median scores, in a manner similar to previous studies[6], the top three priorities for future OHS research were identified as being psychosocial and soft tissue injury hazards, work / life issues, and the impact of multiple, long-term exposures. The identification of soft tissue injury hazards as a key priority was in accordance with a previous Delphi survey of UK personnel managers and occupational physicians, where considerable agreement had been reached regarding Musculoskeletal Disorders (MSD) and stress being the highest priority areas[9]. On the other hand, and somewhat in contrast to our findings, a Delphi study of OHS research priorities in Malaysia found that psychosocial factors and musculoskeletal injuries were deemed less important than health priorities for specific industries and worker groups[1]. Similarly in Italy, MSD were ranked only 12th out of 27 proposed areas[6]. As such, it can be seen that research priority areas clearly differ between countries, and no single strategy is universally appropriate.

Regardless of how they may have been rated elsewhere, given that psychosocial factors and soft tissue injuries represent a major OHS issue in Australia and have been clearly ranked a priority topic for future research, it is important that high quality investigations are now actively sought and funded by both the federal and state governments. It is important to target research funding

carefully, however, by supporting investigations in the most at-risk areas, and in those workplaces where interventions will be most likely to be effective. Locating and encouraging research talent, as well as enhancing collaboration between experts within this field will also be an essential facet in meeting research goals.

Work / life issues were ranked as the second most important research priority during the current investigation. Although other international studies have not necessarily identified "work / life" issues as specific priority areas, similar themes have emerged. In Japan for example[15], work stress was identified as a key priority, with "mental health and quality of work and life", ranked 4th. Australian workers have long believed in the importance of quality working life. As far back as the 1970s when economic recession, anti-war protests and social change shaped the country, Australian workers and labour unions had begun turning their attention to quality of life issues. A proposal to redevelop the Sydney parklands for example, resulted in the historic "Green bans" implemented by the Builders Labourers Federation[16]. Results from the current research forum clearly suggest that quality of working life remains important in Australia, and one that has been identified as a topic in need of more research. While the term "work / life balance" remains somewhat difficult to define, the need for future research in this area is clearly indicated and the multifaceted issue of work / life research will no doubt require a multifaceted approach. As such, policy makers and funding bodies at both the state and national level should seek to support multidisciplinary research teams in the fields of not only "traditional" OHS, but also in occupational psychology, workplace counselling and human resources. Quality, multidisciplinary projects in this area should be actively sought and funded.

The impact of multiple, long-term exposures for both workers and the community was identified as the third most important priority for future OHS research during the research directions forum. This is similar to a previous investigation of research priorities in Japan[10] where the issue of multiple exposures was rated highly as a long-term research goal. High quality investigations which examine the long-term hazards to which Australian workers in certain industries are being exposed should be sought and funded at both the local and national level. These projects should aim to combine the expertise of toxicologists, hygienists and epidemiologists, with more "traditional" OHS researchers. Due to the necessity for laboratory evaluation and relatively long lag times in sampling, funding bodies and governments should be aware that the issue of multiple, long term exposures will be lengthy and costly to investigate, in order to achieve an adequate degree of scientific rigor.

How well these research goals can actually be achieved is difficult to predict, however, as Australian OHS research currently stands at a crossroads. Although the country faces a new era of occupational health reforms and state-to-state harmonisation of legislation, securing adequate research funding represents an ongoing challenge for academics and practitioners in OHS. These problems are not new to OHS professionals around the country, however. As far back as the early 20th century, a Commonwealth Division of Industrial Hygiene had been undertaking important investigations into the state of workers' health around Australia, but was forced to close during the Great Depression[17]. Suboptimal interstate cooperation during the Second World War led to the formation of the National Health and Medical Research Council (NHMRC) in 1942, an organisation which would include a dedicated OHS group for over 40 yr[18]. By 1949 formalised OHS research had begun at the University of Sydney, although lack of resources stalled progress for at least the first 10 yr. Significant OHS reforms occurred throughout Australia during the 1970s and 1980s, as the country was influenced by wide-ranging social and political factors such as the Vietnam War, global economic recession and the end of wage indexation. Increasing costs also played an important role in OHS reform, particularly throughout the 1970s when Worker's Compensation premiums began to exceed the billion dollar mark[16].

The adoption of a national OHS strategy, including national goals for OHS research, has been difficult to achieve in Australia. One of the first sets of national OHS priority areas was formulated by the National Occupational Health and Safety Commission (NOHSC) during 1987. Until it was significantly curtailed by funding cuts in 1995, a large proportion of OHS research in the contemporary era had been undertaken by the Research and Scientific Division of WorkSafe Australia[19]. In 2002, the National OHS Strategy, 2002–2012 (NOHSS 2002–12) was agreed upon by all Australian governments, the Australian Chamber of Commerce and Industry, and the Australian Council of Trade Unions[20]. In 2005, NOHSC was abolished and replaced by the Australian Safety and Compensation Council (ASCC) and continued with the national strategy. Australia now faces a new and exciting era of OHS reform as the country moves towards the harmonisation of state OHS laws and regulations. In 2008 an Inter-Governmental Agreement for Regulatory and Operational Reform in Occupational Health and Safety (IGA) was signed by the federal government and all state and territory governments. Its primary goal is to work cooperatively to harmonise OHS legislation by 2011, or earlier, and to ensure that the terms of the IGA are complied with[21]. While this represents a key step forward for Australian OHS, the original NOHSS 2002–12 on the other hand, is fast becoming obsolete, making research directions forums such as ours a key driver of any future OHS planning at both the state and

national level.

In the current study, and similar to one from the US[5], we have demonstrated that it is possible to reach a broad consensus on OHS research priorities at a national level. Use of the Delphi Technique was also found to be valuable for defining Australian OHS research priorities, as it has been elsewhere[7]. Despite this fact, it is worth noting that other strategies for identifying research priorities have also been used in some countries, such as calculating 10-year priority areas by combining priority scores from both short-term and long-term goals[10]. Although future investigations may benefit from a combined approach to goal identification, the proven track record of Delphi and Delphi-style techniques around the world suggests this is fast becoming a de facto standard in establishing group consensus among expert groups. There have long been calls for the more rational use of research development resources in occupational health[6], and research directions forums such as ours will no doubt continue to serve an important national and international role in this regard.

Aside from targeting appropriate industries in which to fund research initiatives, such as those documented in the current study, its is also critical to ensure that projects are only entrusted to competent researchers with a proven track record in the successful completion of applied OHS research. Resources are scarce in Australia, as they always have been, and as such it is important that they are carefully targeted to attract and support academically sound and scientifically motivated OHS research teams. While the merits of establishing national OHS research priorities have been clearly demonstrated in various countries[4], it is also important to remember that research in the occupational health context is, in practice, no different to that of any other field[22]. Assembling and sustaining an adequate labour pool remains essential. The development of visible, long-term and sustainable research funding for OHS research at a national level will be a key step in encouraging younger researchers and students to enter, and remain in, the world of applied OHS research. Only with such a phase shift in research priorities will it be possible to secure some of Australia's premier research talent for the long term benefit of Australian workers.

Enhanced network building and collaborative partnerships represents another key issue for the future of Australian OHS research. Cultivating broader stakeholder input in a way similar to the US NORA (National Occupational Research Agenda)[5], represents one manner in which a long-term framework for partnerships between the public and private sectors can be facilitated. Aside from targeting appropriate areas on which to focus, successful OHS research prioritisation will also require designated points of leadership. Research Centres of Excellence need ongoing funding at both the state and national level, to provide a focal point for research collaboration, planning and leadership in both the academic and practical world of OHS research. Governments could consider joint funding opportunities and industry collaborations to help perpetuate existing research centres in this regard. Closer cooperation between employer and employee groups when undertaking research projects is also desirable to enable a more seamless transfer progression from research to intervention, and finally, to the overall prevention of disease within Australian workplaces.

## Conclusions

Overall, information gathered from the forum has demonstrated that it is possible to reach a broad consensus on OHS research priorities at a national level, which will allow significant progress in developing a key set of national research priorities for Australia. When ranked according to group consensus, the top three priorities were identified as psychosocial and soft tissue injury hazards, work / life issues, and the impact of multiple, long-term exposures. High quality investigations looking at the psychosocial aspects of work, as well as some of the more subtle, long-term hazards to which workers in certain industries are being exposed, should now be actively sought and funded at both the state and federal level. Greater cooperation between governments, regulators, employers and employee groups will also be useful for facilitating applied OHS research in the coming years.

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