

Social and Economic Impacts of Workplace Illness and Injury: Current and Future Directions for Research

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Millions of occupational illnesses and injuries occur each year in the US, yet the human and economic impact of these events is inadequately studied and understood. Improved information about these impacts is crucial both to setting priorities for an occupational safety and health research agenda and for developing broader policies aimed at prevention of disease, injury, and disability.

Occupational injuries and diseases affect workers themselves, but they also impose significant burdens on workers' families, employers, and the larger community. As Dembe writes in this issue: "An injury or illness, whether caused occupationally or not, can represent a significant life event, becoming part of a person's individual identity and approach to daily existence. An injury or illness thus potentially affects every aspect of life: the pursuit of a career, leisure activities, religious orientation and practice, personal and group relationships, family responsibilities, involvement in political activities, and so forth" [Dembe, 2001]. The ripples from these events reach all of us.

The impact of these injuries include changes in the employment and earnings of injured workers, adverse effects on productivity and competitiveness, and other economic costs, including those associated with compensa-

tion systems. The total economic costs of occupational illness and injury rival those of cancer and heart disease [Leigh et al., 1997]. But, these illnesses and injuries also have substantial noneconomic effects on quality of life. Physical and psychological functioning in everyday activities can be affected, self-esteem and self-confidence reduced, and family relationships stressed. Labor relations in workplaces may be damaged. Despite the large, diverse, and dispersed effects of occupational illnesses and injuries, our understanding of these impacts is unfortunately still limited.

The Occupational Safety and Health Act of 1970 established the National Institute for Occupational Safety and Health (NIOSH) to conduct research that would help "assure every working man and woman safe and healthful working conditions and preserve our human resources." NIOSH unveiled the National Occupational Research Agenda (NORA) [National Institute for Occupational Safety and Health, 1996], to provide a framework to guide occupational safety and health research in the next decade. The collaborative efforts of many partners, including those in academia, industry, and labor, resulted in the identification of 21 priority occupational safety and health research areas. One of these areas is the "Social and Economic Consequences of Workplace Illness and Injury."

In June 1999, NIOSH hosted a conference, co-sponsored by the Robert Wood Johnson Foundation, the Institute for Work and Health, and the Agency for Healthcare Research and Quality. This conference brought together researchers to discuss future directions for research on the social and economic consequences of workplace illnesses and injuries and on occupational health services research. NIOSH commissioned background papers, asking the authors to discuss the state of the art in these areas and

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recommend the most promising areas for future research. These papers provide a foundation for developing a national agenda for research and funding.

These background papers are both conceptual and methodological, addressing central questions about the social and economic impact of occupational illness and injury. What conceptual models are useful to describe the economic and social consequences of occupational illnesses and injuries? What data are available now, and what important gaps should be filled? What relevant research techniques are used, and where would methodological advances be most useful? What do we know based on existing research, and what new knowledge would be particularly useful? After revision in light of input during the conference and peer review, most of the conference papers focusing on the social and economic consequences of workplace illnesses and injuries appear in this issue of the *American Journal of Industrial Medicine*¹. These papers provide an overview that will prove valuable to researchers already studying these areas while providing an excellent introduction to this research domain for readers who are unfamiliar with it. The papers also provide a strong foundation on which to build a research agenda that focuses on the social and economic consequences of occupational illness and injury.

Together with other emerging literature in this area, the papers in this volume of the *American Journal of Industrial Medicine* provide thought-provoking views on research priorities. Each of the five articles deepens our understanding of the post-injury experiences of workers and their families and stimulates a greater appreciation of the impact of occupational illness and injury on a wide range of human experience.

Two of the papers in this volume focus on conceptual frameworks. Dembe [2001] develops a framework for thinking about the many and varied social impacts of occupational illness and injury. In this context, he reviews a wide array of qualitative and quantitative studies of the experiences of injured workers. Weil [2001] presents a discussion of “disability pathways”, using this to structure his review of perspectives on valuing economic consequences and methods of valuing them.

The next two papers describe methods for assessing the impacts of workplace illness and injury. Keller [2001] focuses on the design of valid and reliable instruments that can be used in survey research to measure social consequences of illness and injury. Reville et al. [2001] review state-of-the-art methods and methodological issues in measuring impacts on workers’ earnings and productivity. This paper and Weil [2001] also discuss available, but

largely untapped, data that could be used to measure these impacts.

In the final paper in this group, Krause et al. [2001] focus on the critical issue of return to work. Public and private efforts can affect when injured workers return to work and whether their return facilitates a return to health and continued long-term employment. The paper by Krause et al. [2001] describes key challenges to researchers in this area. These challenges themselves suggest fruitful directions for new research.

As you read the five papers that follow, consider the issues they raise in light of their importance of establishing an agenda to influence research throughout the occupational safety and health community. In developing a research agenda, we see many of the themes discussed at the conference and highlighted in these papers as significant areas for future research.

EMERGING RESEARCH THEMES

Workers’ Costs of Workplace Illnesses and Injuries

Several themes have begun to emerge from the nascent but growing body of research in this area. First, workplace illnesses and injuries have major economic and non-economic consequences for workers and their families. Recent studies support the view that the economic burden of these injuries falls heavily on workers [Miller and Galbraith, 1995; Leigh et al., 1997; Biddle, 1998; Boden and Galizzi, 1999; Reville, 1999]. Recent estimates suggest that workers who lose more than a week from work or have permanent disabilities suffer an average of well over \$10,000 in lost earnings. As both Reville et al. [2001] and Weil [2001] point out in this volume, these estimates account for only a fraction of workers’ total losses, which also include medical and nonpecuniary costs. While the validity of economists’ estimates of the value of nonpecuniary costs has been hotly debated, no serious student of these issues disputes that these costs are considerable.

Research by psychologists, sociologists, anthropologists, and others has recently begun to paint a picture of the social costs that economists find hard to capture. These studies show that injured workers’ ability to continue to perform their social, family, and work roles is compromised by their diminished earnings, long-term physical limitations, depression, fear, and anger. As a result, family relationships suffer and family members frequently sustain significant economic and psychological hardships [Ewan et al., 1991; Tarasuk and Eakin, 1994; Galizzi et al., 1998; Morse et al., 1998; Keogh et al., 2000; Pransky et al., 2000; Strunin and Boden, 2000].

¹ The papers focusing on health services research appeared in the August 2001 issue.

Employers' Costs of Occupational Illnesses and Injuries

Employers' costs resulting from occupational illnesses and injuries are also understudied. Until very recently, virtually all analyses of employer costs focused exclusively on the costs of workers' compensation. Costs to employers are far greater and more varied than this focus suggests. They include the costs of hiring and training replacements for injured workers, the impact on the productivity of co-workers, the "hidden" administrative and supervisory time devoted to the consequences of the injury or illness, redundant hiring as insurance against downtime resulting from injury or illness, and productivity impacts of deterioration in morale and labor relations [Reville et al., 2001]. In public discussions about the value of preventing occupational illness and injury, these unknown costs have typically been treated as if they did not exist. Recent research has just begun to explore costs in this broader and more complete sense. The January 2001 issue of the *Journal of Occupational and Environmental Medicine* focused on issues of health and productivity and presented some of this new work (see, for example, Berger et al. [2001] and Bunn et al. [2001]).

Improving Our Understanding of Return to Work

Although public health has as a primary goal the prevention of work-related illness and injury, prevention efforts do not always succeed. When prevention fails, we then turn to ways of minimizing the harm done. Because work is both a valued social role and a source of income, timely return to work is of great benefit to injured workers. At the same time, early return to work benefits employers because they typically pay for long spells off work either directly (if self-insured) or with higher insurance premiums. In addition, employers pay substantial adjustment costs to maintain productivity in the face of the time lost from work by injured workers.

Factors that affect return to work include worker characteristics, injury type and severity, physical and psychosocial job characteristics, medical care, employer programs and other employer characteristics, macro-economic conditions, and public policies [Krause et al., 2001]. Studies of these factors can educate employers and public policymakers about which programs are effective. At the same time, they can help to guide public policy to provide incentives to employers to promote policies that encourage appropriate return to work. For example, studies have shown that, when the injured worker returns to the preinjury employer, time lost from work is reduced substantially and the trajectory of employment is improved [Burkhauser et al., 1995; Galizzi and Boden, 1996]. Other research has

evaluated specific types of programs designed to return people to productive employment (see Krause et al. [2001] in this volume). Long-term work outcomes for people with impairments are substantially improved when employers provide appropriate accommodation for their disabilities [Burkhauser et al., 1995]. Further studies may quantify the costs of and gains from job accommodations and other efforts to facilitate return to productive employment.

Utilization of Workers' Compensation

There is a complex web of relationships between and among injured workers, employers, social insurance systems, and health care providers. The social and economic burden resulting from occupational illnesses and injuries can be either increased or mitigated by how the affected parties respond.

As Dembe [2001] notes, many injured workers who file claims for workers' compensation benefits experience considerable mistrust from all sides: medical-care providers, supervisors, insurance claims handlers, and sometimes even their fellow employees or family members [Reid et al., 1991; Imershein et al., 1994; Dawson, 1994; Tarasuk and Eakin, 1995]. This mistrust increases the strain associated with episodes of medical care and with filing a claim. It can make employers more reluctant to accommodate injured workers and workers more reluctant to return to their jobs. This, in turn, increases the costs associated with the injury and adds to the worker's social and psychological burden. Along with this mistrust goes stigmatization and workers' fear that employers will take action against them, possibly leading to job loss.

For at least the past 20 years [Dembe and Boden, 2000], there has been a continual flow of research about the effects of benefit levels on workers' claim-filing and work behaviors, focusing on whether workers file more claims or remain off work longer if benefits are raised. In the public arena, this research on "moral hazard" is often cited in campaigns to change workers' compensation benefits, based on the belief that workers, engage in fraud, or at the very least, malingering [Michaels, 1998]. Newspaper articles have claimed that 25% of workers' compensation claims involve fraud [Kerr, 1991], and television "news" programs have followed with graphic depictions of individual cases of worker fraud. These factors and others lead many injured workers to conclude that it is better not to file for workers' compensation benefits than to undergo the indignity and risk of job loss that come with filing. This increases their own economic burden resulting from the injury [Michaels, 1998; Pransky et al., 1999].

New research in the social and economic consequences of occupational illnesses and injuries has begun to put this problem into perspective. As Reville et al. [2001] discusses, recent studies suggest that a substantial number of workers

with occupational illnesses and injuries never enter the workers' compensation system [Michaels, 1998; Biddle et al., 1998; Morse et al., 1998; Morse et al., 2001]. Continuing research on the proportion of workers who file and why some do not file is critical for several reasons. First, workers' compensation is a useful surveillance system only to the extent that workers file claims for workplace illnesses and injuries. Second, workers who do not file are not compensated. The burden of compensation then falls on the workers and their families or on other social and private insurance systems. Finally, to the extent that workers' compensation payments provide safety incentives to employers, those incentives are lost when claims are not filed.

Adequacy of Workers' Compensation Benefits

Moreover, workers' compensation programs do not adequately address the needs of injured workers. Workers who apply for benefits often find the programs to be adversarial, demeaning, and confusing [Imershein et al., 1994; Strunin and Boden, 2001]. Even if their applications for benefits are successful, recent research suggests that workers' compensation payments only replace a small proportion of the lost earnings of these injured workers; this is particularly true for those with substantial lost earnings [Biddle, 1998; Boden and Galizzi, 1999; Reville, 1999; Biddle et al., 2001]. Although workers' compensation is supposed to cover all medical costs associated with workplace illnesses and injuries, recent studies have also called this assumption into question [Galizzi et al., 1998; Morse et al., 1998; Keogh et al., 2000].

Methodological and Data Issues

The articles in this issue clearly indicate both the multidimensional nature of the impacts of illnesses and injuries and the importance of approaching their study in a multidisciplinary manner. Several other common themes emerge that are consistent with the deliberations of the NORA Team on the Social and Economic Consequences of Workplace Illness and Injury. One theme is the potential value of existing administrative and survey data. Reville et al. [2001] and Weil [2001] describe existing data that could be exploited to learn more about the social and economic consequences of interest. However, it is also clear that much of the needed research will depend on new sources of data. In developing new data sources, particularly in the area of social consequences, we need to use valid and reliable measures that capture the important dimensions of causes, effect modifiers, and consequences [Dembe, 2001; Keller, 2001; Krause et al., 2001].

In several areas, research advances may require the development of better measures of important causal factors

or outcomes. Keller [2001] describes current tools available to measure the impacts of occupational injuries on specific roles. While she discusses a number of well-validated instruments, she points out that researchers have only recently begun to develop instruments specifically designed to measure functioning in paid work. This is, of course, a critical area in the study of the social and economic consequences of workplace illnesses. The recent development of such measures reflects a growth in attention to these issues, spurred in part by the NORA effort.

CONCLUSION

It is crucial that we expand our understanding of the substantial burdens caused by workplace illnesses and injuries and that we explore mechanisms that will mitigate these burdens. The emerging research on the social and economic consequences of workplace illnesses and injuries has begun a process that will lead to a better understanding of critical issues: the impact of workplace hazards on the lives of workers and their families; the adequacy of workers' compensation benefits; the effects of illnesses and injuries on productivity, competitiveness, labor-management relations, and employer costs; factors that affect return to work; and barriers to the reporting of workplace illnesses and injuries to workers' compensation and other systems.

The papers in this issue underscore the extent and diversity of the social and economic consequences of workplace illnesses and injuries, provide an excellent introduction to and summary of existing research, and suggest fruitful directions for future research. These directions will help to shape the NORA research agenda on the Social and Economic Consequences of Workplace Illness and Injury.

In addition, a better understanding of the consequences of illnesses and injuries at work helps to frame the public discussion about the appropriate level of resources that our society should devote to the prevention of these conditions and to the amelioration of their impacts when prevention efforts fail. Legislative debates on research funding, regulation, and workers' compensation benefits should all profit from an improved understanding of the burdens that occupational illnesses and injuries place on injured workers and their families, employers, government, and the larger community. A clearer picture of these impacts also will help us to target research and prevention activities toward the most important workplace hazards and to assess the impact of interventions designed to improve workplace safety and health.

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REFERENCES

- Berger ML, Murray JF, Xu J, Pauly M. 2001. Alternative valuations of work loss and productivity. *J Occup Environ Med* 43(1):18–24.
- Biddle J. 1998. Estimation and analysis of long term wage losses and wage replacement rates of Washington state workers' compensation claimant, mimeo. Performance Audit of the Washington State Workers' Compensation System, 1998.
- Biddle J, Roberts K, Rosenman DD, Welch EM. 1998. What percentage of workers with work-related illnesses receive workers' compensation benefits? *J Occup Environ Med* 40(4):325–331.
- Biddle J, Boden LI, Reville RT. 2001. Permanent partial disability from occupational injuries: earnings losses and replacement in three states. In: Allan Hunt H, editor. Ensuring health and income security for an aging workforce. Washington DC: National Academy of Social Insurance. p 263–290.
- Boden LI, Galizzi M. 1999a. Economic consequences of workplace injuries and illnesses: lost earnings and benefit adequacy. *Am J Ind Med* 36(5):487–503.
- Bunn WB III, Pikelny DB, Slavin TJ, Paralkar S. 2001. Health, safety, and productivity in a manufacturing environment. *J Occup Environ Med* 43(1):47–55.
- Burkhauser RJ, Butler S, Kim YW. 1995. The importance of employer accommodation on the job duration of workers with disabilities: a hazard model approach. *Labour Econ* 3(1):109–130.
- Dawson SE. 1994. Workers' compensation in Pennsylvania: the effects of delayed contested cases. *J Health Soc Policy* 6(1):87–100.
- Dembe AE. 2001. The social consequences of occupational injuries and illnesses. *Am J Ind Med* 40:418–437 (this issue).
- Dembe AE, Boden LI. 2000. Moral hazard: a question of morality? *New Solutions* 10(3):257–280.
- Ewan C, Lowy E, Reid J. 1991. 'Falling out of culture': the effects of repetition strain injury on sufferers' roles and identity. *Social Health Illn* 13(2):169–192.
- Galizzi M, Boden LI. 1996. What are the most important factors shaping return to work? Evidence from Wisconsin. Cambridge, Mass: Workers Compensation Research Institute.
- Galizzi M, Boden LI, Liu T. 1998. The workers' story: results of a survey of workers injured in Wisconsin. Cambridge, Mass: Workers Compensation Research Institute.
- Imershein AW, Hill AS, Reynolds AM. 1994. The workers' compensation system as a quality of life problem for workers' compensation claimants. *Adv Med Sociol* 5:181–200.
- Keller SD. 2001. Quantifying social consequences of occupational injuries and illnesses: state of the art and research agenda. *Am J Ind Med* 40:438–451 (this issue).
- Keogh JP, Nuwayhid I, Gordon JL, Gucer PW. 2000. The impact of occupational injury on injured worker and family: outcomes of upper extremity cumulative trauma disorders in Maryland workers. *Am J Ind Med* 38(5):498–506.
- Kerr P. 1991. Vast amount of fraud discovered in workers' compensation system. *New York Times*. 12/29/91:1+.
- Krause N, Frank JW, Sullivan TJ, Dasinger LK, Sinclair SJ. 2001. Determinants of return to work and duration of disability after work-related illness and injury: developing a research agenda. *Am J Ind Med* 40:464–484 (this issue).
- Leigh JP, Markowitz SB, Fahs M, Shin C, Landrigan PJ. 1997. Occupational illness and injury in the United States: estimates of costs, morbidity, and mortality. *Arch Intern Med* 157:1557–1568.
- Michaels D. 1998. Fraud in the workers' compensation system: origin and magnitude. In: Guidotti TL, Cowell JWF, editors. Workers' compensation. Occupational medicine state of the art reviews. 13(2). Philadelphia: Hanley & Belfus.
- Miller TR, Galbraith M. 1995. The costs of occupational injury in the United States. *Accid Anal & Prevention* 27(6):741–747.
- Morse T, Dillon C, Warren N, Levenstein C, Warren A. 1998. The economic and social consequences of work-related musculoskeletal disorders: the Connecticut Upper-Extremity Surveillance Project (CUSP). *Int J Occup Environ Health* 4:209–216.
- Morse TF, Dillon C, Warren N, Hall C, Hovey D. 2001. Capture-recapture estimation of unreported work-related musculoskeletal disorders in Connecticut. *Am J Ind Med* 39(6):636–642.
- National Institute for Occupational Safety and Health. 1996. National Occupational Research Agenda. NIOSH: Cincinnati.
- Pransky G, Snyder T, Dembe A, Himmelstein J. 1999. Under-reporting of work-related disorders in the workplace: a case study and review of the literature. *Ergonomics* 42(1):171–182.
- Pransky G, Benjamin K, Hill-Fotouhi C, Himmelstein J, Fletcher KE, Katz JN, Johnson WG. 2000. Outcomes in work-related upper extremity and low back injuries: results of a retrospective study. *Am J Ind Med* 37(4):400–409.
- Reid J, Ewan C, Lowy E. 1991. Pilgrimage of pain: the illness experiences of women with repetition strain injury and the search for credibility. *Soc Sci Med* 32(5):601–612.
- Reville RT. 1999. The impact of a disabling workplace injury on earnings and labor force participation. In: Lane J, editor. The creation and analysis of linked employer-employee data, contributions to economic analysis. New York: Elsevier Science, North Holland.
- Reville RT, Bhattacharya J, Sager L. 2001. Measuring the economic consequences of workplace injuries. *Am J Ind Med* 40:452–463 (this issue).
- Spieler EA. 1994. Perpetuating risk? Workers' compensation and the persistence of occupational injuries. *Houston Law Rev* 31(1):119–264.
- Strunin L, Boden LI. 1999. Paths of reentry: employment experiences of injured workers. *Am J Ind Med* 38:373–384.
- Strunin L, Boden LI. 2000. The human costs of occupational injuries. Working Paper, Boston University.
- Strunin L, Boden LI. 2001. The workers' compensation system: worker friend or foe? Working Paper, Boston University.
- Tarasuk V, Eakin JM. 1994. Back problems are for life: perceived vulnerability and its implications for chronic disability. *J Occup Rehabil* 4(1):55–64.
- Tarasuk V, Eakin JM. 1995. The problem of legitimacy in the experience of work-related back injury. *Qual Health Res* 5(2):204–221.
- Weil D. 2001. Valuing the economic consequences of work injury and illness: a comparison of methods and findings. *Am J Ind Med* 40:418–437 (this issue).