Toward a Safe Workplace
The Role of Systematic Reviews

Linda Rosenstock, MD, MPH, Stephen B. Thacker, MD, MPH

The systematic evaluation of any health topic is essential to excellent public health practice. Systematic reviews, evidence-based recommendations, and meta-analysis are playing an increasingly important role in decision making in health-related issues[1,2] and for setting priorities for research.[3]

Several findings are striking in these reviews of occupational injury–intervention effectiveness. First, there are excellent examples of interventions that have been evaluated and shown to be effective in specific settings. Casteel and Peek-Asa[4] found approaches to Crime Prevention Through Environmental Design (CPTED) effective in reducing robbery in convenience stores, Segui-Gomez[5] identified a variety of worksite programs effective in increasing employee safety belt use,[5] and Rogers and Goodno identified a group of studies that demonstrate the effectiveness of interventions to reduce needlestick injuries during surgical procedures.[6] Within each of these reviews, however, many questions remain unanswered, such as which components of CPTED work best and in what type of settings, which multiple-strategy safety belt interventions lead to greater and longer lasting changes in safety belt use, and which interventions effective in reducing needlestick injuries in surgical settings will be effective in nonsurgical settings. The need to build on this existing knowledge base is critical given the growing needs of protecting workers in a changing workforce and economic constraints in both the public and private sectors.

Several topics of importance, such as adolescent workplace injury prevention and prevention of assaults to taxicab drivers, were excluded from this review because no intervention evaluations could be found. Studies of adolescent injury rates indicate that 16- to 17-year-olds have one of the highest rates of work-related injuries compared to workers of all ages. The rates for these young male and female workers treated in emergency departments in 1996 were 6.0 and 3.9 injuries/100 full-time equivalent workers, respectively; for male and female workers of all ages, the rates were 3.3 and 2.1/100 full-time equivalent workers, respectively.[7] Similarly, the taxicab service industry has the highest rate of work-related homicides at 41.4 per 100,000 workers, a rate nearly 60 times the national average of 0.70 per 100,000.[8] Effective use of scarce resources requires prioritization of research in order to maximize the value and impact of resource investments. The greatest impact on injury prevention will come from research efforts that focus on worker groups or hazards with high numbers of traumatic injuries, high rates or risk of injury, and a high probability of success in both developing effective prevention or control strategies and implementing them in the workplace.

The reviews in this supplement also highlight that while numerous strategies have been developed for occupational injury prevention, few have been evaluated. Across the 12 topics that were included, the reviewed intervention studies represent a small portion of the published research. For example, Kiefer[9] reviewed 5998 abstracts and titles and 129 articles, yet included only 17 studies for the topic of pesticide poisoning; Frank[10] reviewed 3489 citations and 79 articles with 7 being included in the review of shiftwork. Across all research topics, 41,871 abstracts and titles were screened, which resulted in 1356 potentially eligible studies. The number of studies included in this review totals 207, which represents 15.2% of potentially eligible studies. The primary reason for exclusion was the lack of an objective outcome measure. Even so, the articles included in the reviews were often judged as poor quality, with reviewers citing issues related to lack of control groups, no attempt at randomization, no control for confounding factors, and inadequate detail regarding interventions and statistical methods. For progress to be made in occupational safety and health, we must first make a commitment that new interventions should only be implemented in conjunction with evaluative research to document their effectiveness, and that future programs be based on interventions which have been shown to be effective.

Despite the large number of intervention strategies identified, there was difficulty in locating occupational intervention research through standard information

From the National Institute for Occupational Safety and Health (Rosenstock), Washington, DC; and the Epidemiology Program Office, Centers for Disease Control and Prevention (Thacker), Atlanta, Georgia

Address correspondence and reprint requests to: Linda Rosenstock, MD, MPH, Director, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Hubert H. Humphrey Building, Room 715H, 200 Independence Avenue S.W., Washington, DC 20201. E-mail: LZR6@cdc.gov.

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identification and retrieval methods. Within the topics identified, reports were often found in difficult-to-access publications and databases. This highlights two issues. First, occupational intervention research is a new and multidisciplinary field that requires skills and disciplines not traditionally applied to occupational safety and health research. Behavioral scientists, economists, organizational theorists, and engineers, among others, should be included in interdisciplinary efforts to identify, develop, and evaluate practical prevention and control strategies. Second, there is a need for rigorous dissemination of these findings in the peer-reviewed, scientific literature.

Over the past two decades, the use of systematic reviews and meta-analyses in all areas of medicine and public health has increased dramatically. These efforts have resulted in critical examination of the process of research synthesis.[11,12] This attention to research synthesis and evidence-based medicine has led to the recognition that efforts to improve the design, implementation, and reporting of primary studies must continue in order to enhance the quality of systematic reviews. An added consequence of these activities is the need for researchers, practitioners, and policymakers to understand both the benefits and limitations of alternative methods of data synthesis.

The National Occupational Research Agenda (NORA), developed through input and consensus of over 500 organizations and individuals, identified 21 research priorities for the occupational safety and health community.[13] Two of these priority research areas, traumatic injury and intervention effectiveness research, are addressed in this evidence-based review of the effectiveness of interventions to prevent occupational injury. The dedication of a special supplement focused on these crosscutting areas underscores the importance of identifying what works best for enhancing worker safety.

We hope this collection of scientific reviews will encourage researchers to make use of existing knowledge and address issues that will maximize the future progress of occupational injury prevention. These issues include requiring that new interventions be rigorously evaluated, using a multidisciplinary approach to conduct intervention research that addresses worker groups and hazards at high risk for injury, developing study designs that include controls and measurable outcomes, and publishing these data in the scientific literature. These are necessary steps if the promise of NORA to improve worker health and safety is to be realized.

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