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Best Practices in Ergonomics

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Introduction

Back belt purchases, once a safety solution touted as a 'best practice' for preventing back injuries especially in material handling jobs, took off in the 1980's and 1990's. Back belts were a simple yet practical and cost effective solution. Workers wearing back belts appeared in many warehouses and retail establishments. Many early studies produced conflicting results. It was not until the publication of Wassel's (2000) Walmart study that NIOSH chose to formally not support the use of back belts (NIOSH, 1996). Then in the early part of the 21st century, a systematic review looked at all the evidence and found there was no support for back belt use in preventing back injuries (Amendolia, 2003).

How is it that back belts could be defined as a best practice? How do we develop a compendium of ergonomic best practices? Best practices are the most effective techniques, methods, processes or practices at preventing injury or controlling the costs related to an injury. While best practices are often defined through standards which are based on the best available evidence – the scientific evidence can change. Best practices evolve and require keeping up with the most up-to-date ergonomic practices that are successful. Leaders engage in best practices. But the challenge in ergonomics is how to know what is true scientifically credible evidence. What is a health and safety manager to do when multiple product representatives attest to the science supporting the product? How can a safety professional sift through the mass of scientific publications?

The occupational health and safety research community has also sought to better clarify the evidence it can bring to the safety professional. Lavis (2004) has proposed a basic model for how science informs evidence-based decision making.

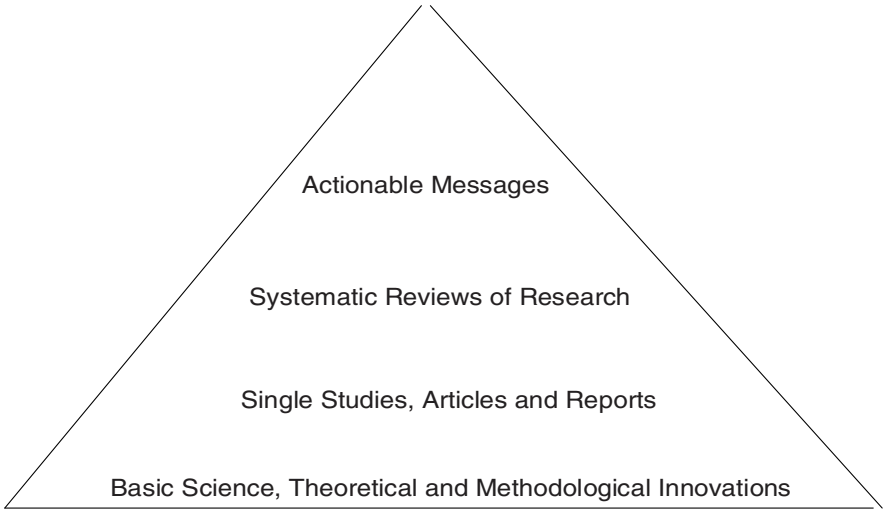

Exhibit 1. Hierarchical Structure of Evidence from Basic Research Evidence to Evidence-Based Actionable Messages

While innovations may be sparked by new ideas, actionable messages evolve from systematic reviews of research. A systematic review provides a concise and transparent synthesis of research evidence, making it a valuable aid to practitioners and researchers as an objective synopsis of the literature on a particular topic.

Linking Science to Defining Best Practices

For those interested in applying research there is a need to sift through the pool of research that is marketing one scientific approach over another and search for the scientific studies that provide the evidence base for practice. In health care, systematic reviews have become the language of scientific consensus, bringing together a large and diverse number of research studies to answer the question "what drug or medical treatment works." Systematic reviews often place single studies, which are used to advance a specific safety approach, into the broader safety research field.

Systematic reviews are different than what are now termed narrative reviews: Systematic reviews have the following advantages as cited in Lavis (2004):

1. The likelihood of being misled by research is lower with a systematic review – bias in the conclusions about the effectiveness of the ergonomic interventions is reduced.

2. Confidence in what can be expected from an intervention is higher with a systematic review – precision is increased.
3. Drawing on a systematic review constitutes a more efficient use of time because the research literature has already been identified, selected, appraised and synthesized in a systematic and transparent way – efficiency is increased.
4. Systematic reviews can be more constructively contested than an individual study because debate focuses on appraisal and synthesis rather than on why one study was identified and selected over others – scientific debate is more constructive

The Institute for Work & Health Prevention Review Program

In 2004, the Institute of Work & Health launched a prevention systematic review initiative. Funded by the Work Safety Insurance Board of Ontario, this four year initiative has produced systematic reviews of the effectiveness of interventions to prevent workplace injury, illness and disability. The prevention review initiative was undertaken in response to a concern raised by employers, labour and the Ontario Worker Safety Insurance Board that there was limited accessible evidence about the effectiveness of interventions for protecting workers' health. To date, the following reviews have been completed:

- The effectiveness of workplace interventions to reduce musculoskeletal injuries in health care settings
- Workplace interventions to prevent musculoskeletal and visual symptoms and disorders among computer users
- Economic evaluations of primary prevention or secondary prevention interventions in workplaces
- The effectiveness of participatory ergonomic interventions
- The effectiveness of Occupational Health & Safety Management Systems
- The effectiveness of injury prevention and control programs
- Participatory ergonomics interventions – implementation and process evaluation
- Effectiveness of education and training strategies for the protection of workers
- Preventing injuries in small businesses
- Preventing upper extremity musculoskeletal disorders

The reviews have examined over 60,000 scientific papers and extracted data from over 200 research studies that were considered to provide scientifically credible evidence for decision making.

The Systematic Review Process

A systematic review is typically completed in 10 steps:

1. Assemble a review team
2. Formulate research question and search terms
3. Identify articles expected in literature search by all review team members
4. Invite international content experts to identify key articles
5. Convene stakeholder meetings to research question, definitions, search terms and inclusion criteria

6. Conduct literature search and pool articles with those submitted by experts
7. Conduct review to exclude non-relevant studies
8. Conduct review to assess methodological quality of remaining relevant articles
9. Conduct review to extract data from relevant articles that were identified for evidence synthesis
10. Complete evidence synthesis

At each stage of the process stakeholders (employers, safety professionals, labour, policy representatives and other key consumers of the information) are involved. It is interesting to note that over the four years the stakeholder community had the opportunity to select from over 50 possible systematic reviews and selected the ones listed above.

It is also important to recognize that a review team comprised of researchers, practitioners and policy makers is preferred to one composed solely of researchers.

Best Practices in Ergonomics

What have we learned from the systematic reviews? Overall, best practices are not about specific ergonomic tools but are more integrated approaches to hazard control.

First and perhaps most important – there is strong evidence that ergonomic programs are cost effective –the evidence is particularly strong for ergonomic programs implemented in manufacturing, transportation and manual material handling (Tompa et al, 2007). In a review of the financial benefits for all occupational health and safety programs, only ergonomic programs designed to reduce musculoskeletal injuries and disability management programs had enough scientific evidence to conclude that their financial merits warranted effectiveness Thus, the body of scientific evidence supports the financial case can be made for ergonomics programs.

Second, there is no evidence that magic bullets exist as a best practice. There are no ergonomic equivalents of penicillin. When engaging in ergonomic changes to improve safety and prevent injury, the evidence does not support doing any one thing (Brewer et al, 2006; 2007). Specifically there is credible scientific evidence that the following will not be successful.

1. Rest breaks
2. Ergonomic training
3. Adjustments to workstations

The evidence is strongest for the absence of any health and safety benefits for ergonomics training alone. This makes perfect sense to the safety professional as one would never training a person appropriate lifting techniques without providing them with the technology to support and lifts. It also makes sense since none of these activities is likely to significantly reduce the exposure or risk.

Third, there is evidence that the following are key characteristics of successful ergonomic programs (Amick et al, 2007).

1. An ergonomic program must be supported by a organizational policy

2. An ergonomic program must be implemented with a broad-based ergonomics training and not simply a training on how to use the tool, correctly behave or the appropriate technique
3. An ergonomic program must make available to the worker the appropriate technology with which to do work.

This, of course follows from the second observation. The classic example is in health care where there is emerging evidence that ceiling lifts with lift training will not have the intended effects (Amick et al, 2007). Rather the health care business (mostly hospitals and nursing homes) must establish some form of 'zero lift policy' that clearly indicates management commitment to enforcing this initiative. Second the training must be broad-based and consider not only how to use the lift, but motivate the employees to engage in proper lifting. The training could be extended to supervisory practices to enforce the policy. Finally, the ceiling lifts must be in place.

Fourth, ergonomic modifications are important in the management of workers who have developed an injury or illness. In this case there is not a specific set of best work accommodations. Rather there are a series of reviews that demonstrate the importance of disability management programs in reducing injury and illness (Brewer et al, 2007; Tompa et al, 2007).

Fifth, we found specific to computer-based work that alternative pointing devices were useful in reducing the risk of musculoskeletal injuries as was working with the computer user and training them about ergonomics and then going over workstation adjustments (Brewer et al, 2006). Often many computer users have more possible adjustments to their workstation that they know how to adjust or understand why they should adjust it. Providing the training and demonstrating the adjustments can serve to establish the appropriate behaviors.

Finally, participatory ergonomic programs are effective in reducing injuries (Rivilis et al, 2007; Van Eerd et al, 2008). Wilson (1985) defined PE as "the involvement of people in planning and controlling a significant amount of their own work activities, with sufficient knowledge and power to influence both processes and outcomes in order to achieve desirable goals". Kuorinka (1997) defined PE as "practical ergonomics with participation of the necessary actors in problem solving".

For PE programs to be successful the right people must be chosen when creating the PE team and it is important to provide them with ergonomic training. These are among 6 key elements of success for PE programs:

- Management support of the PE program,
- Appropriate resources committed to the program,
- Appropriate ergonomics training provided,
- An appropriate team is assembled,
- Attention is paid to communication between team members and between the team and management and teams and the workplaces,
- There is training in how the organization works so the team understands how to function.

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