



Interface

a common boundary between systems,
equipment, concepts, and human beings

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INTRODUCTION Jeremy Chingo Harris, Chair, Ergonomics Branch

Greetings! Hopefully, everyone did something in October to recognize National Ergonomics Month. In 2003, the Human Factors and Ergonomics Society (HFES) designated October of every year as National Ergonomics Month (NEM). NEM's purpose is to promote human factors/ergonomics to corporate executives, students and the general public by providing information and services to the community.

I am pleased to report that our membership numbers have increased slightly to 332. To help drive membership, Cindy Roth, our newsletter co-chair, has volunteered to co-chair membership with Scott Valorose. We are still targeting 500 members so we can become a standalone practice specialty. I am confident that Cindy and Scott will be a great team driving us to that goal. If all goes well, we might be able to transition to practice specialty at the Council on Practices and Standards meeting in Baltimore next year.

Cindy's transition leaves an open opportunity as newsletter co-chair with Hank Austin. If anyone is interested in working on the newsletter, please contact me at jeremy.chingoharris@ge.com.

Lastly, Kim Monroe has stepped down from her role as awards and honors chair. Thank you to Kim for her work on the Ergonomics Branch advisory committee and best wishes!



The Importance of Ergonomics to Healthcare

Healthcare is a crucial and growing area for SH&E professionals. The U.S. population's increasing longevity has put added pressure on the nation's healthcare delivery system. The implications of inadequate staffing among healthcare workers differ from those of other workers in many industries.

Healthcare workers are suffering from the highest numbers of ergonomic-type, musculoskeletal disorders (MSDs) while working. The most recent U.S. Department of Labor (DOL) summary statistics indicate that nursing aides, orderlies and attendants, along with 2 other occupations (truck drivers and nonconstruction laborers) account for 1 out of 5 musculoskeletal disorders reported nationally in 2001. The American Hospital Association has stated that work-related MSDs account for the largest proportion of workers' compensation costs in hospitals and long-term nursing home facilities nationwide. In addition, the American Nurses Association reports that ergonomic injuries occur in nurses at a rate that is twice that found in the general working population.

The exact nature of RNs' daily duties usually depends on the setting in which they work:

- In hospitals, staff RNs typically provide bedside nursing care and carry out medical regimens. They often supervise licensed practical nurses (LPNs) and aides.
- Nurses who work in physicians' offices usually prepare patients for exams and help doctors perform them, give injections, apply dressings and sometimes maintain the office's records.
- Nursing home RNs largely perform administrative and supervisory functions. They may also evaluate residents' health and develop treatment plans as well as perform difficult procedures.
- Home health nurses provide services in patients' homes. They often work independently but also supervise home health aides.
- Government and private agencies, schools, senior citizen centers and other community-based organizations employ public health nurses. They provide instruction about such things as disease prevention and nutrition and arrange for various health screenings.
- Occupational health or industrial nurses work at firms that engage them to provide limited medical care. In addition to providing emergency assistance and writing up accident reports, these RNs offer health counseling, help with injections and assess work environments for potential health/safety problems.
- Head nurses or nurse supervisors perform administrative and supervisory functions, such as creating work schedules for and assigning duties to nurses and aides, providing or arranging for training and visiting patients to observe nurses and to ensure the proper delivery of care.
- Nurse practitioners provide primary healthcare (i.e., prescribe medication and otherwise diagnose and treat common acute illnesses and injuries). Other advanced practice nurses include clinical nurse specialists, certified registered nurse anesthetists and certified nurse-midwives. They all must fulfill higher educational and clinical experience requirements than those established for the prior groups.

Labor shortages in various occupations and industries were reported during the late stages of the U.S.'s longest economic expansion, which ended in early 2001. The unemployment rate in some fields (e.g., nursing)



The Importance of Ergonomics to Healthcare (cont'd)

has remained virtually unchanged despite the advent of the recession, which suggests that factors unrelated to the business cycle affect them. For example, the population's increasing longevity and wealth combined with a growing share of elderly persons put added pressure on the healthcare delivery system, and these trends are expected to continue. Moreover, although women continue to account for the majority of workers in many healthcare occupations, their career opportunities have widened over time. Among women who already are licensed RNs, many are expected to retire soon while others have chosen to work in non-nursing occupations.

Healthcare providers who thought their labor supply was fairly well assured must now compete for the interest of students based on nursing's attractiveness. Providers could become more concerned about retaining their aging RN workforce and about appealing to licensed RNs who are otherwise employed. However, during the mid-1990s, earnings growth among RNs slowed compared to earlier in the decade, and their wage increases were smaller than those of all professional workers. This might explain the drop in nursing program graduates that began in the 1995-1996 academic year and the greater share of RNs not employed in nursing in 2000 as compared to 1992 and 1996. U.S. Health Resources and Services Administration (HRSA) 1996 projections and those of analysts suggested the likelihood of a shortage of RNs beginning in 2007.

If current trends continue and actions for change are not taken, HRSA projects that the aggregate shortfall could worsen at an accelerating rate—from 6% in 2000 to 12% by 2010, then rising to 20% by 2015 and climbing to 29% by 2020. Not all states currently share in the RN shortage, nor are those with shortages sharing equally, according to HRSA's latest projections. Therefore, it is crucial to maintain the health and safety of the working nursing population, especially as they age.

New studies address the importance of RNs to patient recovery. Measuring nursing-sensitive patient outcomes using publicly available data provides exciting opportunities for the nursing profession to quantify the patient care impact of staffing changes at individual hospitals and to make comparisons among hospitals with differing staffing patterns. Using data from California and New York, a study tested the feasibility of measuring such outcomes in acute-care hospitals and examined relationships between these outcomes and nurse staffing. Nursing intensity weights were used to acuity-adjust patient data. Both higher nurse staffing and higher proportion of RNs were significantly related to shorter lengths of stay. Lower adverse outcome rates were more consistently related to a higher proportion of RNs.

Ergonomics applied in the healthcare industry is the science that will save the number of RNs available for work. Studies have been shared since the 1980s regarding manual material handling (MMH) of patients, defined as lifting, pushing, pulling, holding and carrying and MMH contributions to healthcare staff ergonomic risk factors.

One of the best known articles is "Prevention of Back Injuries in Healthcare Workers" by A. Garg and B. Owen, which appeared in the Vol. 14, No. 4 issue of the *International Journal of Industrial Ergonomics*. A Finnish review has concluded that employer attempts to push training programs that offer lifting advice and material handling devices in an effort to alleviate worker back pain do not prevent the injury potential, which is said to be the top cause of workers' compensation claims. The review, which appears in the latest issue of the *Cochrane*



The Importance of Ergonomics to Healthcare (cont'd)

Library, examines data from more than 18,000 employees in 11 studies. “This study confirms that much of what is happening at the workplace is well-intentioned but probably pointless,” says Christopher Maher, associate professor of physiotherapy at the University of Sydney in Australia, who was not involved with the study.

According to Maher, regulatory agencies as well as employers make the mistake of concentrating on equipment and policies that do not work, such as back belts, lifting devices and workplace redesign, and fail to focus on the “only known effective intervention,” which is exercise.

“We also know that exercise has health benefits beyond prevention of back pain, so you are getting 2 health benefits (or more) for the price of 1,” Maher adds.

With the inclusion of this study, even more confusion exists regarding solutions to reduce ergonomic risk factors in healthcare. Many studies demonstrate the hazards and costs of ergonomic injuries to healthcare providers and workers. Other studies support the efficacy of ergonomics programs in addressing these concerns.

Ergonomics programs can protect workers' health, reduce lost workdays and workers' compensation costs and aid in patient care. Prevention is the key to saving staff and patients.

One thing is certain—common sense and the willingness to assume responsibility for one's own actions is mandatory. Do not lift, push, pull or carry beyond capacity. Get help. The patient always comes first, however, if the nursing professional is out with a back, shoulder, wrist or any other type of MSD injury, who is thinking of the patient now?

ErgoArticle Hank Austin, N.L. Austin & Associates, Inc., ErgoANSWERS.com

Tips for the Safety Professional/Ergonomist

As a safety professional, you have likely read about and learned about ergonomics. You may have attended classes and study sessions. I would like to pass on some of the tips and tricks that I have learned in my years in ergonomics.

First, understand and take to heart that employees are your customers and that much of what they tell you in an ergonomics assessment should be considered confidential. They may tell you about medical procedures and conditions, medications and doctor's visits. They may comment on their personal activities and their body parts. Be careful with comments on personal factors, such as weight, gender, physical capabilities and/or medical issues. Be careful about touching, leaning over an employee, crawling under desks and any questions you may ask.

Do not discuss anything about an ergonomics assessment with anyone who does not have a specific business need to know. In fact, talk to your legal group to determine who in your organization can access this information. Do not joke about anything pertaining to an employee or an ergonomic consultation. Be professional, understanding and courteous at all times.



Tips for the Safety Professional/Ergonomist (cont'd)

Also, if the employee you assist begins an inappropriate discussion, you must draw the line or you could possibly face harassment issues from the employee or from someone who overhears or who is told about the incident.

Before you bring employees in for a class on ergonomics, get involved in learning about what they do, how they do it and why. Watch and listen. Ask questions. People love to talk about what they do. Try to understand their processes and what the driving issues are. Where does the work come from and where does it go? Get copies of any workflow diagrams that might exist.

As you watch them, try and guess what types of pain and injuries they might be experiencing. Look for non-neutral movements and postures, extreme angles, force and repetition. Remember, these items do not always signify an injury. What is going on with their neck? Are their shoulders raised? Is the head turned or up or down? Does the employee sit on his or her leg? Are their wrists pronated, supinated, extended, flexed, clinched or resting?

After you understand what is going on, talk to employees about their job and ask if they feel discomfort or pain. Make them feel at ease, and if possible, meet with them without their supervisor present. Practice reasonable ergonomics. Be reasonable about your recommendations. Do not set the employee up with unreasonable expectations. Keep aligned with what you can do within company guidelines. Do no harm. Do not ever force someone to do something that they do not want to do or is of questionable value for them.

For example, you have just completed an assessment for an employee who has worked for the company for ten years. This employee has been sitting and working in postures that break all of the “rules”, but they are not experiencing any injury or pain. Do not force this employee into “proper” posture. Ergonomics recognizes that everyone is different. Forcing them will only upset them, possibly diminish their performance and job satisfaction and upset other employees in the area. This is the exact opposite of what you tried to accomplish. You might even cause an injury and/or find yourself explaining your actions to management. Leave well enough alone and do no harm.

Ergonomics can touch upon personal issues. Determine how to handle them before you are confronted with a problem. Get your policies in place and ensure that the company will back you up so that you are not left standing alone when a complaint comes in.

Hank Austin, CSP, MS, is vice president of N.L. Austin & Associates, Inc. and ErgoANSWERS.com.

Ergonomics Branch Seeks New Members

We are a hard-working, fun-loving group who enjoys exchanging ideas, solutions and new innovations. The Ergo Branch is always looking for new members to join our ever-growing group, and we hope to be a standalone practice specialty soon.

To learn more about the Ergonomics Branch, contact [any one of us](#) or [Scott Valorose](#), our Membership Chair.



Little-Known Components of Top Ergonomics Programs

What else might be included in a world-class ergonomics program?

Top ergonomics programs incorporate program components, such as:

1. Top management support.
2. A written program.
3. Training.
4. Employee involvement.
5. Injury analysis.
6. Workstation adjustments.
7. Ergonomic chairs.
8. Computer peripherals.

Many top programs also go beyond the basics to achieve documented improved productivity.

To reach the top level of ergonomics programs, a company must expand into new arenas like Six Sigma, process engineering, cognitive engineering and usability testing. It all starts with knowing the job. In modern architecture, this is also known as evidence-based design. To ensure that the tools are proper for the employee, one must first intimately understand what the job is. Before any design begins, one must determine if the job is needed. One of the worst mistakes to make is to improve an unnecessary job.

A job must be broken into tasks and flowcharted, then the proper tools must be chosen. This includes equipment, furniture, lighting, air quality, fire spread ratings, building evacuation, sound, colors, etc. In fact, proper computers, monitors, keyboards and input devices cannot be chosen until the work is known and the proper usability tested software is available.

Lighting has much to do with reading documents, writing, seeing the computer screen, glare, headaches, power consumption and overall feelings of well being.

Air quality impacts people greatly. Dr. Alan Hedge of Cornell University reports that a correlation exists between air quality constituents like temperature, humidity, particulate count, total volatile organic compounds and work done. Air quality is impacted by interior finishes used, including paints and adhesives, and by off-gassing from desks, chairs and carpets as well as by the amount of outside air introduced into the area.

Sound issues have been shown to impact employees in their work. Ambient noise can be a distraction and can impact employees' ability to concentrate. Noise can also impact customer service, as it can potentially be heard by the customer through a headset microphone. Also consider the impact of headsets on employee hearing. How loud will they go, and could they trigger a hearing conservation program?

Interior furnishings can impact fire spread. Furniture items should be fire spread-tested as a unit and not as individual components. An individual component might get an A-rating, but the unit might fail. If you are considering what interiors (sound, colors) to include or what furniture to select, you must look at the whole thing. Do not select an item that is a great biomechanical fit but pollutes the air and is a fire hazard.



Little-Known Components of Top Ergonomics Programs (cont'd)

How will furniture affect emergency evacuation from the building? Consider evacuation aisles and distances. If the furniture panels are high, can the exit signs be seen?

The best programs consider these items. They impact employee productivity and employee injuries. Does it really matter that much? Should a company put money into all of these things? Consider what makes your company different and/or better than your competitors. In most cases, you likely use much of the same equipment, software, etc. as they do. How can you be better than them? You can make things better in a biomechanical and cognitive respect than your competitors.

Peter Drucker once said, "The chief economic priority for developed countries, therefore, must be to raise the productivity of knowledge and service work. The country that does this first will dominate the 21st century economically."

It all comes down to productivity.

ErgoArticle Cynthia Roth, Ergonomic Technologies Corp (ETC)

Combat Sports Overuse Injuries with Education & Treatment

Muscle strains and stress fractures are some of the most common sports-related overuse injuries, but they are preventable. By focusing on pregame stretching, early reporting and proper treatment, athletes can avoid these injuries and perform at their best. Overuse injuries account for approximately 50% of all sports-related injuries in middle and high school athletes.

Muscle strains often have root causes that go beyond the playing field. Muscle discomfort, numbness, tightness and a loss of flexibility are some of the warning signs. Stress fractures can result from repeated physical stress placed on a bone. "One of the most important things that athletic directors should pay attention to is preseason physical exams that include height, weight, blood pressure and respiration," says Cindy Roth, president of Ergonomic Technologies Corp. in Syosset, NY. "There should also be a preseason orthopedic exam to look at bone and joint injuries, flexibility and range of motion." These preseason exams provide a baseline on the athlete's physical state. Any deviation during the season should raise a warning flag. Roth suggests that athletic departments follow a 6-step process to combat overuse injuries.

1. Educate athletes on proper nutrition. "Schools are looking to win, but they should be able to do so with healthy, well-conditioned student-athletes," Roth says. The school administration, working together with the athletics department, should establish nutritional guidelines. Athletes should be encouraged to include calcium in their diet to keep bones strong and able to withstand pressure.
2. Warm up and cool down. All athletes should stretch and warm up before games. If an athlete sits on the bench for a long period of time during the game, s/he should stretch before entering. Prolonged sitting prior to competition can increase the likelihood of injury. Also, ensure that athletes cool down following vigorous activity.

For example, after a long-distance run, athletes should walk for 5 minutes so their pulse rate comes down gradually. Fifty percent of sports-related injuries are due to overuse of the body part. Muscle strains and stress fractures are the most common overuse injuries. Monitor athletes' physical state to prevent injuries.



Combat Sports Overuse Injuries with Education & Treatment (cont'd)

Stretching reduces muscle strains and increases flexibility. Stretching improves range of motion, reducing the likelihood that athletes will strain their muscles during competition. Athletic departments should have a coordinated stretching program for each sport. CDC recommends the following recommendations for athletic stretching programs:

1. Warm up before stretching. Stretching muscles when they are cold increases the risk of pulling them. Warm up with a brisk walk or jog.
2. Focus on commonly performed tasks. The stretching routine for a football kicker will differ from a golfer's routine. For example, a kicker will likely perform squats and lunges to work on leg muscles, while a golfer will focus on upper-body strength and hip rotation to drive the ball. Go beyond the pregame. Stretching is not just a pregame activity. Ensure that athletes stretch following extended breaks, such as halftime, or if they have been sitting waiting to go in.
3. Strive for the right fit. "All of the equipment an athlete wears has to protect the body and allow a range of motion," Roth says. Ill-fitting equipment that impedes motion forces an athlete to work harder to accomplish the task, thus resulting in muscle strains.
4. Encourage early reporting. Remind athletes to report early signs and symptoms. Continuing to play with an injured body part can affect other parts of the body and can lead to other injuries. For example, a football player with a shoulder strain might try making more tackles with the strong side of his body. Untreated chronic injuries can lead to long-term disabilities.
5. Provide immediate treatment. "Do not wait to evaluate," Roth says. "When an athlete complains about an injury, s/he should immediately see a physician." The physician, rather than the coach, should decide when the athlete can return to play. Coaches should not allow athletes to play through injuries.
6. Provide ample recovery time. Some students participate in multiple sports. They might go directly from football to basketball to baseball during the school year. In addition, some of those sports might overlap. This often leaves little time for their bodies to recover. Athletic departments should monitor multisport student-athletes and discuss the symptoms of overuse injuries, Roth says.

For more information, e-mail Cindy Roth at croth@ergoworld.com.

Get Published!

Write an article for the Ergonomics Branch Newsletter! Tell us about something that has worked well for you. Contact Hank Austin at hank@ergoanswers.com. Articles are typically one to two pages long. Spread the knowledge!

