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**National Institutes of Health
Office of Research Services
Division of Occupational
Health and Safety**

Providing a safe and healthy environment for employees, patients and visitors.

“Safe science and good science go hand-in-hand.”

The articles in this Newsletter are intended to provide general summary information to the National Institutes of Health (NIH) community. They are not intended to take the place of either the written law or regulations. It is not NIH's intention to provide specific advice to readers of this Newsletter, but rather general information to help better understand how to prevent or reduce workplace injuries and illnesses.

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Your part in hazard identification

It is important for everyone to take a proactive role in identifying potential hazards. Hazardous conditions in the workplace increase in numbers and complexities as technology advances. By identifying problems and correcting them, you not only promote workplace safety, but you save your organization money by avoiding down-time, injury and illness claims, and the cost of training new workers.

Hazard recognition

As an employee, there are any number of hazards that you may be exposed to in your normal work duties. Contact with electrical hazards, the chance of a slip or fall, and exposure to loud noises can affect you daily. Exposure to chemicals, radiation, and temperature extremes also contribute to hazards on many jobs. Recognizing where these hazards exist is the first step in making sure your workplace is safe.

Following is a list of the most common hazards you may be exposed to on a daily basis. Not all will apply to your facility, so you will only need to address those that are present. You may also need to add categories for hazards that are unique to your field.

1. Chemical exposure hazards

Exposure to chemicals can pose serious physical or health hazards. They are usually grouped according to the type of hazards they present.

Physical hazards

Certain chemicals exhibit physical hazards due to their physical

properties, such as combustibility, flammability, or reactivity. This category includes the following classes of chemicals:

- Flammable solids or liquids;
- Combustible liquids;
- Explosives;
- Organic peroxide;
- Oxidizers;
- Pyrophoric materials (may ignite spontaneously in air at temperatures of 130° F or below);
- Unstable materials; and
- Water-reactive materials.



Health hazards

Certain chemicals can cause acute or chronic health effects after exposure. It may be an instantaneous, obvious effect, such as death following inhalation of cyanide. However, many physical reactions don't occur for days, weeks, or even years after exposure. Some examples of chemicals that can present health hazards to you include the following:

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- Carcinogens — cancer causing agents such as formaldehyde or benzene
- Toxic agents — lawn and garden insecticides, fungicides, and arsenic compounds
- Reproductive toxins — thalidomide and nitrous oxide
- Irritants — bleaches and ammonia
- Corrosives — battery acid and caustic sodas
- Sensitizers — creosote and epoxy resins
- Organ-specific agents that act on specific organs or parts of the body — sulfuric acid, which affects the skin and asbestos, which affects the lungs

What can you do?

Be knowledgeable about the chemicals you use. Read the label to gain an understanding of what kind of ventilation is needed and what type of personal protective equipment (PPE) is required for safe use. Also pay attention to recommended exposure limits and proper storage of chemicals so incompatible materials are not stored together.

2. Electrical hazards

Carelessness and failure to follow set procedures cause many of the deaths linked to electrical hazards, which include shock and burns from arc-blasts, explosions, and fires. These accidents can be avoided, for the most part, if you use safe electrical equipment and work practices.

What can you do?

If you participate in an electrical hazard assessment of your workplace, check to see that the following are being used wherever possible:

- Insulators of glass, mica, rubber, or plastic
- Electrical protective devices, including fuses, circuit breakers, and ground-fault
- Guarding of dangerous equipment in separate rooms or remote areas
- Grounding for paths of dangerous currents

3. Ergonomics

Ergonomics means arranging the environment to fit the worker. Using ergonomic principles in the workplace will help reduce stress and eliminate many potential injuries and disorders associated with the overuse of muscles, bad posture, and repetitive motions. In the course of your job, your hands, wrists, arms, shoulders, backs, and legs may be subjected to thousands of repetitive twisting, forceful or flexing motions during a typical workday. When coupled with poorly designed work environments, tools, and job duties, you may be continually subjected to both physical and psychological stressors.

A combination of these factors rather than any single factor may be responsible for an individual's psychological or musculoskeletal distresses.

If exposed to certain ergonomic hazards for a long period, employees can develop strained vision, hearing loss, permanent back, neck and shoulder injury, and other serious health complications. In fact, ergonomic hazards are the number one cause for employee absenteeism at most companies.

What can you do?

One of the best things that you can do is to take better care of yourself. Exercise regularly to keep your core muscle groups strong. Practice a combination of muscle-strengthening, cardiovascular, and stretching exercises. Get into a routine that works for you.

Practice safe lifting at work. Stretch muscles periodically to avoid cramping, especially if you use your hands a lot or if you are bending over to perform tasks.

Controlling hazards

Once hazards have been identified, steps should be taken to control those hazards. The following actions can be taken:

- Find a new method of doing the job. Consider work-saving tools and equipment. Ergonomically designed tools, equipment, and workstations increase worker comfort and productivity.
- Change or modify the physical conditions that create the hazards.
- Eliminate hazards still present by changing work procedures.
- Reduce the necessity of doing a job or the frequency with which it must be performed.
- Use provided personal protective equipment (PPE). If you feel that there is a need for additional PPE, let your supervisor know.

Do your part to identify hazards. After all, you are in the best position to recognize hazards. Suggest ideas on how to reduce hazards if they can't be eliminated.



Safety focus: Extension cords

Employers often have a lot of questions regarding extension cords: Can they be repaired? Can a new extension cord be made? Does the Occupational Safety and Health Administration (OSHA) allow the purchase of components to build cords to the length needed?

Repairing extension cords

Superficial nicks or abrasions — those that only slightly penetrate the outer jacket of a flexible cord and do not permit the cord to bend more in that area than in the rest of the cord — do not normally render a cord “worn or frayed.” Therefore, there is no need to repair or replace such a cord. However, employers generally use electrical tape to cover this type of damage to cord jackets.



While taping nicks or abrasions does not necessarily violate any OSHA standard, OSHA recommends that employers not tape this type of damage for two reasons:

1. OSHA standards preclude using approved electrical conductors and equipment if their characteristics are significantly altered. Applying electrical tape that is too thick or applying too much of it could change the cord's original flexibility and lead to internal damage.
2. The depth of the abrasions and cuts cannot be monitored to see if they get worse without removing the tape.

On the other hand, tape repairs of the jacket may not be used to bring a worn or frayed flexible cord into compliance. Repair or replacement of an extension cord, depending on its gauge, is required when the outer jacket is penetrated enough to cause that part of the cord to bend more than the undamaged part or penetrated completely, or when the conductors or their insulation inside are damaged. When repaired, the cord must be in the same condition as when it was new with regard to both design and safety.



Taping cords can compromise both of these criteria. For example, taping can change the flexibility characteristics of the cord, which in turn can affect the amount of stress in the adjacent areas. This is of particular concern with respect to the grounding wire.

Also, flexible cords must be used only in continuous lengths without splice or tap. Hard-service cord and junior hard-service cord No. 14 and larger may be repaired if spliced so that the splice retains the insulation, outer sheath properties, and usage characteristics of the cord being spliced.

Be aware that taped repairs usually will not duplicate the cord's original characteristics; in most cases neither the jacket's strength nor flexibility characteristics will be restored.

Assembling new extension cords

Employers are allowed to make extension cords if a qualified employee does the work and the cord is equivalent to those that are factory assembled and approved. To meet existing electrical standards, ensure shop-made cords contain components that are:

- Approved for use by a nationally recognized testing laboratory; and
- Compatible for use with the other components of the completed assembly.



Safe practices

Safety should be foremost in your mind when working with electrical equipment. You face hazards from the tools themselves and the electricity that powers them. It's up to you to wear protective equipment whenever it's specified, use all safety procedures, and work with tools correctly. Here are some “do's and don'ts” for extension cords:

- Do inspect extension cords regularly. Have damaged cords repaired or replaced immediately.
- Do keep extension cords clean and free from kinks.
- Don't use extension cords as substitutes for fixed wiring — only when flexibility is necessary.
- Don't run extension cords through holes in walls, ceilings, floors, doorways, or windows.
- Don't use extension cords where they are concealed behind walls, ceilings, or floors.

NIH, OD, ORS, DOHS
Bldg 13, Room 3K04
13 South Drive, MSC 5760
Bethesda, MD 20892-5760
Phone: (301) 496-2960
Fax: (301) 402-0313

The purpose of this newsletter is to provide a forum for the dissemination of health and safety information. It is intended to enhance communication to National Institutes of Health (NIH) employees, raise awareness of current safety policies and procedures, and provide guidance on relevant issues. It is provided as a service by the NIH, Office of Research Services, Division of Occupational Health and Safety.

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Back pain and how to prevent it

"Without a struggle, there can be no progress."

Frederick Douglass



Prevent back pain by keeping your back and abdominal muscles strong.

Back pain affects most adults at some point in their life and can last for a few days to weeks or months. Lower back pain is most common, but soreness can be felt anywhere along the spine, from the neck to the hips. The pain can range from a dull, constant ache to a sudden, sharp sensation that leaves a person incapacitated.

Conditions such as arthritis, osteoporosis, or scoliosis can lead to back pain. Back pain can also be brought on by:

- A sudden, awkward movement;
- Repeated heavy lifting;
- A sprain or strain;
- Poor posture;
- Anxiety and stress; or
- Sleeping in an awkward position.

Taking good care of your health is one way to prevent back pain. People who are not physically active, are overweight, or smoke may be at risk for back pain.

Most cases of back pain improve on their own over time, but if you're worried about your back, or if pain hasn't gone away after six weeks, it's best to see a doctor.

Prevention

One of the best ways to prevent back pain is to keep your back and abdominal muscles



strong. If these muscles are weak, they may not properly support the spine.

Staying active, and doing back strengthening and stretching exercises two to three times each week, can help protect your back from injury. Common exercises to help your core and back include:

- **Planks:** While on your stomach, prop yourself up on your toes and hands or forearms. Your shoulders should be above the elbows. Create a straight line from head to toe. Don't allow the lower back to sink. Hold for 10 seconds to 1 minute, and repeat.
- **Bridge pose:** Lie on your back with knees bent and feet on the floor. Keeping your shoulders and head on the floor, raise your hips. There should be a straight line from your knees to your shoulders. Lift and lower the hips 10 times or more.
- **Child's pose:** Lie face down with knees tucked under you. Extend the arms. You should feel a stretch from the shoulders to the lower back. Hold for five to 10 breaths.

Before starting an exercise program, it's best to consult a doctor for more information on exercise and specific strengthening exercises.