

INDIANA

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Fall/Convention Issue

2001



Indiana Association
for Health, Physical
Education, Recreation
and Dance

*Making
Choices*



*That
Count*

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JOURNAL

Indiana Journal

for Health, Physical Education, Recreation and Dance

Volume 30, Number 3

Fall/Convention 2001

Indiana Association for
Health, Physical Education, Recreation and Dance

Indiana AHPERD 2000-2001

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Message from the President

Making Choices That Count

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Football, Cross Country, and Soccer have all begun their Fall Seasons. Classes have begun for each of us. There is a tinge of autumn in the air. We trust you sense the vitality of the seasons. One nice thing about a school calendar is that each year starts off new, fresh, and exciting.

I hope you were able to refuel your tank this summer as you made choices that count in order for you to replenish, revitalize, refresh, and rejuvenate yourselves. Summers go by quickly but they sure are needed.

A big choice that counts this fall is for you to attend our annual IAHPERD Convention. We trust you will make the important decision to attend. We will endeavor to give you many choices to choose from in order to enhance your professional growth.

Let me encourage you professionally to not stop short. May you walk away from every situation with the confidence that you made a choice that counts for something. Seek the council of one of your colleagues along the way. Learn how to listen. Discipline yourself. Use your gifts, talents, and abilities. Count the cost. Develop the faith and courage necessary for you to succeed. Remember with every decision there is usually a challenge. Do the right thing and good consequences will follow.

In conclusion whether it is finances, family, students, careers, or relationships we wish you the best. May you strive for peace and excellence in all you do. This comes with "making choices that count".

Mike Fratzke
IAHPERD President

*Share Your Journal With
A Young Professional*

NOTIONS From YOUR EDITOR...

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Occupational Safety and Health Act and the Golf Course Worker

Federal laws regulate the safety and health practices of most organizations. The discussion will be limited to laws that affect a majority of organizations, but note that several additional laws exist that cover particular segments of the workforce. For instance, numerous laws pertain to government contractors, to specific states, and to specific industries (e.g., transportation, nuclear power, food, and drug).

The Occupational Safety and Health Act

The Occupational Safety and Health Act (OSHA) of 1970 is probably the most comprehensive and wide-ranging legislation in this area. It applies to nearly all U.S. workplaces.¹ The act aims to ensure safe working conditions for every American worker by:²

- Setting and enforcing workplace safety standards,
- Promoting employer-sponsored educational programs that foster safety health, and
- Requiring employers to keep records regarding job-related safety and he matters.

Three separate agencies were created by the act:

- The Occupational Safety and Health Administration (OSHA) develops enforces health and safety standards.
- The Occupational Safety and Health Review Commission hears appeals from employers who wish to contest OSHA rulings.
- The National Institute for Occupational Safety and Health conducts health and safety research to suggest new standards and update previous ones.

Current Mission Priorities of OSHA

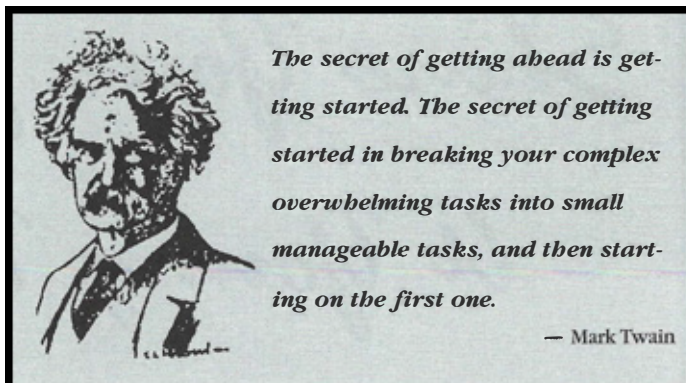
OSHA has fewer than a thousand inspectors for the entire country. With over six million workplaces to visit, some kind of priority system must be established.

Inspection is aimed most frequently at sites that have higher-than-industry average injury and illness records.³ OSHA recently proposed a controversial CCP (Cooperative Compliance Program) through which employers could avoid an OSHA inspection in exchange for agreeing to establish a comprehensive safety and hi program that would exceed the legal requirements of existing OSHA stand. However, the CCP idea has met with some resistance by employers.

Two recent legislative actions have been taken that affect OSHA. One codifies the existing "consultation" programs, in which employers may voluntarily—and without penalty—request OSHA consultations to identify hazards; and violations so that the problems can be corrected. The other law prohibits OSHA from basing evaluations for inspectors on the number of citations issue.⁴ Exhibit 1 shows some areas commonly considered during a safety inspection.

OSHA Standards

The following discussion focuses on the safety standards imposed by OSHA and how they are enforced. OSHA has issued literally thousands of safe-



ty and health standards. Areas of basic concern include fire safety, personal protection equipment, electrical safety, basic housekeeping, and machine guards. Each standard specifies such things as permissible exposure limit, monitoring requirements, methods of compliance, personal protective equipment, hygiene facilities, training, and record keeping.⁵

To comply with these standards, most mid- to large-sized organizations employ safety professionals

Exhibit 1

Areas to Audit for OSHA Compliance

- Is there a written safety/health program?
- Can safety and health training be documented?
- Is a hazards communication program in place?
- Are employees knowledgeable about hazardous materials?
- Are employees trained in first aid/CPR?
- Are employees trained in using personal protective equipment?
- Have accident investigators been trained?
- Can the firm show OSHA a good-faith effort to provide a safe and healthy workplace?

to keep up with them and ensure that each is being met. These professionals face too many specific issues to mention here, but some of the most important issues they must address appear in Exhibit 2.

Enforcement of OSHA Standards

Companies with more than 10 employees are subject to routine OSHA inspections. Companies with fewer than 10 employees are exempt from such inspections, but can be investigated if a safety-related

Exhibit 2

Fundamental Safety Issues Addressed by OSHA Safety and Health Standards

- Adequate exits and working fire extinguishers
- No frayed wires or overloaded circuits
- Quick power cutoff, if necessary
- Use of safety glasses, hard hats, or other needed protective gear by employees
- Safety devices for machinery
- Guard rails car floor mats where needed to protect against slipping and falling
- Clear aisles and exits

SOURCE: Adapted from Warner, D. (1991). Ways to make safety work. *Nation's Business*, December, 25-27.

problem is brought to the attention of OSHA. High-hazard industries, such as manufacturing firms, chemical companies, and construction companies, are subject to inspections regardless of the number of employees.⁶

OSHA conducts inspections based on the following priority classifications, which are listed in order of importance:⁷

- Imminent danger: OSHA gives top priority to workplace situations that present an "imminent danger" of death or serious injury to employees. The company must take immediate corrective action.
- Fatality or catastrophe investigations: The second highest priority is given to sites that have experienced an accident that has caused at least one employee to die or five or more to be hospitalized. The inspection aims to determine the cause of the accident and whether any violation of OSHA standards contributed to it.
- Employee complaint investigations: OSHA responds third to employee complaints about unsafe working conditions. The speed with which OSHA responds depends on the seriousness of the complaint.
- General programmed inspections: OSHA will also inspect an organization if its lost workday injury rate is above the national norm for that industry.

When an OSHA inspection reveals that an employer has violated one of its standards, it issues a citation. The citation, posted near the cite of the violation, lists the nature of the violation, the abatement period (i.e., the time frame within which company must rectify the problem), and any penalty levied against the employer. Willful violations (i.e., those that an employer intentionally and knowingly commits) carry a penalty of up to \$70,000 for each offense. If a death occurs because of a willful violation, the employer may be both fined and imprisoned.*

Major OSHA Provisions Affecting Employers

The Occupational Health and Safety Act requires that in areas in which no standards have been adopted, the employer has a general duty to provide safe and healthy working conditions. Employers who know of, or who should reasonably know of, unsafe or unhealthy conditions can be cited for violating the general duty clause. Also, employers are responsible for knowing about and informing their employees of safety and health standards established by OSHA, and for displaying OSHA posters in prominent places. In addition, employers are required to enforce the use of

personal protective equipment and to provide communications to make employees aware of safety considerations. The act also states that employees who report safety violations to OSHA cannot be punished or discharged by their employers.

Refusing Unsafe Work

Union as well as nonunion workers have refused to work when they considered the work unsafe. Although such actions may appear to be insubordination, in many cases they are not. The following are current legal conditions for refusing work because of safety concerns:

- The employee's fear is objectively reasonable.
- The employee has tried to have the dangerous condition corrected.
- Using normal procedures to solve the problem has not worked.

Work Assignments and Reproductive Health

Related to unsafe work is the issue of assigning employees to work in areas where their ability to have children may be affected by exposure to chemical hazards. Women who are able to bear children or who are pregnant have presented the primary concerns but in some situations, the possibility that men might become sterile also has been a concern.

There is very little research on reproductive health hazards. Yet employers need to protect themselves from liability for the effects of worker's exposure to threats to reproductive health. To do so, the following actions are suggested:

- Maintain a safe workplace for all by seeking the safest methods,
- Comply with all state and federal safety laws,
- Inform employees of any known risks, and
- Document employee acceptance of any risks.

However, it should be noted that there is no absolute protection from liability for employers.⁹

Enforcement of Standards

To implement OSHA, specific standards were established regulating equipment and working environments. National standards developed by engineering and quality control groups are often used. Exhibit 27.4 shows the OSHA standard for personal protective equipment (PPE) as an illustration. OSHA rules and standards often are very complicated and technical. Small-business owners and managers who do not have specialists on their staffs may find the standards difficult to read and understand. In addition, the presence of many minor standards has hurt OSHA's credibility.

Personal Protective Equipment (PPE)

One goal of OSHA has been to develop standards for personal protective equipment (refer again to Exhibit 3). These standards require that employers conduct analyses of job hazards, provide adequate PPE to employees in those jobs, and train employees in the use of PPE.

Bloodborne Pathogens

OSHA issued a standard "to eliminate or minimize occupational exposure to hepatitis B virus (HBV), human immunodeficiency virus (HIV), and other bloodborne pathogens." This regulation was developed to protect employees from AIDS who regularly are exposed to blood and other such substances. Obviously, health-care laboratory workers, nurses, and medical technicians are at greatest risk. However, all employers covered by OSHA regulations must be prepared in workplaces where cuts and abrasions are common. Employers with the most pronounced risks are required to have written control and response plans and to train workers in following the proper procedures.

Hazard Communication Standard (Employee Right-to-Know Law)

Congress enacted the Hazard Communication Standard (more commonly referred to as the Employee Right-to-Know Law) in 1984. This law gives workers the to know what hazardous substances they are dealing with on the job. A substance is considered hazardous if exposure to it can lead to acute or chronic health problems. Federal and state agencies have compiled lists of more than 1,000 substances deemed hazardous under this law.¹⁰

Specific provisions of the Employee Right-to-Know Law are spelled out in Exhibit 27.2. In brief, the law requires all organizations to (1) develop a system for inventorying hazardous substances, (2) label the containers of these substances, and (3) provide employees with needed information and training to handle and store these substances safely.

Employers typically violate the OSHA Hazard Communication Standard frequently than any other OSHA standard.¹¹ The majority of organizations are cited for failing to have:¹²

- Written hazard communication programs,
- Training programs for teaching employees about the chemicals they work,
- Material Safety Data Sheets (Exhibit 4) at the work site, and
- Properly labeled chemical containers.

Exhibit 3

Provisions of the Employee Right-To-Know Law

1. Develop a written hazard communication policy describing how the organization is complying with the law. The policy should indicate:
 - What constitutes a hazardous substance
 - What hazardous materials are used by the organization
 - How information concerning hazardous materials is transmitted to employees
 - How, when, and by whom employees are to be trained in the right-to-know program
2. Provide Material Safety Data Sheets (MSDS) for each substance in use at the workplace. The MSDS should specify:
 - The substance's hazardous components, chemical ID, common names, and worker exposure limits
 - The substance's physical and chemical characteristics, such as boiling point, melting point, and water solubility
 - The physical hazards stemming from the use of this substance, such as fire or explosion, and ways to handle these hazards
 - The substance's reactivity (i.e., whether the substance is stable) and situations to avoid so it will not react
 - The health hazards posed by the substance; the MSDS should specify how the chemical could enter the body and the possible health hazards upon exposure
 - Precautions for safety handling and use (i.e., what to do if it spills or leaks; how to dispose of the substance; how to handle the substance properly; how to store it).
3. Clearly label each container housing a chemical. The container label should:
 - The name of the chemical
 - The name of the manufacturer of the chemical
 - The physical hazards associated with the chemical (e.g., Will it explode? Will it catch fire? Is it radioactive?)
 - The health hazards associated with the chemical (e.g., Is it toxic? Could it cause cancer? Is it an irritant?)
 - The protective clothing, equipment, and procedures that are recommended when working with this chemical.
4. Train all employees on how to deal safely with the chemical substance. The training should cover:
 - How to properly handle and store the chemical
 - The appropriate action to take when coming into contact with the substance
 - Safety precautions, protective equipment, and first aid
 - How to detect hazardous substance exposure (e.g., distinct odors) and how to read monitoring devices.

Government fines for right-to-know violations may be as high as \$1,000 per chemical for first violations and \$10,000 per chemical for second violations. Add penalties for environmental crimes include fines up to \$75,000 per day and imprisonment.¹³

OSHA Inspections

The Occupational Safety and Health Act provides for on-the-spot inspections by OSHA representatives, called compliance officers or inspectors. Under the original act, an employer could not refuse entry to an OSHA inspector. Further, the original act prohibited a compliance officer from notifying an organization before an inspection. Instead of allowing an employer to "tidy up," this no-knock provision permits inspection of normal operations. The provision was challenged in numerous court suits. Finally, in 1978, the U.S. Supreme Court ruled on the issue in the case of *Marshall v. Barlow's, Inc.* In that case, an Idaho plumbing and air conditioning firm, Barlow's, refused entry to an OSHA inspector. The government argued that the no-knock provision was necessary for enforcement of the act, and that the Fourth Amendment did not apply to a business situation in which employees and customers have access to the firm.

The Supreme Court rejected the government's arguments, holding that safety inspectors must produce a search warrant if an employer refuses to allow an inspector into the plant voluntarily. However, the Court ruled that an inspector does not have to show probable cause to obtain a search warrant. A warrant can easily be obtained if a search is part of a general enforcement plan.

Dealing with an Inspection

When an OSHA compliance officer arrives, managers should ask to see the inspector's credentials. Next, the HR representative for the employer should insist on an opening conference with the compliance officer. The compliance officer may request that a union representative, an employee, and a company representative be present while the inspection is conducted. In the inspection, the officer checks organizational records to see if they are being maintained and to determine the number of accidents that have occurred. Following this review of the safety records, the officer

Exhibit 4

OSHA Standard 1910.13215

General Requirements for Personal Protective Equipment for General Industry OSHA requires employers to:

Perform a hazard assessment and equipment selection.

- Inform all affected employees of the hazards and the type of equipment that will be used to protect them.
- Ensure that each employee is properly fitted.
- Verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace and the person certifying that the evaluation has been approved.
- Mandate that defective or damaged PPE shall not be used and determine the extent of applicable “defect or damage.”
- Train each employee to know, at a minimum, the following— when PPE is necessary—what PPE is necessary; how to properly don, doff, adjust, and wear PPE; PPE’s limitations; and proper care, maintenance, life, and disposal of PPE.
- Test employees or otherwise ensure that employees can demonstrate understanding of the training covered and the ability to use the PPE properly before being allowed to perform work requiring the use of PPE. The employer must first define the learning objectives of the training required.
- Retrain an employee when there is reason to believe that an affected employee who has undergone training does not have the understanding and skill required.
- Verify that each affected employee has received and understands the required training thorough a written certification bearing the name of each employee trained and the subjects of certification.

conducts an on-the-spot inspection and may use a wide variety of equipment to test compliance with standards. After the inspection, the compliance officer can issue citations for any standards and provisions of the act.

Citations and Violations

While OSHA inspectors can issue citations for violations of the provisions of the act, whether a citation is issued depends on the severity and extent of the problems, and on the employer’s knowledge of them. In addition, depending on the nature and number of violations, penalties can be assessed against employers. The nature and extent of the penalties depend on the type and severity of the violations as determined by OSHA officials.

There are five types of violations, ranging from severe to minimal, including a special category for repeated violations:

- Imminent danger: When there is reasonable certainty that the condition will cause death or serious physical harm if it is not corrected immediately an imminent-danger citation is issued and a notice posted by an inspector. Imminent-danger situations are handled on the highest-priority basis. They are reviewed by a regional OSHA director and must be corrected immediately. If the condition is serious enough and the employer does not cooperate, a representative of OSHA may go to a federal judge and obtain an injunction to close the company until the condition is corrected. The absence of guard railings to prevent employees from falling into heavy machinery is one example.

- Serious: When a condition could probably cause death or serious physical harm, and the employer should know of the condition, a serious-violation citation is issued. Examples are the absence of a protective screen on a lathe or the lack of a blade guard on an electric saw.

- Other than serious: Other-than-serious violations could have an impact on employees’ health or safety but probably would not cause death or serious harm. Having loose ropes in a work area might be classified as an other-than serious violation.

- De minimis: A de minimis condition is one that is not directly and immediately related to employees’ safety or health. No citation is issued, but the condition is mentioned to the employer. Lack of doors on toilet stalls is a common example of a de minimis violation.

- Willful and repeated: Citations for willful and repeated violations are issued to employers who have been previously cited for violations. If an employer knows about a safety violation or has been warned of a violation and does not correct the problem, a second citation is issued. The penalty for a willful and repeated violation can be very high. If death results from an accident that involves such a safety violation, a jail term of six months can be imposed on responsible executives or managers.

Record-Keeping Requirements

OSHA has established a standard national system for recording occupational injuries, accidents, and

fatalities. Employers are generally required to maintain a detailed annual record of the various types of accidents for inspection by OSHA representatives and for submission to the agency. Employers that have had good safety records in previous years and that have fewer than 10 employees are not required to keep detailed records. Those organizations required to complete OSHA 200 reports are:

- Firms having frequent hospitalizations, injuries, or illnesses,
- Firms having work-related deaths, and
- Firms included in OSHA's annual labor statistics survey.

No one knows how many industrial accidents go unreported. It may be many more than anyone suspects, despite the fact that OSHA has increased its surveillance of accident-reporting records. OSHA guidelines state that facilities whose accident record is below the national average rarely need inspecting.

Accident Frequency Rate

Accident frequency and severity rates must be calculated. Regulations from OSHA require organizations to calculate injury frequency rates per 100 full-time employees on an annual basis. Employers compute accident severity rates by figuring the number of lost-time cases, the number of lost workdays, and the number of deaths. These figures are then related to total work hours per 100 full-time employees and compared with industry-wide rates and other employers' rates.

Reporting Injuries and Illnesses

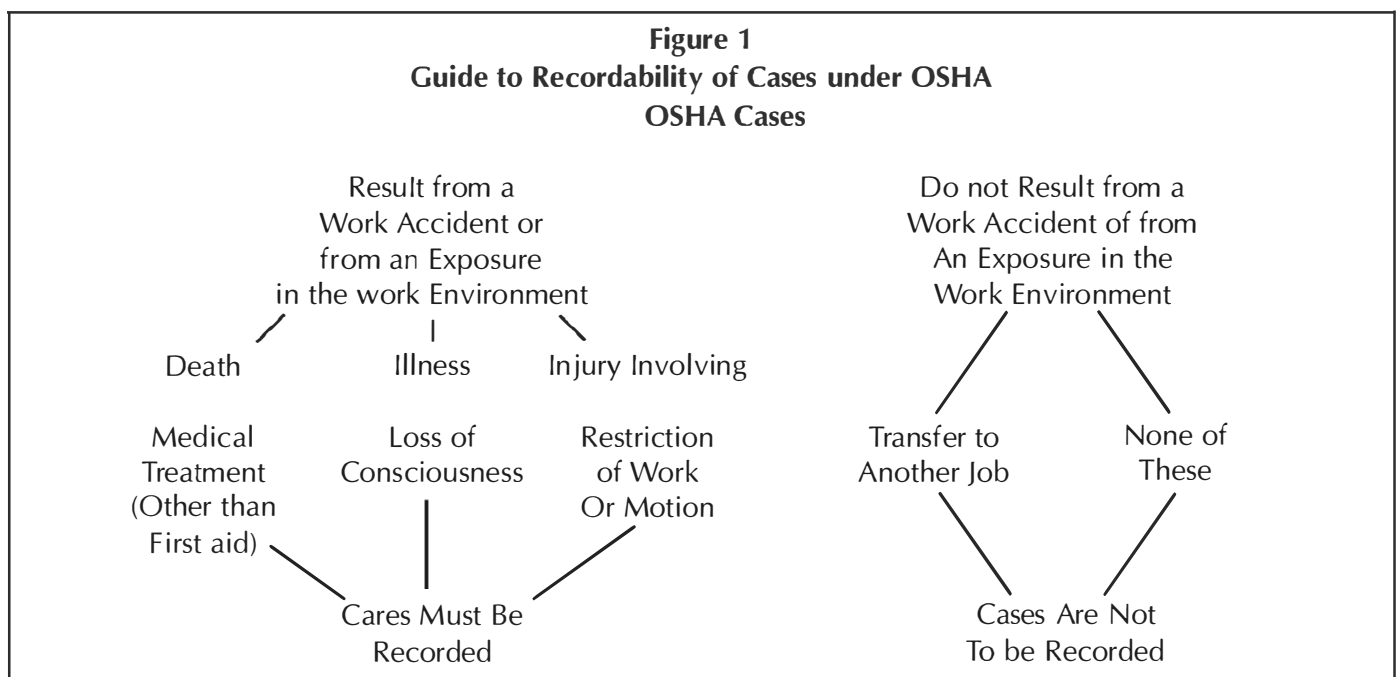
Four types of injuries or illnesses have been defined by the Occupational Safety and Health Act of 1970:

- Injury- or illness-related deaths;
- Lost-time or disability injuries: These include job-related injuries or disabling occurrences that cause an employee to miss his or her regularly scheduled work on the day following the accident.
- Medical care injuries: These injuries require treatment by a physician but do not cause an employee to miss a regularly scheduled work turn; and
- Minor injuries: These injuries require first-aid treatment and do not cause an employee to miss the next regularly scheduled work turn.

The record-keeping requirements for these injuries and illnesses are summarized in Figure 1. Notice that only minor injuries do not have to be recorded for OSHA. Managers may attempt to avoid reporting lost time or medical care injuries. For example, if several managers are trained in first aid, some minor injuries can be treated at the worksite.

Evaluating Effects of OSHA

By making employers and employees more aware of safety and health considerations, OSHA has had a significant impact on organizations. But how effective the act has been is not clear. It does appear that OSHA regulations have been able to reduce the number of accidents and injuries in some cases. But while some studies have shown that OSHA has had a positive impact, others have shown that OSHA has had no



impact.

OSHA has been criticized on several fronts. Because the agency has so many worksites to inspect, many employers have only a relatively small chance of being inspected. Some suggest that many employers pay little attention to OSHA enforcement efforts for this reason. Labor unions and others have criticized OSHA and Congress for not providing enough inspectors. For instance, it is common to find that many of the worksites at which workers suffered severe injuries or deaths had not been inspected in the previous five years.

Employers, especially smaller ones, continue to complain about the complexity of complying with OSHA standards and the costs associated with penalties and with making changes required to remedy problem areas. Small employers point out that according to statistics from OSHA, their businesses already have significantly lower work-related injury and illness rates than larger ones. For larger firms, the costs of penalties and required changes may be larger, but incurring such costs does not appear to significantly affect the way outsiders—such as investors—view the firms.

Safety Management

Effective safety management requires an organizational commitment to safe working conditions. But more importantly, well designed and managed safety programs can pay dividends in reduced accidents and the associated costs, such as workers' compensation and possible fines. Further, accidents and other safety concerns do respond to management efforts emphasizing safety. The difference between firms with good safety performance and those OSHA has targeted as being well below the industry average often is an effective safety management program.

An Effective Safety Management Program

An effective safety management program usually entails the following:

- Organizational commitment and responsibility,
- Safety policies and discipline,
- Safety training and communications,
- Safety committees,
- Inspection, accident investigation, and research, and
- Evaluation of safety efforts.

Organizational Commitment and Responsibility

At the heart of safety management is an organizational commitment to a comprehensive safety effort. This effort should be coordinated from the top level of

management to include all members of the organization. It also should be reflected in managerial actions. If the president of a small electrical manufacturing firm does not wear a hard hat in the manufacturing shop, he can hardly expect to enforce a requirement that all employees wear hard hats in the shop. Unfortunately, sincere support by top management often is missing from safety programs. However, the importance of a real commitment to safety is strongly demonstrated by some public and private organizations, which choose to reject contract bids from firms with poor safety records.

Once a commitment is made to safety, planning efforts must be coordinated with duties assigned to supervisors, managers, safety specialists, and HR specialists.¹⁴ Naturally, duties vary according to the size of the organization and the industry.

There are three different approaches that an employer might choose in managing safety. Successful programs may use all three in dealing with safety issues. Figure 2 shows the organizational, engineering, and individual approaches and their components.

The focus of any systematic approach to safety is the continued diligence of workers, managers, and others. Employees who are not reminded of safety violations, who are not encouraged to be safety conscious, or who violate company safety rules and policies are not likely to be safe.

Safety Policies and Discipline

Designing safety policies and rules and disciplining violators, are important components of safety efforts. Frequently reinforcing the need for safe behavior and supplying feedback on positive safety practices also are extremely effective in improving worker safety.

Consistent enforcement has been used by employers as a defense against OSHA citations. In one situation, a utility foreman was electrocuted while operating an overhead crane. However, the company was exonerated because it had consistently enforced safety rules and penalized violators. The employee who was killed had violated a safety rule for grounding equipment even though the company had given him regular safety training, had posted signs prominently, and had warned all employees about grounding equipment. The OSHA district director ruled that the employee's action was an isolated incident and management was not to blame.

Safety Training and Communications

One way to encourage employee safety is to involve all employees at various times in safety train-

Figure 2

Approaches to Effective Safety Management

Organization Approach

- Designing jobs
- Developing and Implementing Safety Policies
- Using Safety Committee
- Coordinating Accident investigations

Engineering Approach

- Designing work environment
- Reviewing equipment
- Applying ergonomic principles

Individual Approach

- Reinforcing safety motivation and attitudes
- Providing employee safety training
- Rewarding safety through incentive programs

ing sessions and committee meetings and to have these meetings frequently. In addition to safety training, continuous communication to develop safety consciousness is necessary. Merely sending safety memos is not enough. Posting safety policies and rules is part of this effort. Contests, incentives, and posters are all ways to heighten safety awareness. Changing safety posters, continually updating bulletin boards, and posting safety information in visible areas also are recommended. Safety films and videotapes are additional ways to communicate safety ideas.

Safety Committees

Workers frequently are involved in safety planning through safety committees, often composed of workers from a variety of levels and departments. A safety committee generally has regularly scheduled meetings, has specific responsibilities for conducting safety reviews, and makes recommendations for changes necessary to avoid future accidents. Usually, at least one member of the committee is from the HR unit.

Care must be taken that man-

agers do not compose a majority on a safety committee. Otherwise, the employer may be in violation of some provisions of the National Labor Relations Act. The act prohibits employers from dominating a labor organization. Some safety committees have been ruled to be labor organizations because they deal with working conditions.

In approximately 32 states, all but the smallest employers may be required to establish safety committees. From time to time, legislation has been introduced at the federal level to require joint management/employee safety committees. But as yet, no federal provisions have been enacted. Figure 3 shows a job description for a safety committee.

Inspection, Accident Investigation, and Research

It is not necessary to wait for an OSHA inspector to inspect the work area for safety hazards. Inspections may be done by a safety committee or by a safety coordinator. They should be done on a regular basis, because OSHA may inspect organizations with above average lost workday rates more frequently.

When accidents occur, they should be investigated by the employer's safety committee or safety coordinator. In investigating the scene of an accident, it is

Figure 3

Responsibilities of a Safety Committee Huckleberry Finn Country Club Safety Committee

Function: To eliminate workplace hazards that are capable of causing significant injury or illness.

Mission: To foster a spirit of open communication and cooperation in resolving all issues that pertain to employee safety and health.

Responsibilities:

- Review the results of workplace safety inspections to identify and analyze hazards.
- Review accident and injury reports (including close calls) to identify and analyze hazards.
- Review and act upon safety and health concerns, suggestions, and needs communicated by employees and supervisors.
- Review workplace hazard assessments.
- Conduct semiannual walk-through safety inspections.
- Identify and communicate specific safety and health related needs and improvements to the employer, supervisors, and employees.
- Perform an annual audit of the safety and health program.

SOURCE: Adapted from Dennis Zimet, "A Comprehensive Safety and Health Program for the Small Employer," *Occupational Health & Safety*, October 1997, 129.

important to determine the physical and environmental conditions that contributed to the accident. Poor lighting, poor ventilation, and wet floors are some possible contributors. Investigation at the scene should be done as soon as possible after an accident to ensure that the conditions under which the accident occurred have not changed significantly. One way to obtain an accurate view of the accident scene is with photographs or videotapes.

The second phase of the investigation is the interview of the injured employee, his or her supervisor, and witnesses to the accident. The interviewer attempts to determine what happened and how the accident was caused. These interviews may also generate some suggestions on how to prevent similar accidents in the future. In the third phase, based on observations of the scene and interviews, investigators complete an accident investigation report. This report form provides the data required by OSHA.

Finally, recommendations should be made on how the accident could have been prevented, and on what changes are needed to avoid similar accidents. Identifying why an accident occurred is useful, but taking steps to prevent similar accidents from occurring also is important.

Closely related to accident investigation is research to determine ways of preventing accidents. Employing safety engineers or having outside experts evaluate the safety of working conditions is useful. If many similar accidents seem to occur in an organizational unit, a safety education training program may be necessary to emphasize safe working practices. As an example, a publishing company reported a greater-than-average number of back injuries among employees who lifted heavy boxes. Safety training on the proper way to lift heavy objects was initiated to reduce the number of back injuries.

A Final Word ...

Organizations should monitor and evaluate their safety efforts. Just as organizational accounting records are audited, a firm's safety efforts should be audited periodically as well. Accident and injury statistics should be compared with previous accident patterns to identify any significant changes. This analysis should be designed to measure progress in safety management. A manager at a hospital might measure its safety efforts by comparing the hospital's accident rate with hospital industry figures and with rates at other hospitals of the same size in the area.

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Guidelines for PEP Grants Released

Paula Kuhn
AAHPERD

The U.S. Department of Education recently released the guidelines for the Physical Education for Progress Act (\$5 million) grants program. School districts can apply for grants expected to average \$300,000 each to initiate, expand, or improve physical education programs. The grants can't be used to fund extracurricular activities. Applicants are required to perform needs assessments of their current PE programs and, based on the assessment, describe how they will use federal funds to help meet state standards for physical education. Priority for funding will go to applicants who will use at least half the funding to benefit schools identified for improvement by their states under Title 1 of the Elementary and Secondary Education Act. Deadline to file applications is June 18, application forms are currently available from Connie.Deshpande@ed.gov. For further information, see website www.ed.gov/GrantApps/#84.215F or the Federal Register for May 7, 2001.

State of the Profession



SHORT SHORTS

by

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1. The AAHPERD Leadership Development Conference for PresidentElects was held the second week of June in Washington, D.C. Nikki Assmann, Executive Director of IAHPERD, Barbara Tyree, President Elect of IAHPERD and myself, President-Elect of AAALF attended. The event started off with a dinner on Wednesday night. The next day was spent on the hill. Nikki, Barbara and I met with two House aids and Senator Lugar's aid. Friday the entire group went to Reston to visit headquarters and learn more about AAHPERD. Saturday additional meetings were held with a graduation dinner concluding the event. Everyone seemed to enjoy the program and gained not only knowledge, but weight from all the meals.
2. Currently, it appears that the PEP bill has an unusual twist for the second round of proposals . There will be no general call for proposals. The reviewers will only review leftover proposals from the first round. NASPE is working to change this, so that there would be another opportunity to submit new proposals.
3. Last week the Indiana Professional Standards Board approved having licensure for Adapted Physical Education and Driver's Education.
4. Recently, a survey was mailed to all physical educators in the state requesting information about their curriculum and specifically about the fitness area. That information will be presented at the state convention and a form of it will also be presented at the Professional Preparation Conference at McCormick's Creek in February. Results and recommendations will be presented to the state legislature in December.
5. The Professional Preparation Conference will be held at McCormick's Creek on the 14th and 15th of February. Put in on your calendar.
6. Recently, a new text was published in the area of administration. It is entitled Health, Kinesiology and Leisure Studies. There are twenty-nine authors of twenty-four chapters. Of those twenty-nine authors, five are in Indiana; Tony Mobley from Indiana University, Tom Templin from Purdue University, Steve Smidley from Indiana State University, J. Laurence Passmore from Indiana State University and yours truly. If you are interested in purchasing the book, contact AAHPERD publications.

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Peer Reviewed Article

Aquatics for All Physical Education Majors

by

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Aquatics for All Physical Education Majors

Aquatics is an essential part of the professional preparation for all physical education teacher preparation majors. Swimming pools have been in American schools for some time and are becoming more prevalent in the construction of new educational facilities. School districts are increasingly in search of physical education instructors with the proper qualifications to properly teach swimming classes and safely operate the natatorium. While not all majors will wish to become aquatics specialists, they can receive a basic aquatic education. In providing basic preparation in aquatics for all physical education majors, colleges produce more marketable and better-prepared teachers that can provide safe and educationally appropriate activities.

Evaluation and classification

All physical educational majors should be evaluated to determine their aquatic skill level prior to being placed in any aquatics courses. Preferably this skill evaluation will take place in the students freshman year, enabling the student to be properly tracked.

This evaluation should focus on two specific areas: stroke performance and stroke endurance. Students should be tested to determine if they can perform the four basic strokes: freestyle, back stroke, sidestroke, and elementary backstroke. These strokes are those most likely to be learned in basic level instruction and are therefore the most likely the students will know, and the ones they will most likely teach. The endurance test should include a minimum 200 yard or meter continuous swim.

At the conclusion of this test students should be categorized as those who are in need of remediation

or those who are eligible to take the introduction to aquatics for physical educators course. Students who are completely unable to swim, cannot demonstrate any of the basic strokes, or are in fear of the water should be directed to the remedial swimming course to develop their skills.

Introductory Aquatics Courses

The remedial aquatics course, often called "beginning swimming", should focus on basic aquatic skill development. The major goal of this course should be to develop the students' swimming ability to the point that they can demonstrate each of the four basic strokes with sufficient ability to pass the skills screening to enter the introduction to aquatics for physical educators course. A minimum of two activity periods per week will be necessary for these students to progress sufficiently. Other topics that may be covered in this course include aquatic safety rules, treading water, jumping from the side, buoyancy and flotation.

Safety is a concern for these students; their aquatic skill level may be very low. Particular care should be taken when transitioning from the shallow end to the deep end. A lifeguard should always be on duty. The lifeguard should never be used for instructional duties as their first priority is the safety of the students.

The use of aides is especially helpful with this group. The use of upper-class physical education majors who possess the Water Safety Instructor certificate enables the faculty member to provide more individualized attention and skill demonstrations on demand. Students may be ability grouped by lane, an aide or intern assigned to those lanes with the most need. Physical education majors assisting with the

beginning swimming course may be able to earn internship credit for the experience.

Aquatics for the Physical Educator

It is hoped that all physical education majors will have sufficient skills in aquatics that this will be their first aquatics course, for those who have progressed through the beginning swimming course, it will be their second aquatics experience. This course should be a survey experience in aquatics, combining stroke and basic aquatics skill development with an introduction to aquatics certifications, activities and physical laws. Ideally this course would be taught three days per week, allowing for two lab days and one day of lecture.

At the beginning of the aquatics course stroke development will be the focus. Several weeks should be devoted to refining and smoothing the students strokes. The purpose of this procedure is to prepare the students to progress to the lifeguard training and/or water safety instructor level should they have the opportunity. Following stroke development, students should experience aquatic games, basic aquatic rescue such as reaching and throwing assists, introduction to diving, water polo, water exercise, synchronized swimming and skin diving. All topics should be very basic in nature, spanning one or perhaps two class periods. This method will enable the student to understand the depth of aquatic activities, and revisit those they have a particular interest in. Allowing the students to participate in aquatic events such as water polo games, and inter-class swim meets allows them to enjoy the activities while seeing how they can be integrated into a class setting for their own classes later in their careers.

The lecture portion of the course should include a segment that introduces the students to basic aquatic certifications including lifeguard training and swimming instructor certifications. The need for and importance of these certifications must be explained.

Some states' department of education mandate that teachers of swimming in school physical education programs hold certification as a swimming instructor from a nationally recognized agency such as the American Red Cross or YMCA of the USA. Additional topics that may be covered in the lecture portion include: hydrodynamics, swim meet management, aquatic safety and risk management, adapted aquatics, and rules for aquatic games such as water polo.

If the proper elements are included in the planning of this course, students may be eligible to receive certification in American Red Cross Basic Water Rescue or YMCA Principles of Aquatic Safety. This option will require that the students take and pass the standardized tests for these courses and that they pay the requisite fees should they desire certification. Fees for these certifications are normally less than \$10.00. Exact cost should be ascertained from the local chapter of the American Red Cross or the national office of the YMCA of the USA.

Advanced Certification and Training

Most physical education programs cannot require more than two courses in aquatics due to the number of courses required for state licensure. However, advanced training is required to enable the major to be fully qualified to teach swimming in schools. In the event that students cannot be required to take advanced courses in aquatics, training should be offered on an elective course basis,

The most important aquatic certification that a physical education major can possess is a swimming instructor certificate. The American Red Cross Water Safety Instructor (WSI) certificate is considered by many states and most of the public, as the standard in the field for swimming instruction. It is undoubtedly the most recognized. While the YMCA of the USA Progressive Swimming Instructor (PSI) course is equally as acceptable, it is simply not as well known in the education community.

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Lifeguard training is also an important certification for teachers supervising aquatics classes in the schools. While it is not required training for teachers in most states, it does assist the physical education major in becoming more marketable and attractive to the potential school corporation-employer. Majors who hold the dual certifications of WSI-Lifeguard training, coupled with other aquatic certification such as certified pool operator, may be eligible for an addendum to their teaching contract and additional pay, or summer pay for coaching swimming, managing the school pool, supervising school lifeguards or directing community aquatic activities held in the school pool.

First aid and CPR training is a normal part of the curriculum for many physical education majors. This certificate must be current for those desiring to teach swimming. Preferably all physical education majors will be certified in adult, infant and child CPR from a nationally recognized agency. Regular re-certification courses should be provided by the servicing department so as to ensure that students graduate with current certification.

Program Preparation

In order for an aquatic program to be successful in servicing its goal of preparing physical education majors to teach swimming in schools, the collegiate physical education department must provide certain resources. Faculty development is the key to a strong aquatics preparatory program. At least one permanent faculty member must be certified as a Water Safety Instructor Trainer or hold equivalent certification from a similar agency. This faculty member should at minimum also be a lifeguard, and preferably will be a lifeguard instructor. This faculty member must establish

a relationship with a national agency that permits the institution to teach of instructor level courses at will.

In addition to faculty commitment, investment in texts, videos and other instructional materials must be made (See table I). Program changes occur periodically and this material will need to be updated. Activity materials such as pullbuoys, kick boards, diving bricks, backboards, rescue tubes, ring buoys, CPR manikins, first aid materials, aquatic toys, and masks/fins/snorkels must be purchased.

Conclusion

Providing all physical education majors with a systematic and complete aquatic education not only makes them a more well rounded instructor, but provides the with an added ability to be competitive in the employment market. More importantly, it enables them to provide a safe and appropriate aquatic experience for students entrusted to their care.

Table I: Suggested Resources for Introductory Aquatic Classes

Student texts:

American Red Cross *Swimming and Diving*
Clayton and Thomas *Professional Aquatic Management*, Human Kinetics Publishers

Video Tapes:

American Red Cross *Swimming and Diving*
American Red Cross *Whales Tales*
American Red Cross *Water: The Deceptive Power*
American Red Cross *CPR for the Professional Rescuer*
Frank Pia *The reasons people drown*

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Peer Reviewed Article

The Health Teaching Self-Efficacy Scale Applied to Elementary Student Teachers

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Abstract

The purpose of this study was to better understand the psychometric properties of the Health Teaching Self-Efficacy Scale (HTSES) among elementary education student teachers. The scale was developed to measure degree of confidence in teaching health and it was initially tested for use among secondary school health teachers. Cronbach's alpha was found to be .98 for the scale. Five factors emerged from the factor analysis. Reliability coefficients for the sub-factors ranged from .81 to .98. These preliminary results suggest that the instrument may be reliable for use among elementary education students. However, additional research needs to reexamine the factor structure and the items that load on them.

Introduction

Elementary education teachers are expected to teach health to their students even though they receive very little training in the area of health (Everett, Price, Telijohann, & Durgin, 1996). Several states do not require any health education coursework to be completed. Many new teachers feel uncomfortable teaching health or do not meet the minimum competencies in health education due to lack of training and support (Telljohan, Everett, Durgin, & Price, 1996).

Teachers' entering ability has been found to be a predictor of teaching self-efficacy. However, organizational support also plays an important role in increasing self-efficacy. In-service programs, which symbolize organizational support, can make teachers feel well prepared and improve their health education competency (Newman, 1989). When teachers receive training in a specific health area, their health knowledge, intention to teach, and level of comfort

increase (Ross, Cousins, & Gadalla, 1996).

Self-efficacy is a construct of Bandura's (1977; 1986) Social Cognitive Theory. Self-efficacy refers to the belief that one can perform a task successfully. The concept of self-efficacy suggests that a teacher's belief in her or his ability to teach health may influence her or his willingness to teach certain subjects, the degree to which he or she perseveres in the face of challenges, and the amount of success he or she ultimately enjoys (Ross, Cousins, & Gadalla, 1996).

Some studies indicate that student teachers are excited and have high health teaching self-efficacy levels before their first actual field experience. However, their self-efficacy tends to decrease shortly after the teaching begins (Ross, Cousins, & Gadalla, 1996; Soodaka & Podell, 1997). Examining the self-efficacy level of elementary education students might provide valuable information to school administrators regarding in-service and support needed during the first years of teaching, when new teachers are more

likely to abandon the profession. To be able to measure the teaching self-efficacy levels of elementary education student teachers, valid and reliable scales are needed. The Health Teaching Self-Efficacy Scale (HTSES) has been found to be valid, reliable, and unidimensional among school health teachers (Kingery, Holcomb, Jibaja-Rusthh, Pruitt, & Buckner, 1994). A review of literature found two other health teaching self-efficacy scales. One was topic specific (Perry-Casler, Price, Telljohann, & Chesney, 1997) and the other was less comprehensive than the HTSES (Telljohann, Everett, Durgin, & Price, 1996). Because the HTSES has been tested among experienced school health teachers, this study sought to determine the psychometric properties of the HTSES among elementary education student teachers.

Methods

Subjects

Student teachers at a midwestern university, with no concern as to demographic characteristics, were recruited during the final meeting of their student teaching experience to participate in this study. Responses were recorded on an optical scanning device. Appropriate human subjects procedures were followed concerning voluntary participation, anonymity, and confidentiality.

Instrument

The instrument used in this study was the "Health Teaching Self-Efficacy Scale" developed by Kingery, Ballard, and Pruitt (1990). Previous research found the scale to be unidimensional; internal consistency was high (.96); and test retest reliability was shown to be high (.82). The instrument consists of 35 items. Each item is rated on a nine-point scale from "not at all sure" (1) to "completely sure I can do" (9). The instrument has been shown to be valid and reliable among school health teachers (Kingerly et al., 1994).

Analysis

Cronbach's alpha was calculated to estimate the reliability of the instrument. Internal consistency and inter-item correlation were computed for the instrument. Principal Component Factor Analysis was used to determine the underlying dimensions of the scale. SPSS was used to analyze the data. The following criteria were used to retain factors: factor loading of .30 or greater; factor interpretation; and, highest loading of factors. Reliability was also computed for each factor.

Results

Sample Demographics

All participants were last semester elementary education majors. Fifty-two of the 54 students (96%) choose to participate in the study. Nine students (18.4%) were males, one half (51%) were between the ages 20 to 22; 32.7% ages 23 to 25, and 16.3% were 26 or older.

Reliability and means

Cronbach's alpha was calculated to estimate the reliability of the instrument. An alpha of .98 resulted, suggesting a high degree of internal consistency. Means of individual items ranged from 6.65 to 8.24, and standard deviations ranged from 1.29 to 2.17. Inter-item correlation ranged from -0.006 to .0889. Cronbach's alpha was also calculated on three subscales. Internal consistency was again very high. Factor 1 had an alpha of .98, Factor 2 .93, and Factor 3 .81. Factors 4 and 5 consisted of one item each. Health teaching self-efficacy was the highest for "encouraging students to repeat positive phrases" (mean = 8.24), "provide opportunity for discussion of health topics" (mean = 8.20), and for "providing rewards to each student who is successful in reaching a particular health goal" (mean = 8.20). Health teaching self-efficacy was the lowest for "assessing the health status of students using weight scales, skin fold calipers, blood pressure cuffs, or other devices" (mean = 6.65), "providing specific health information" (mean = 6.92), and "providing health information using health fairs" (mean = 7.12).

Factor Analysis

A five factor, 35 items solution resulted. Principal Component Factor Analysis was used to determine the underlying dimensions of the scale; varimax rotation was applied; convergence required 10 iterations. Factor 1 (Direct Instruction) includes 22 items (item 2 through 8, 10, 14, 16, 17, 18, 20, 21, 23, 24, 26, 27, 28, 32, 33, 34). Factor 2 (Indirect Instruction) includes items 9, 12, 13, 19, 22, 29, and 35. Items 11, 25, 30, and 25 loaded on Factor 3 (Health Instruction). Items 1 and 15 each loaded on the fourth and fifth factor, respectively. Item 1 (Factor 4) addressed specifically health information (Health Content) and item 15 (Factor 5) addressed visitation to food/health products outlets. (See Table 1).

Discussion

The purpose of the study was to evaluate the psychometric properties of the Health Teaching Self-Efficacy Scale among elementary education student

Table 1.
The Health Teaching Self-Efficacy Scale

Items	1	2	3	4
2. Emphasize the amount of control students have over their own health.	.686			
3. Use diagrams, overheads, and other visual symbols to convey health information.	.774			
4. Use still photographs to evoke subjective responses.	.718			
5. Use film/video to support or reinforce health concepts.	.826			
6. Provide statistical data on health risks.	.572			
7. Encourage self-responsibility for health.	.855			
8. Invite guest speakers to present information on health topics.	.813			
10. Tell realistic stories about the positive or negative consequences of certain health practices.	.787			
14. Visit health service facilities.	.600			
16. Provide opportunities for discussion of health topics.	.695			
17. Provide each student with individualized feedback about his/her performance in attempting a health task.	.792			
18. Provide role playing opportunities about resisting peer pressure.	.640			
20. Encourage students to repeat positive rather than negative phrases to themselves.	.827			
21. Encourage students to be persistent in their attempts to practice healthy behaviors.	.876			
23. Discuss ways to overcome barriers to changing their health practices.	.583			
24. Assess the health behaviors of students using self-monitoring, self-reporting, or other techniques.	.678			
26. Have students set realistic goal to change health behaviors.	.736			
27. Have students sign behavior change contracts.	.608			
28. Suggest health goals which are long term, flexible, and reasonable.	.753			
32. Provide rewards (food, badges, certificates, etc.) to each student who is successful in reaching a particular health goal.	.909			
33. Encourage students to praise one another for their successes, and to avoid insulting or ridiculing those who are less successful.	.784			
34. Encourage students to choose partners who will encourage them to reach their health goals.	.754			
9. Bring student health model (positive health role model) into the class.		.814		
12. Provide health information using health fair exhibits.		.662		
13. Provide information using bulletin boards.		.781		
19. Provide role playing opportunities about problem solving.		.813		
22. Have students identify barriers to changing their health practices.		.854		
29. Allow students to become successful at one health task before urging them to attempt a harder health task.		.819		
35. Encourage students to tell their parents and other family members about their health goals so family members can provide encouragement.		.858		
11. Prepare exhibits showing the effects of health behaviors			.547	
25. Assess the health status of students using weight scales, skinfold calipers, blood pressure cuffs, or other devices.			.790	
30. Chart each student's progress toward a health goal.			.579	
31. Attribute the success or failure of students to their level of effort in attempting a specific health task.			.600	
1. Provide specific information about the actual risks or benefits of particular health related behaviors.				.834
15. Visit food/health products outlets				.832

teachers. The scale showed high internal consistency. Originally, HTSES was found to be unidimensional among secondary school health educators (Kingerly et al., 1994). However, factor analysis among the elementary education students in the current study found five factors. Each factor was analyzed and correlations among items were determined.

After reviewing the items, it seems that Factor 1 reflects "Direct Instruction" to students and "General Teaching Methods Self-Efficacy." Even though "health" was added to each statement, the focus seemed to be on the teaching methodology.

Seven items loaded on Factor 2. This factor was labeled "Indirect Instruction" because it represented someone else doing the actual teaching. Teachers were encouraging students to perform a task or providing the opportunity for learning through someone else. Item 12, "providing health information using health fair exhibits," loaded similarly on Factor 2 and 4 (.663 and .631 respectively,) indicating the need to revisit the question.

Factor 3, "Direct Health Instruction," was composed of four items. This factor represents specific health instruction, not general methodology. Here, item 11 loaded heavily on both Factors 1 and 3 (.530 and .547, respectively), indicating a need to rewrite the question.

Only one item each loaded on Factor 4 and Factor 5. Item 15, "visiting a health food store," loaded on Factor 4 and Item 1, "providing specific information about the actual risks or benefits of particular health related behaviors," loaded on Factor 4. A case could be made for Factor 4. It seems to address "health content" specifically. If this Factor were to be retained, additional items would need to be added. The authors were not able to explain Factor 5.

The major discrepancy between the previous and current findings is the factor loading. As mentioned earlier, the scale was originally determined to be unidimensional among school health teachers. However, five factors resulted in this study. Perhaps general teaching methods and health content needs to be examined in addition to health teaching in order to determine what support elementary teachers need. In order to be able to use the instrument among elementary teachers, further analysis of the factors and items needs to be conducted. Among elementary education students, the instrument seems to measure self-efficacy in teaching methodology, health specific teaching methodology, ability to encourage students and pro-

vide students with opportunities for learning, and health content. Factor 5, Item 15, "visiting a health food store", was eliminated from further analysis because of lack of an adequate explanation for the one item factor.

Subsequent research among elementary education teachers needs to determine the variables that are specific to teaching health. If the current instrument were to be used, some items may need revision, and others may need to be added.

It is of utmost importance to be able to provide support to elementary school teachers. Many suggest that in order for health education to be effective in prevention, health education needs to start at this level.

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Using Technology to Teach Health

Psychological and Physical Violence Issues (Anger Management)

Reaching the Magic Level for Motivating Athletes

National Coaching Standards- How does Indiana Compare to Other States?

Working Portfolios in grades 7, 8 and 9

Team Workouts in Water

Grissom Outdoor Achievement Lab (GOAL)

Cardio-Kick Boxing

Martial Arts: An Exciting, Safe and Easy Lifelong Activity for Physical Education

Dare to Discipline: Continued Creation of Strategies to Managing Student Behavior

The Best of Cincinnati

Fitness— Maybe a Few New Ideas

Providing Physical Activity for Students With Visual Impairments

Cooperative and Confidence Building Rhythms

Making Health Education Fun and Games

Developing Effective Physical Education Assessments

Liability Issues in Coaching

Using the FITNESSGRAM Software

Indiana Aquatic Summit

Art & Physical Education Working Together

Use of Portfolios For the Interviewing Process

Double Feature Presentation: Yoga and Flexibility Training, A Whole New Light.

Brain-Based Physical Education

Creating a Grade Book in Excel

Introducing Orienteering Into the Physical Education Curriculum

Beginning Reel & Contra Dances

Water Games for Physical Education

Injury Identification, Care and Prevention in the School Setting

Incorporating Social Responsibility in Elementary Physical Education

Barrel Ball and Wacky Kickball

Cooperative Activities for Enhancing Behavior in Physical Education

Jump for Cash: Model Programs Funded Through IAHPERD Grants

Concepts, Skills and Teaching Strategies to Promote Healthy Sexual Behaviors Among Adolescents

Concepts, Skills and Teaching Strategies to Prevent Injury-Related Behaviors Among Adolescents

Friday November 9, 1:30 p.m. - 5:30 p.m.

Physical Education Curriculum Ideas

Activities and Games in Elementary Physical Education

Drowning Prevention and Risk Management Programs

Concepts, Skills, and Teaching Strategies to Prevent Alcohol and Other Drug Use Among Adolescents

Forms, Files and Finesse

IFAT: Reality Vs. Perception

Teaching Latin and Swing Dance Steps in the Physical Education Curriculum

Flag Football

Risk Management

Join Forces with the American Heart Association

Physical Activity Considerations for Minority Populations

Solving Practical Problems When Teaching Students with Disabilities

Physical Education Through the Multiple Intelligences

Galaxy Magic: Learning Solar System Facts Through Dance Movement

Lead-Up Games for Basketball

PAD & CPR in Schools

Climbing Walls

Cup Stacking

Step Aerobics Partner Style

International Folk Dancing

The Great Confidence Builder- Juggling

Jump Across the World with the Cougars

Essentials of Health Literacy: Indiana Health Education Standards

Exercise Behavior Change

The Kid's on the Block

Recruiting Lifeguards for High School Swim Programs

Physical Education for Preschoolers: Developmentally Appropriate Game-Based Activities

Superstars Competition

Saturday November 10, 8:30 a.m. -1:00 p.m.

Lifeguard/CPR for PR Update

Stomp, Shuffle and Sway

The Kin-Ball Activity

Diabetes & Obesity in Children

Lafayette Spinners

New Technology in League and Tournament Sport Scheduling

Sport Safety Training

Indiana Governor's Council for Physical Fitness & Sports Programs

Physical Best Program

Grant Writing for Beginners: Steps to Success Workshop

Understanding and Recognizing Child Abuse

Climbing Walls

Cup Stacking

Enhancing Inclusion Through Sport

Activity Sharing

Dance the Country Western Way

Cooperation Games with Omnikin balls

Special Events & Meetings

Thursday November 8

Pre-Conference Workshop 9:00a.m. - 5:00p.m. Experience Butler University's low and high ropes course as a participant while learning the role of facilitators. The theme is challenge by choice, and physical abilities are not a factor in enjoying this experience. Literature will be provided. Dress casually, bring your own sack lunch and water bottle. **Location:** Meet at Butler University Hinkle Field house, Gate 4 (call 317-940-9434). Participants must Pre-register. Cost is \$25. Advance information!

Contact: Matt Rota Autry, IUPUI, 317-274-0613, mrotaaut@iupui.edu

Board Executive Committee Meeting	5:00 p.m.	TBA
Board Meeting	7:00 p.m.	TBA

Friday November 9

Awards Luncheon	12:30 - 2:00	Ballroom
Dance Gala	4:00 - 5:15	IUPUI, Auxiliary Gym
All Conference Social	5:30 - 6:30	TBA
Free 2002 Conference Drawing		

Saturday November 10

New Board Meeting	7:00 a.m.	TBA
JRFH/HFH & Region Coordinators	8:30 a.m.	TBA
Continental Breakfast		
Sports-related CPR Certification	8:30 a.m.	TBA

Make Choices That Count!

IAHPERD Conference Information

Receive a free stop watch

by pre-registering for the 2001 Conference.

Deadline or pre-registration is October 15 (postmarked).

Registration

The best and least expensive way to register for the conference would be to mail the attached pre-registration form to Nikki Assmann at the address listed on the form. **The deadline for preregistration is October 15 (postmarked).** Non-members can pre-register or pay on-site by paying the higher, non-member fee. Registration at the conference will be located in the Conference Center Foyer. It will be open Thursday evening from 5:00-7:00p.m. and begin at 7:30a.m. on Friday and Saturday morning.

Awards Luncheon

The Awards Luncheon is scheduled for Friday, November 9th at 12:30p.m. A ticket for the luncheon can be purchased in advance for \$ 15. Be sure to check "awards luncheon" on the Pre-Registration form and include the fee when you write your check. Tickets must be ordered in advance to ensure seating. The Awards Luncheon will include special awards for our teachers of the year, student awards, and other association awards. Plan to attend, to support your friends and colleagues.

Dance Gala

The Dance Council has planned a talent-laden, high energy, Dance Gala 4:00-5:15pm Friday afternoon. Plan to attend this session just prior to the All-Conference Social. The Dance Gala will be an outstanding show with variety featuring local students as well as dance majors or clubs from many of our colleges and universities.

Starting Times

Conference sessions will start at 8:30a.m. each morning. Most sessions will be 1 hour long including fifteen minutes between sessions to facilitate moving from one session to the next. Sessions will continue until 5:15p.m. on Friday. Saturday sessions will finish at 12:15p.m. The Friday schedule will finish with an All-Conference Social from 5:30-6:30p.m. **Win a free 2002 Indiana AHPERD Conference.** The drawing will be held at the All Conference Social after the Dance Gala. After the social you are on your own for a night in "Indy". Plan to attend Saturday sessions. We saved some of the best for Saturday.

Hotel Registration

The conference hotel is the IUPUI University Place Center. **The deadline to receive the conference rates is 5:00pm on October 7.** Reservations should be made by calling (800-627-2700). Be sure to identify yourself as attending the IAHPERD Conference to get the special rates.

Make Choices That Count

2001 Indiana AHPERD Conference Registration Form

Pre-Registration

(must be postmarked on or before Friday, November 3, 2000)

Professional		
Member	\$50	_____
Non-member	\$90	_____
Student		
Member	\$10	_____
Non-member	\$25	_____
Awards Luncheon (Friday, November 17)	\$15	_____
2001-02 Membership Dues		
Professional	\$20	_____
Student	\$10	_____
Butler University Challenge Course Workshop (pre-conference)	\$25	_____
Spouse/Significant Other	\$25	_____
Retired Professionals	N/C	_____
Total Submitted		_____

Badge and Membership Information

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 School _____
 Home Phone _____
 Work Home _____
 E-mail address _____

Make Checks Payable to IAHPERD

Mail registration form and fees to:
 Nikki Assmann, Executive Director
 IAHPERD
 School of Physical Education
 Ball State University
 Muncie, IN 47306

On-Site Registration:	Professional Member	\$70	Student Member	\$15
(Two day only)	Professional Non-member	\$110	Student Non-member	\$30

HOTEL RESERVATIONS

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Double Room **\$119.00+tax/night**

**University Place Conference
 Center, IUPUI Campus
 1-800-627-2700**

(Deadline to receive special rates is 5:00 pm October 15)

**For Special rates listed above be sure to identify yourself as
 attending the IAHPERD Conference**

Peer Reviewed Article

Creating a Rubric to Assess Performances to Meet New Teaching Standards

by

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*There once was a teacher
Whose principal feature
Was hidden in quite an odd way
Students by millions
Or possibly zillions
Surrounded him all of the day*

*When finally seen
By his scholarly dean
And asked how he managed the deed
He lifted three fingers
And said "all you swingers
Need only to follow my lead"*

*To rise from a zero
To big campus hero
To answer these questions you'll strive*

***Where am I Going
How shall I get there, and
How will I know I've Arrived***

Author Unknown

Abstract

By the year 2002, public educational programs throughout Indiana and other states will have gone through major modifications, and new educational standards for teachers will have to be implemented. As a result, it is imperative to begin organizing and assessing current programs to assure these standards are met. Indiana State University (ISU), Terre Haute, IN, began this process in August 1999. This article provides a detailed account of how the ISU health and safety education programs were assessed, changes that were made, and assessment plans for the future.

Where are we going?

The new standards for health education teachers graduating from ISU are the same as the current Interstate New Teaching Assessment Standards Consortium (INTASC), with revisions in wording and order (Figure A). Since the standards are the same, the process for meeting these standards is essentially the same for all subject and content areas. The new standards are student outcome based; students will have to show their proficiency at particular performances in order to obtain Indiana teacher certification and licensure. The students will no longer simply meet a specified number of hours and enroll in a certain number of classes in order to become certified as a teacher. Education majors must show they have met the standards in their academic area. For example, a performance requirement of First Aid training or CPR could be met by proof of certification rather than a three hour university class. In health education, a student might meet a teaching performance by demonstrating teaching experience rather than completing a teaching methods course. Subjective assessment will be difficult, if even practical; therefore, specific assessment program must be developed.

How do we get there?

It is important to use all knowledge, disposition, and performance standards in the original assessment. The final step needs only to assess the standards, using performance criteria; knowledge plus disposition equals performance. Preliminary assessment includes determining which of the performance objectives are most important for your particular program. This determination provides the direction to assess department's and individual student's progress toward meeting the new standards.

Before assessing any current educational program, first determine which of the new standards are being met with the current curriculum. To accomplish this at ISU Department of health and safety, each standard, with all performance, knowledge, and dispositions, was typed on a rubric. Second, individual instructors were given the rubric for each standard and asked to indicate the class in which the particular standard was taught. When all sheets were collected, a large rubric was developed, combining all classes that met a particular standard (Figure B). Third, the instructors were asked to list the specific activities used to meet each performance standard. The activities were added to the compiled rubric.

The next step was to determine how each of the standards was met. Individual instructors were requested to list specific classroom activities used to meet specific standards. Students majoring in the subject area being assessed were also to validate that they were taught the particular standard. It is imperative to get the students' input in order to determine if what is supposed to be taught is being taught and received. To facilitate this step, a list of commonly used activities was compiled and given to the individual(s) making the assessment (Figure C). Once a specific activity for each standard and objective had been determined, a column was added to the original rubric and activities were listed next to the courses in which the objective was met.

If a particular standard was not sufficiently met, a decision must be made as to how that standard will be implemented into the program. It may be necessary to add a specific unit to an existing class, or have the students take a class outside the major program to meet the standard. Another option might be to add a class to the educational curriculum that will specifically prepare the students to meet the standard. If the decision is made to add a new class, or to have students take a class outside the major program, changes to the existing curriculum must be done.

In order to compile the standards and their performance criteria into a final chart, or rubric, each performance objective for each standard was viewed individually. Objectives that were measurable and that best assessed meeting the specific standard were determined. A rubric listing the standard at the top and the performance objectives needed to meet the standard down the left margin was developed (Figure D). This rubric was used to test progress and to determine if students are succeeding in the program.

How do we know we have arrived?

Advantages of using rubrics

Rubrics help individual students understand the expectations and assessment procedures of an assignment or curriculum. They facilitate focusing on performance standards, student progress, individual classes, and serve as a guide for peer review and student self-assessment.

What should a Rubric Include?

A rubric should include the dimensions for examining the work. In the case of a curriculum, individual objectives are listed under each major standard. A rubric may also be used to critique performance at different levels, and the activity used to meet the individual objective. It is possible that a professional experience outside the classroom will be used to meet the individual standards. The rubric must be descriptive and not comparative, and it must have an individual assessment for each goal or objective that is to be met. This description must be a clear and concise summation of what is expected as an outcome in observable and measurable ways. It is advisable to list more than one observation time from more than one observer in order to obtain a more valid assessment of the student's performance.

Constructing a Rubric

The first step in creating a rubric is to review the course goals and objectives, or in this case, the curriculum standards and performances. Next, identify how the assignments meet the particular objectives and address the course goals. In the case of curriculum review, determine how the individual courses meet the overall standards, and which particular activities within the courses meet the individual objectives. The criteria that will be used to judge the student performances must be determined. The major categories of the rubric must be the individual standards. A separate rubric for each standard should be created. The performance levels for the individual performances must also be determined and placed on the rubric.

Conclusion

Once rubrics are placed in the student folders and used to assess the current curriculum, it is reasonable to expect change. Put the rubric and assessment plan into practice before the final deadline for meeting the new standards so that assessment and changes can take place before the deadline for meeting the new standards approaches. Both individual student progress and the program may be assessed at the same

time. It will be obvious when a particular standard is not being sufficiently addressed when a number of

students are unable to meet the individual standard with the existing program.

Figure A

INTASC Standard

Health Education Standard

1. The teacher understands the central concepts, tools of inquiry, and the structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.

1. *Content Knowledge for Health Education: The teacher understands the content areas of health education, and the tools of inquiry and skills related to the development of a health literate person.*

2. The teacher understands how children learn and develop, and can provide learning opportunities that support their intellectual, social, and personal development.

2. *Growth and Development: The teacher understands how individuals learn and develop, and provides opportunities that support mental, physiological, social, emotional and moral development.*

3. The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.

3. *Instructional Strategies: The teacher plans and implements a variety of developmentally appropriate instructional strategies based upon the curriculum goals in order to develop learners' critical thinking, problem solving, and performance skills.*

4. The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.

4. *Communication: the teacher uses knowledge of effective verbal, nonverbal, and multi-media communication techniques to foster inquiry, collaboration and engagement in the learning process.*

5. The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning and self-motivation.

5. *Management and Motivation: The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.*

6. The teacher uses knowledge of effective verbal, non-verbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.

6. *Diverse Learners: The teacher understands how individuals differ in their approaches to learning and creates appropriate instruction adapted for diverse learners.*

7. The teacher plans instruction based upon knowledge of subject matter, the community, and curriculum goals.

7. *Assessment: The teacher understands and uses formal, informal and authentic assessment strategies to evaluate and ensure the learners' physical, mental, social and emotional development.*

8. The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social and physical development of the learner.

8. *Reflection: The teacher is a reflective practitioner who seeks opportunities for professional growth and evaluates the effects of his / her actions on learners, parents / guardians, and other professionals.*

9. The teacher is a reflective practitioner who continually evaluates the effects of his / her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.

9. *Collaboration: The teacher fosters relationships with colleagues, parents / guardians, and community agencies to support the learners' growth and well-being.*

10. The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.

Figure B

STANDARD #1 Content Knowledge for Health Education	COURSE	COURSE
The Teacher understands the content areas of health education and the tools of inquiry and skills related to the development of a health literate person	221, 400, 211	327, 323
Performances – The teacher		
1. Provides a foundation of health knowledge	111, 221, 211	327, 323, 360
2. Designs and implements learning experiences that motivate students to adopt and maintain health-enhancing behaviors throughout their lifetime.	111, 211, 400	327, 323, 360
3. Models health-enhancing behaviors	111, 211, 400	323, 360
4. Creates a learning environment which respects and is sensitive to controversial health issues.	111, 400	360
5. Demonstrates a leadership role in the development of a comprehensive school health program.	400	327, 360
Knowledge – The teacher		
1. Has knowledge of the 10 content areas of health education	111, 400	327
2. Knows concepts and instructional strategies related to the state mandated health topics: HIV/AIDS, drugs, organ donation, immunizations, and breast and testicular self-examinations	111, 211, 221, 400	327
3. Has knowledge of health risk behaviors.	111, 221, 400	327, 323
4. Has knowledge of the implications of teaching controversial health issues.	111, 221, 400	323
5. Knows how to incorporate health education into related subject matter.	111, 400	327, 323, 360
6. Understands the relationship between health education content areas and youth risk behaviors.	111	327, 323
7. Understands the concepts and components of a comprehensive school health education program.	400	
8. Understands inquiry techniques that promote health literacy.	111, 211	327, 323
Dispositions – The teacher		
1. Believes that knowledge of the ten content areas of health education is essential.	111, 221, 400	327
2. Believes health education is essential for developing health literacy.	111, 211, 221, 400	327, 323
3. Believes in modeling health-enhancing behaviors.	111, 211, 221, 400	323, 360
4. Is committed to acquiring current and emerging information related to health concepts and societal issues.	111, 211, 221, 400	323, 360
5. Believes in the importance of interdisciplinary learning experiences.	111, 211	327, 323, 360
6. Recognizes that health is multidimensional: physical, spiritual, mental, emotional, and social.	111, 221, 400	327, 360

Figure C

- Assessment Instruments
- Written Tests
- Observation
- Portfolios
- Student Teaching Evaluation
- Exit Interviews from Preparation Phase
- Interview Mentor Teachers
- Mid Year Reviews in Internship Phase
- Survey past Teachers
- Sport and Health Related Fitness Tests
- Student Interest Surveys
- Attitude Inventories
- Student Journals
- Group projects
- Peer Assessment
- Motor Aptitude Tests
- Term Papers
- Video of Teaching
- Reflection Paper
- Mid Term Paper

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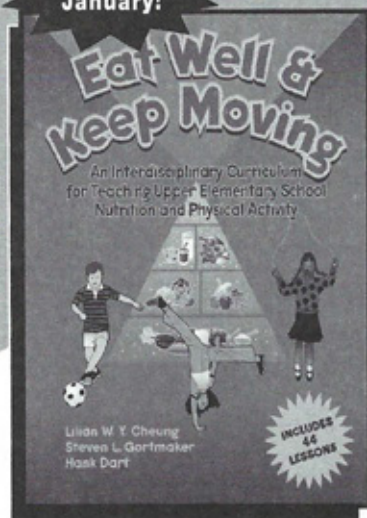
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Managing Worker's Exposure to Solar Radiation with Sunscreens

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ABSTRACT

Workers whose occupations require them to be exposed to large amount of solar radiation are at risk of developing skin cancer. This article provides an overview of the FDA approved sunscreen active ingredients, the mechanisms by which they offer protection and the risks associated with their use. Workers should not use sunscreens to lengthen the time spend in the sun; but rather they should be used as additional protection for those times when solar exposure is unavoidable. Presently, no sunscreen active ingredient or combination of ingredients can provide all day protection.

More than one million new cases of skin cancer are reported each year in the United States. Most of the public's attention thus far has focused upon solar radiation exposure as a result of sports and recreational activity. However, the large number of new cases of skin cancer strongly suggests that workers in those occupations that cause them to be exposed to large amounts of solar radiation are at risk of developing skin cancer. Although the causes of cancer are not well characterized, exposure to solar radiation has been directly linked to some forms of skin cancer. The need for sunscreen protection by workers in such industries as construction, agriculture, landscaping, as well as many others has become more evident over the last several years. In industries where a large segment of the working population spends long periods of time in the sun, there is a growing awareness of the harmful effects of sunlight exposure, resulting in

increased skin cancer, accelerated aging of the skin, and other changes in skin tissues including pigmentation anomalies and precancerous lesions.

Sunlight

The radiation from the sun propagates through space in all directions. Some of this radiant energy reaches the earth's surface. Only those wavelengths of radiant energy, which reach the surface of the earth, are capable of causing health risks. Figure 1 below illustrates the typical solar spectrum. Of the solar radiation reaching the surface of the earth 25 % is infrared, 60% is in the visible region, and 15% is ultraviolet ⁽¹⁾. It is the ultraviolet and near ultraviolet visible radiation that has been implicated in the biological damage cited above ⁽²⁾. The ultraviolet portion of the solar spectrum can be divided into three regions UVA, UVB, and UVC radiation, based on the reaction of human skin. The UVA portion is the least

energetic, however, new evidence has shown that UVA radiation is capable of penetrating deep into human skin tissue and may cause some damage ⁽³⁾. The UVB region of the solar spectrum is the radiation, which has traditionally been associated with sunburn ⁽²⁾. UVC radiation can cause biological damage, but this region of the solar spectrum is absorbed by ozone in the earth's atmosphere and therefore does not reach the surface of the earth. However, as the ozone layer continues to thin, workers will be exposed to increasing amounts UVC radiation.

Physiological Effect of Sunlight

Not all workers in the United States share equal risk for the development of skin cancer, accelerated aging of the skin, or other changes in skin tissues. Physical characteristics associated with skin cancer are well characterized. People with blond hair, light eyes, fair complexion, and who sunburn easily and repeatedly, particularly those who tan poorly are particularly vulnerable to skin cancer. The highest incidences of skin tumors are reported among the Anglo-Saxon and Celtic populations in the United States. In contrast, incident rates of skin cancer in darkly pigmented people such as the Afro-American and Indian populations are relatively low. In people with dark skin active melanin provides a front line of defense against ultraviolet and near ultraviolet visible radiation. The photoprotection provided by melanin is accomplished by both physical and absorption mechanisms. These mechanisms will be discussed later in this article, because sunscreen active ingredient also takes advantage of similar physical and absorption mechanisms.

Sunscreens

The first reported use of sunscreens was in 1928. The formulation contained two sunscreen active ingredients benzyl salicylate and benzyl cinnamate. Early in the 1930's lotions containing quinine oleate and quinine bisulfate appeared on the market. Para aminobenzoic acid (PABA) was introduced into the United States in 1943. In a notice published by the Food and Drug Administration (FDA) in 1978 ⁽⁴⁾, twenty-one sunscreen filters were approved for use in the United States as UV absorbers see Table 1 below. Only one compound, Parsol 1789, has been added to this list since 1978. The use of many of the compounds, which were approved in 1978 have been discontinued. p-Aminobenzoic acid (PABA) and Amyldimethyl PABA are no longer used today due to phototoxicity and solubility concerns. Digalloyl trioleate, 2-ethoxyethyl p-methoxy cinnamate, Lawsone,

Dihydroxyacetone and Ethyl 4-bis(hydroxypropyl) aminobenzoate (ethyl dihydroxypropyl PABA) are no longer available. Triethanolamine salicylate, Glycerylaminobenzoate and Diethanolamine p-methoxy cinnamate are all too water soluble to be of much value in waterproof formulations and therefore are not frequently encountered. Homomenthyl salicylate (homosalate) is a compound that is very seldom used.

The active ingredients in sunscreens products provide protection from harmful solar radiation. These compounds are generally divided into two broad groups based upon their protective mechanism: physical blockers that reflect or scatter ultraviolet radiation and chemical absorbers that absorb the ultraviolet radiation.

Physical Blockers

Titanium dioxide and zinc oxide have been used for many years as physical blockers ⁽⁵⁾. When pigmentary size particles are used the sunscreen agent imparts an ultra white appearance to the skin, which forms a reflective barrier to incoming solar radiation and thereby prevent transmission. However, workers generally do not consider the ultra white appearance of the sunscreen agent aesthetically pleasing ⁽⁶⁾. In an attempt to make the sunscreen agent more transparent to visible light, sunscreen manufacturers have decreased the particle size. These micronized oxides are transparent to visible light and can be used to produce more aesthetically appealing cosmetic products. The micronized oxides effectively scatter and absorb solar radiation thereby providing protection to the skin ⁽⁷⁾.

Both titanium dioxide and zinc oxide in the large particle size form have been regarded as inert and non-toxic. Titanium dioxide in micronized form is frequently formulated in combination with other organic active ingredients, such as p-methoxycinnamate, especially in those sunscreens advertising a high sunscreen protection factor (SPF). Of current concern, is the oxidative degradation of the organic active ingredients in sunscreen when both titanium oxide and organic active sunscreen ingredients are present in mixed formulations. Micronized titanium dioxide and zinc oxide exhibit semiconductor properties producing oxidants, which destroys organic compounds including organic sunscreen active ingredients⁽⁸⁾. Another issue associated with the use of titanium dioxide and other micronized sun blockers is the potential for a similar oxidative process to occur in the skin and thereby causing toxic effects. In 1992, Cai et al. published a study in the journal *Cancer Research*, which

demonstrated that photoexcited micronized titanium dioxide could cause cell death ⁽⁹⁾.

Chemical Absorbers

Chemical absorbers, such as p-methoxycinnamate, absorb the harmful ultraviolet radiation. Chemical absorbers are classified by the type of ultraviolet radiation that they absorb, UVA or UVB radiation. Ideally the energy associated with the absorption of ultraviolet radiation is dissipated in a way that is not harmful to the workers using them. Sunscreen active ingredients get rid of the absorbed energy in several ways: First, they can dissipate the energy as heat by vibrating or through internal structural rearrangement, which is harmless. Also harmless is a second possibility, sunscreen active ingredients can undergo radiative decay; that is by giving off the energy as fluorescence, like black light posters; or as phosphorescence, like glow sticks. A third possible means to dissipate absorbed energy is not harmless. Sunscreen active ingredients can transfer the energy to another molecule such as oxygen producing an oxidant; or when applied to the skin, react directly with biomolecules, such as DNA. Like micronized oxides discussed above, these organic chemical absorbers have been reported to produce oxidants that have been shown to be toxic ⁽¹⁰⁾. Finally, sunscreen active ingredients can undergo photolysis; they can break apart to form new compounds. Whenever a sunscreen active ingredient breaks apart, it is possible that toxic oxidants can form or toxic new compounds can form; but in every case there will certainly be a loss in efficacy of the sunscreen product.

UVA Absorbers

There are only five chemicals, which absorb UVA radiation still in use today. Of the five chemicals in this category, three of them are benzophenone derivatives: Benzophenone-3 (oxybenzone), Benzophenone-4 (sulisobenzene), Benzophenone-8 (dioxibenzone). These compounds have been found to be remarkably stable⁽¹¹⁻¹²⁾. They do not undergo photolysis to form new products nor do they transfer energy to oxygen or biomolecules. There have been reports, however, of skin and eye irritation attributed to the use of these compounds ⁽¹³⁾. Menthyl anthranilate is the fourth compound in this category. It has the pleasant odor of coconut. Menthyl anthranilate undergoes photolysis to form new compounds and it also efficiently transfers energy of oxygen to form toxic oxidants ⁽¹²⁾. In addition, it is known to cause photoallergic reactions, such as severe sunburn ⁽¹³⁾. One real problem faced by manufactures' is how to produce sunscreen formulations with high SPF values given the

small amount of UVA radiation that these four compounds will absorb and the FDA's maximum content limits (no more than 5-10%). The FDA, under pressure from the cosmetic industry to increase the number of approved UVA absorbers to include a compound with a high absorbance for use in high SPF formulations, approved Parsol 1789 (Avobenzone). Of all of the UVA absorbers, Parsol 1789 poses the greatest risk to workers. Parsol 1789 is not stable in sunlight it breaks apart rather quickly to form photoproducts and thus loses much of its efficacy ^(12,14). It is currently unknown whether these photoproducts are toxic. In addition, Parsol 1789 very efficiently passes energy to both oxygen to produce oxidants and biomolecules to form bioadducts. Both the formation of oxidants and bioadducts have been shown to cause toxic effects in human skin tissue ⁽¹⁵⁾.

UVB Absorbers

Four UVB absorbing compounds are currently used in the production of sunscreen formulations. The most widely used chemical is Ethylhexyl p-methoxy cinnamate (octyl methoxycinnamate). Octyl methoxycinnamate is a very stable compound that does not form oxidants or bioadducts ⁽¹²⁾. Octyl methoxycinnamate dissipates most of the energy, which it absorbs from the sun as heat. This is done in a very efficient non-toxic manner called cis-trans isomerization. A second compound currently in use is 2-Ethylhexyl-2cyano-3, 3-diphenylacrylate (octocrylene). Octocrylene undergoes photolysis very slowly forming toxic photoproducts ⁽¹³⁾. It is the ability of octocrylene to produce very toxic oxidants, which poses the greatest risk to workers who use sunscreens containing this compound. Octocrylene is known to cause skin and eye irritation ⁽¹³⁾.

A third compound found in sunscreen formulations is Octyl Dimethyl PABA (Eusolex 6007, Escalol 507, Padamate-O). Padamate-O slowly undergoes photolysis to form photoproducts ⁽¹²⁾. It also forms very toxic oxidants ⁽¹⁵⁾. Of the UVB absorbing compounds Padamate-O poses the most risk to workers due to the production of a very toxic oxidant called hydroxyl radical. Padamate-O is known to produce skin and eye irritation as well as phototoxicity ⁽¹³⁾. Finally, 2-Ethylhexyl salicylate (octyl salicylate) is a compound still found in some sunscreen formulations, however, its use seems to be lessening due to its low absorbance at the FDA's maximum limits (5%). Octyl salicylate does not undergo photolysis to form new products nor does it form toxic oxidants ⁽¹²⁾. This compound has been implicated in phototoxicity and skin irritation ⁽¹³⁾.

Conclusion

Sunscreen active ingredients effectively absorb and/or scatter harmful UVA and UVB solar radiation. When used properly, they can provide workers with an effective first line defense against the harmful effects of sunlight exposure. Physical blockers such as large particle size titanium dioxide provide workers with safe maximum protection. Chemical absorbers, such as micronized titanium dioxide and organic sunscreen active ingredients can provide maximum protection; but the level of safety depends upon the pathway by which the absorbed solar energy is dissipated. Ideally, the energy acquired by absorption of solar radiation should be dissipated by vibration or internal rearrangement, by fluorescence, or by phosphorescence. However, based upon the limited data available shown in Table 1, many sunscreen active ingredients appear to produce potentially toxic oxidants and/or toxic new compounds. In the case of a sunscreen active ingredient breaking down and forming new compounds, there is also a loss of protection due to the loss of the sunscreen active ingredient. There are, at present, surprisingly few published reports in the literature concerning the stability of sunscreens and the protection that they afford workers. Much additional data from controlled studies are needed in order to assess the risk factors associated with the use of various sunscreen active ingredients. In addition, new sunscreen active ingredients need to be developed, which afford workers both maximum protection and maximum safety. Until such time as new data and new products become available, workers should avoid skin exposure to UVA and UVB radiation by wearing protective clothing, and when that is not possible they should use a sunscreen that has a sun protection factor rating of 15 to 30 SPF. A sunscreen with an SPF of 15 prevents about 92% of the UV from penetrating the skin ⁽¹⁶⁾.

For those individuals who are more vulnerable to the adverse effects of solar radiation, a sunscreen with an SPF of 30 is advised. Such sunscreens prevent 98% of the UV radiation from penetrating the skin ⁽¹⁶⁾. For additional safety workers can check Table 1, energy dissipation pathway and avoid using products, which contain sunscreen active ingredients that have a potential to form toxic oxidants or toxic new products. Finally, workers should apply the amount of sunscreens recommended by the manufacture to provide the listed SPF rating and they should reapply every 30 minutes that they are exposed to solar radiation. Sunscreens should not be used to lengthen the time workers spend in the sun; but rather they should

be used as additional protection for those times when solar exposure is unavoidable. Presently, no sunscreen active ingredient or combination of ingredients can provide all day protection.

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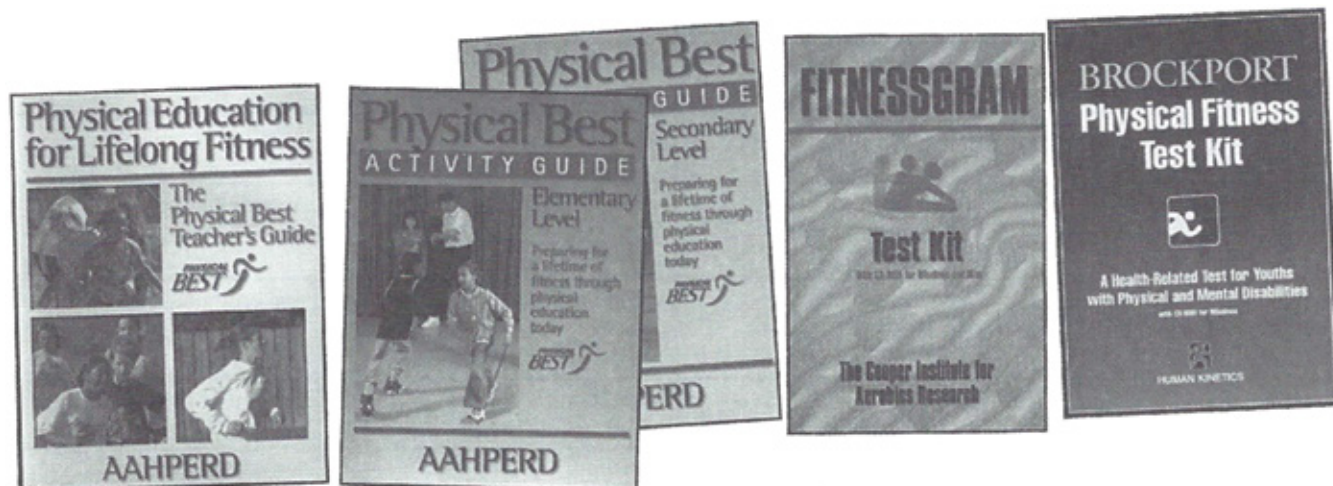
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Table 1 List of U.S. FDA-approved sunscreen active ingredients

Name	Synonyms	Type of Sunscreen	Energy Dissipation Pathway
Aminobenzoic acid (no longer in use) (known photoallergen)	PABA Benzoic acid Aminobenzoic acid Amben Pabanol	Absorber - UVB	Vibrational Fluorescence Phosphorescence Oxidant production Break down
Cinoxate	Propenoic acid Phiasol	Absorber - UVB	Unknown
Diethanolamine Methoxycinnamate		Absorber - UVB	Unknown
Digalloyl trileate (no longer in use)	Benzoic acid	Absorber - UVB	Unknown
Dioxybenzone	Benzophenone Benzophenone-8 Dioxybenzone	Absorber – UVA	Vibrational
Ethyl-4-[bis(hydroxypropyl)] Aminobenzoate (no longer in use)	p-aminobenzoate Escalol 106	Absorber - UVB	See aminobenzoic acid
Glyceryl aminobenzoate (no longer in use)	Glyceryl PABA	Absorber - UVB	See aminobenzoic acid
Homosalate (not used in water resistant formulations)	Caswell No. 482B Coppertone Uniderm Homsal	Absorber - UVB	Unknown
Lawsone (no long in use)	Lansone Henna Mendi	Absorber - UVB	
Dihydroxyacetone	Oxatone Soleal Triulose	Absorber - UVB	Unknown
Menthyl anthranilate (known photoallergen)		Absorber – UVA	Oxidant production Break down
Octocrylene	Octocriline UV Absorber-3	Absorber - UVB	Oxidant production Break down
Octyl methoxycinnamate	P-methoxycinnamate methoxycinnamate	Absorber – UVB	Internal rearrangement
Octyl salicylate	Benzoic acid, Octyl ester n-Octyl salicylate	Absorber - UVB	Oxidant production Break down
Oxybenzone	Benzophenoone-3 MOB Cyasorb UV 9		Vibrational
Padimate-O	Octyl dimethyl PABA Arlatone UVB Solarchem O	Absorber - UVB	Oxidant production Break down
Parsol 1789		Absorber – UVA	Oxidant production Break down
Phenylbenzimidazole Sulfonic acid (not used in water resistant for- mulations)		Absorber - UVB	Unknown
Red petrolatum	Petrolatum	Physical blocker	
Sulisobenzone	Benzenesulfonic acid	Absorber – UVA	Unknown
Titanium dioxide Titanium dioxide micronized		Physical blocker Absorber - UVB	Oxidant production Break down
Trolamine salicylate	Trierhanolamine salicylate	Absorber - UVB	Unknown

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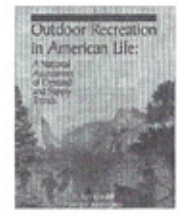
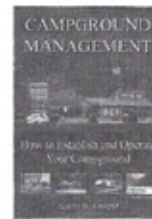
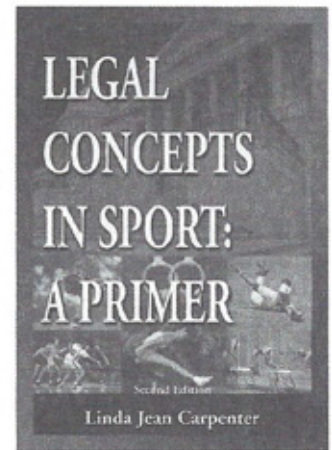
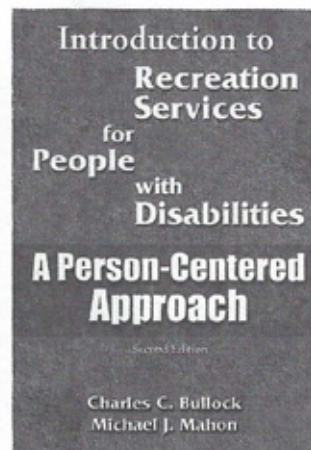
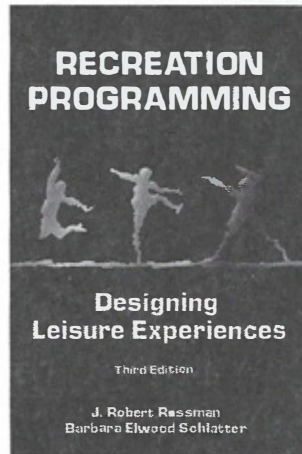
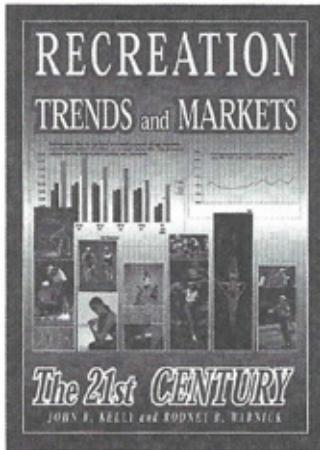
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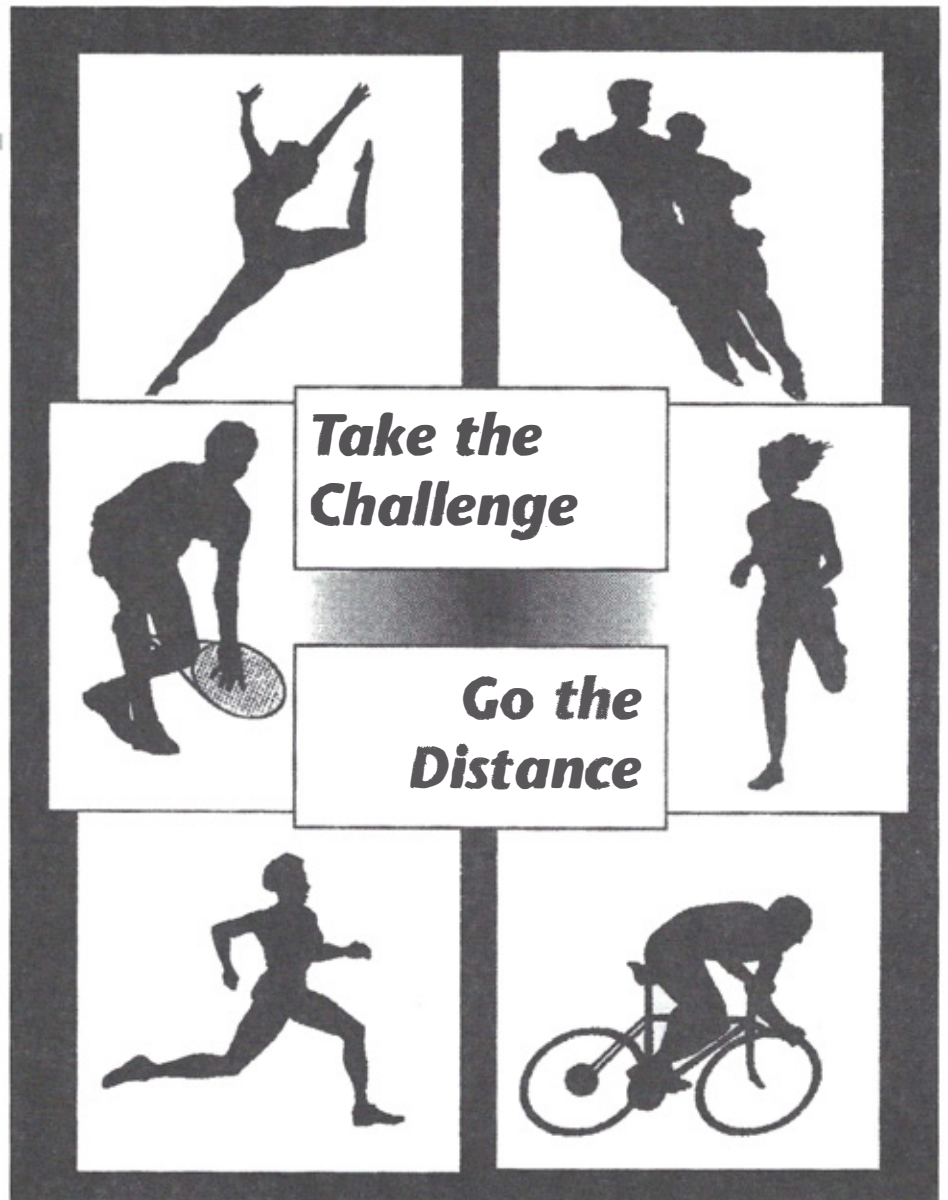
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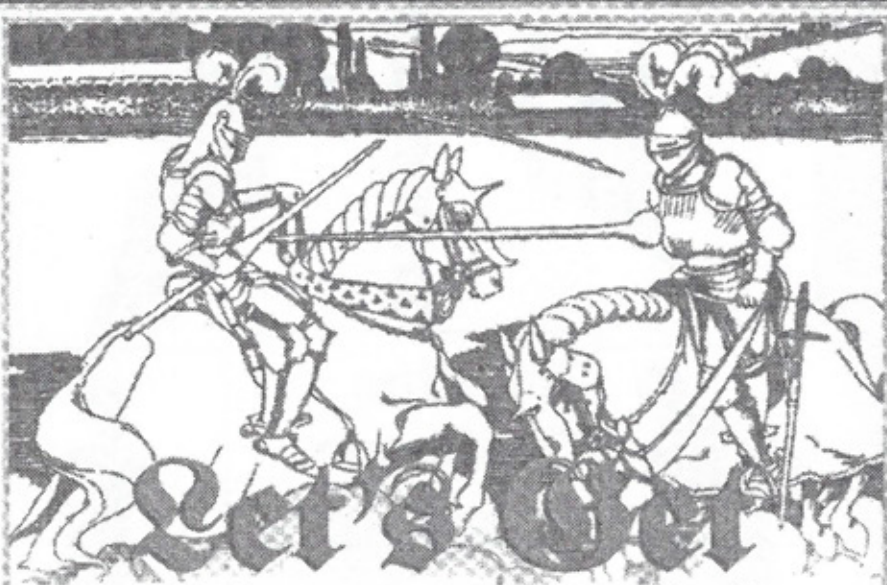
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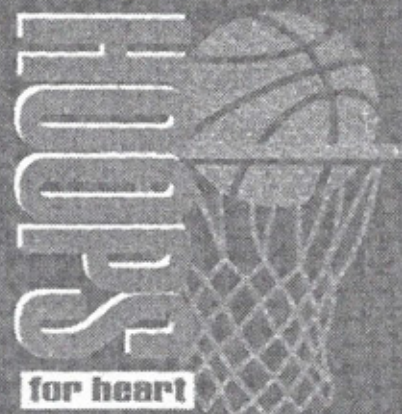
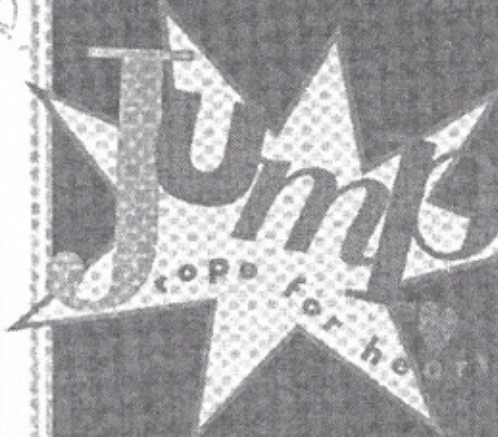


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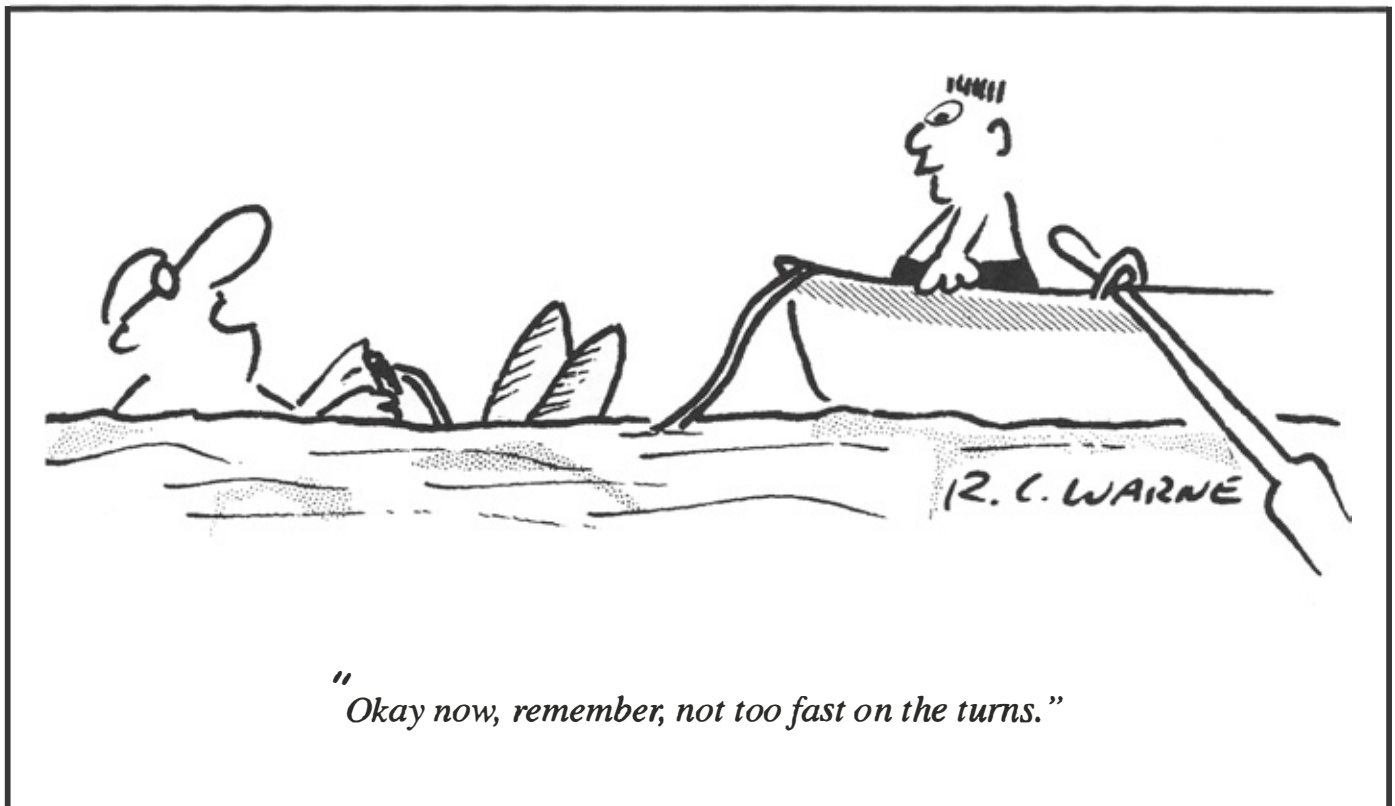
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