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THE DESIGN AND EVALUATION OF A FIRE AND SAFETY TRAINING (FAST) SYSTEM FOR HOSPITAL EMPLOYEES

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THE DESIGN AND EVALUATION OF A FIRE SAFETY TRAINING (FAST) SYSTEM FOR HOSPITAL EMPLOYEES

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ABSTRACT

Numerous environmental factors within the hospital capable of causing injury and loss to patients, employees, visitors, and equipment have been described in the literature. The single greatest environmental threat to a modern hospital is generally agreed to be the occurrence of fire. The Joint Commission on Accreditation of Hospitals (JCAH) recognizing this threat, requires hospitals to provide employees with training in the recognition, prevention, and response to fire emergencies. The degree to which such training is successful may mean the difference between a "fire prevented" and a fire loss.

A review of fire safety literature showed no major research activities directed toward the design and evaluation of hospital fire safety training programs. A 1972 survey conducted by the National Institute for Occupational Safety and Health indicated that only fifty percent of the nation's hospitals had formally organized safety training programs for their employees. As one expert observed "there is a great need for a constructive, yet simple to use, training program which hospitals could conduct themselves for employees."

Information concerning common hospital fire safety subjects (emergency preparedness, flammable liquids, compressed gases, fire extinguisher use, etc.) is reviewed. Fire safety job tasks that each employee should be able to perform are defined with specific skills and knowledges described. Methods of instructional system design are discussed with emphasis placed on the use of simple simulations (role play, case histories) in a hospital fire safety training program. A fire and safety training (FAST) model is presented with a manual for implementing the model.

To determine if the FAST model could be used to improve hospital fire safety training programs an error-choice test instrument was developed to measure employee knowledge and attitudes toward fire safety activities. Test scores of hospital employees exposed to the FAST model were compared to test scores of employees not exposed to the model. Test scores were compared utilizing the Student T statistic at the 0.05 level of significance. Employees exposed to the FAST model significantly scored higher on the test instrument. Data indicate that the FAST model and training manual can be used to improve employee knowledge of fire safety subjects.

Recommendations made as a result of the study include:

1. The JCAH should develop and utilize a written test instrument to evaluate hospital fire safety training programs as part of their accreditation process.

2. The JCAH should place more emphasis on the experience and qualifications of hospital environmental safety personnel.

3. A nation-wide mandatory fire incident reporting system should be established for health care facilities.

4. Schools of nursing should design specific courses in hospital safety and fire prevention and require such courses to be taken by all students.

5. Hospitals should include specific fire safety tasks in each employee's written job description.

Future plans include submission of the FAST manual for publication and distribution to military and civilian hospitals.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

General Statement of the Problem

Numerous environmental factors within the hospital capable of causing injury and loss to patients, employees, visitors and equipment have been described in the literature. The single greatest environmental threat to a modern hospital is generally agreed to be the occurrence of fire. The Joint Commission on Accreditation of Hospitals (JCAH) recognizing this threat to life and safety requires that hospital employees be provided with training in the recognition, prevention, and response to fire emergencies. The existence of fire hazards as a result of structural shortcomings in combination with inadequate fire protection, unsafe maintenance and housekeeping practices, and an ineffective and unrehearsed internal disaster plan constitute grounds for nonaccreditation by the Joint Commission. (1)

The degree to which a hospital's fire-safety training program is successful may mean the difference between a "fire prevented" and a fire loss. Occupational Safety and Health Administration inspections of hospitals in 1975

showed a major deficiency to be the lack of effective employee safety training programs. (2) A review of fire safety literature (1978-1968) from the National Fire Protection Association suggests that no major research activities have been directed toward the design and evaluation of hospital fire safety training programs.

A hospital's capability to respond to a fire emergency is normally evaluated through the use of fire drills. The fire drill is intended to simulate an actual fire emergency which employees might encounter. A review of literature describing fire drills used in hospitals indicates a need for designing better training and simulative methods. Reliance on a fire drill and other training methods which fail to simulate realistic situations could result in the "trained incapacity" of employees inhibiting their ability to appropriately respond to different variables which could be present in an actual fire situation. (3)

Simulation and instructional system design methods have been used successfully to improve training programs in several areas including military operations, business organizations, and even public schools. (4) Application of these methods could be used to improve fire drills and related safety training for hospital employees. The use of simulation (role playing, games, case histories) in a hospital fire safety training program could result in improved knowledges, attitudes, and behavioral responses to fire situations.

If present hospital fire safety training programs have been successful the following outcomes should be observable:

1. Hospital employees should have a greater knowledge of fire safety than individuals without similar training.
2. Hospital employees should have a more positive attitude toward fire prevention than those without similar training.
3. Hospital employees should be more likely to correctly respond to fire situations than those without similar training.

The design and development of a training module utilizing simulations for use in a hospital's fire safety program could result in a significant increase in the above training outcomes.

The questions addressed by this research are:

1. As a result of fire safety training programs, do hospital employees possess a greater knowledge of fire safety, have a more positive attitude toward fire prevention, and are they more likely to correctly respond to fire situations than individuals without similar training?
2. Can instructional system design techniques be used to improve fire safety training for hospital employees?

Importance and Historical Aspects of the Problem

The design, construction, and maintenance of a safe hospital environment is a non-debatable goal desired by health

care consumers, doctors, nurses, employees, visitors, building inspectors, code writers, and design engineers. Patients expect and demand a safe hospital environment conducive to quick recovery from illness and injury. It is indeed a paradox that today's hospital while designed, built, and maintained with State-of-the-Art fire safety technology still requires outside agencies and organizations similar to the Joint Commission on Accreditation of Hospitals to insure that environmental threats are minimized.

The hospital as an established social institution is recognized as a haven for the sick and injured. Unlike surgery and medicine, originating from the earliest ages, hospitals have a later historical origin. It is documented that hospitals existed in Ceylon as early as 437 B.C. (5) In India, King Asoka (273-232 B.C.) directed the building of hospitals which had several characteristics similar to those of modern hospitals. Attendants were instructed to provide gentle care, fresh fruit and vegetables, prepare medicines, and provide baths for patients. Early Hindu literature in 6 B.C. describes the building of shelters for the care of diseased individuals and pregnant women. (6)

In early Greek and Roman culture temples were utilized as hospitals with treatment and care intertwined with mysticism and superstition. It was not until the time of Hippocrates that patient treatment in the Greek hospitals was based on facts rather than faith. The temples under the

teachings of Hippocrates became more like hospitals of today. (5)

During the early Christian era church hospitals sprang up as an outgrowth of religious teachings. By the year 500 many of the larger Roman towns had some form of a church hospital. Unfortunately, the medical precepts of Hippocrates and other Greek physicians were discarded due to their pagan origin and replaced with mysticism and theurgy. (7) One notable hospital during this time was the Hotel-Dieu-Paris built by Bishop Landy in 660 in Paris, France. Even though built on different sites since 660 this institution has provided continuous patient care. (5)

During the Dark Ages hospitals reflected man's general intellectual decline and stagnation. During this period the hospital became a social disgrace where medical practice was based on ignorance and stupidity. It was accepted practice to crowd several patients into one bed without regard to the severity of illness of the patients. A Church edict in 1163 forbidding the performance of surgery which necessitated the shedding of blood resulted in even a further decline in the art of medicine and hospital care. From the Dark Ages well into the 18th Century, progress in hospital treatment and patient care was almost nonexistent.

In the U.S. the first facility utilized for the treatment of patients is reported to be one used for sick soldiers built in 1663 on Manhattan Island. (8) Philadelphia

was the site of the first incorporated, community hospital in the U.S. Built in 1755, this facility, known as the Pennsylvania, was designed with the assistance of Benjamin Franklin. The design was fairly modern with a central administration unit and two patient care wings. Because the Pennsylvania was the first medical facility incorporated, it is generally recognized as the oldest hospital in the U.S. (8) Soon after, other community hospitals sprang up in major cities. In 1798 the U.S. Congress passed the United States Marine Hospital Service Act which provided for the construction of hospitals for the care and treatment of sick and injured sailors. (5)

Even though other community hospitals sprang up in major cities it was not until 1771 that New York City, with a population of 300,000, decided to construct a hospital. Under the guidance of Dr. John Jones the Society of the New York Hospital was formed. Dr. Jones, acutely aware of the extremely bad conditions in existing hospitals, supervised construction of a model facility which provided every patient with a single bed, limited the number of beds to only eight per ward, and provided ample ventilation for patients. Before completion, a fire burned the interior which delayed use until 1776. This is one of the earliest hospital fires recorded in America.

After the American Revolution hospital construction continued to increase. Although hospitals were becoming

numerous in the U.S., treatment and care of patients suffered. The mortality of surgery patients was as high as 90 to 100 percent in some facilities during the early 19th Century. MacEachern describes hospital conditions during this period:

> Hospital wards were filled with discharging wounds which made the atmosphere so offensive that the use of perfume was required. Nurses of that period used snuff to make conditions tolerable. Surgeons wore their operating coats for months without having them washed, the same linen served several patients.

Hospital conditions were so bad that in common language they were referred to as pesthouses. (3)

Environmental conditions in hospitals continued to be a major contributing factor in patient mortality until Florence Nightingale (1820-1910) demonstrated the importance of basic sanitation. During the Crimean War in 1854, Florence Nightingale was able to reduce patient mortality from 40% to 2% through her efforts in improving environmental conditions within the hospital wards. (9) Even though a drastic reduction in patient death rate due to simple environmental controls was effectively demonstrated, physicians and hospital workers continued their old practices well into the end of the century. Even with Lister's introduction of antiseptics, the medical community was slow to appreciate the importance that environmental factors played in the patients' progress toward recovery.

It was not until the latter half of the 1880's that the control of adverse environmental conditions in the hospitals became generally accepted as important in patient care.

The construction of hospitals during the Civil War helped focus attention on the need to control such factors as ventilation.

Construction of the Roosevelt Hospital in 1871 in New York City set the style for new hospital design that became known as the American Plan. A unique feature of this plan was that it provided for openings in the roof to increase ventilation in patient wards. (8)

During the same time numerous innovations in medical technology were being developed and introduced to a growing complexity of the hospital environment. These new techniques, while improving patient treatment, were also introducing new and often unforeseen fire and safety problems that would result in often tragic consequences.

Current Aspects of the Problem

In 1918 the American College of Surgeons initiated a requirement for prospective candidates for fellowship to submit fifty medical records of patients upon whom major surgery had been performed. (10) The purpose of submitting the patient medical records was for peer review of the candidate's technical and professional abilities as a surgeon.

It was soon realized that few surgeons could comply with this seemingly simple requirement due to the fact that most hospitals did not maintain adequate medical records. A survey of one hundred hospitals by the College of Surgeons showed that the lack of medical records was not the only

inadequacy. Conditions were so substandard that some type of minimal standards was needed to insure an acceptable quality of medical care within the American hospital system.

Based on the findings of this survey, the American College of Surgeons prepared minimal standards which they believed necessary for providing and improving medical care. These early hospital standards included:

(1) Medical staff organization for the supervision and control of professional work.
(2) Conferences for the review and analysis of clinical work at regular intervals.
(3) Accurate and complete medical records.
(4) Clinical laboratory and x-ray facilities essential for the proper preoperative study of the patients.
(5) Elimination of fee-splitting.

It was these early standards upon which the American College of Surgeons established a program of hospital standardization.

The need for standardization and improving hospital facilities was more than apparent. Of the 692 hospitals surv eyed during the first year only ninety were approved. From a somewhat dismal beginning the program advanced; helping to improve not only health care, but the entire patient environment. Of the 2,429 hospitals surveyed by the College in 1950, 2,297 (94.6%) were approved. (10)

As the standardization program grew, both in size and range of interest, it was evident that the American College of Surgeons could not manage the program alone. What had begun as an effort to improve surgical care had grown to include the total patient environment within the hospital.

In 1952 several professional organizations, including

the American College of Surgeons, established an independent, voluntary, and nonprofit organization to be responsible for the standardization and review process. This independent organization became the Joint Commission on Accreditation of Hospitals (JCAH) with representatives from the following groups: American College of Surgeons; American College of Physicians; American Hospital Association; American Medical Association; and the Canadian Medical Association. The Canadian Medical Association withdrew in 1958 to establish the Canadian Council on Hospital Accreditation.

The American Medical Association considers the Joint Commission as "the most experienced and responsive agency to patient needs in assuring quality of care." (11) Standards of the JCAH reflect the highest requirements of medical care in the U.S. Government agencies often use accreditation by the JCAH as a factor in determining if a particular facility is eligible for receiving federal monies.

Fire and safety standards of the Joint Commission were upgraded in 1976 to include stricter fire protection and fire prevention activities. The JCAH requires that "hospital building and grounds be designed, constructed, equipped, and furnished in a manner that protects the lives and ensures the physical safety of its patients, personnel, and visitors." (10) In interpreting this standard, compliance with local, state, and federal building regulations and occupational safety and health codes are used. Extensive use of standards

written by the National Fire Protection Association (NFPA) is made by the JCAH in determining the accreditation of a particular hospital. Of particular importance is the NFPA Life Safety Code. Table 1-1 lists other codes which are used in determining compliance with the JCAH fire and safety standard.

As codes are rewritten to reflect current technical findings, existing hospitals may find that, while meeting accreditation one year, they may be in non-compliance less than a year later. In one instance, Reynolds Army Hospital at Fort Sill, Oklahoma had received previous accreditation and approval of safety glass panels used on the pediatrics ward. A change in the 1973 NFPA Life Safety Code limited the size of glass vision panels to 1,296 square inches and required them to be of fixed wire and set in steel frames. This change would cost Reynolds Hospital over $150,000. The intent of the new requirement was to reduce the chance of glass paneling blowing out due to heat pressures which could build up during a fire.

When compliance with new standards poses a significant hardship on the facility, the JCAH may grant a statement of equivalency. The hospital must institute and document extraordinary fire prevention and training procedures to receive a statement of equivalency.

New and increased health care technology resulted in the hospital being a highly complex man-environment system. (12) Improving technology while enhancing medical

TABLE 1-1

FIRE SAFETY STANDARDS AND CODES USED TO DETERMINE COMPLIANCE WITH THE JOINT COMMISSION ON ACCREDITATION OF HOSPITALS

Occupational Safety and Health Act of 1970

Standards and Codes from the National Fire Protection Association:

NFPA 3M Health Care Emergency Preparedness
NFPA 30 Flammable & Combustible Liquids Code
NFPA 53M Hazards in Oxygen-Enriched Atmospheres
NFPA 56A Inhalation Anesthetics
NFPA 56B Respiratory Therapy
NFPA 56C Laboratories in Health-Related Institutions
NFPA 56F Non-flammable Medical Gas System
NFPA 70 National Electrical Code
NFPA 76A Essential Electrical Systems
NFPA 76B-T Safe Use of Electricity in Patient-Care Facilities
NFPA 76C High-Frequency Electrical Equipment in Health Care Facilities
NFPA 101 Life Safety Code
NFPA 50 Bulk Oxygen Systems
NFPA 56D Hyperbaric Facilities
NFPA 56E Hypobaric Facilities
NFPA 56G Inhalation Anesthetics in Ambulatory Care Facilities
NFPA 56HM Home Respiratory Therapy
NFPA 70B Electrical Equipment Maintenance
NFPA 75 Electronic Computer/Data Processing Equipment
NFPA 801 Facilities Handling Radioactive Material
NFPA 49 Hazardous Chemicals Data
NFPA 491M Hazardous Chemical Reactions
NFPA 325A Flash Point Index of Trade Name Liquids
NFPA 704 Identification of Fire Hazards of Materials
NFPA 13 Installation of Sprinkler Systems
NFPA 13A Care & Maintenance of Sprinkler Systems
NFPA 14 Standpipe & Hose Systems
NFPA 72A Local Protective Signaling Systems
NFPA 80 Fire Doors & Windows
NFPA 82 Incinerators, Rubbish Handling
NFPA 90A Air Conditioning and Ventilation Systems
NFPA 96 Vapor Removal from Cooking Equipment
NFPA 211 Chimneys, Fireplaces and Vents
NFPA 232 Protection of Records

care has resulted in introducing new and unique fire safety problems. Unlike other types of public occupancies where rapid evacuation is the major strategy for life safety, the health care facility must be prepared to successfully confine and control the fire. In situations where hospital evacuation is necessitated, personnel must be able to slow the spread of the fire to provide time for ill and injured patients to move to a safer location. In some cases certain patients will not be able to be moved and need to be protected from smoke and toxic gas exposure.

To lessen the threat of fire, structural standards for health care facilities are continually upgraded. Even though a hospital has to be designed and built to meet State-of-the-Art fire safety standards, tragic consequences can still occur. The 13 story Hartford Hospital, completed in 1948, had been described as "one of the safest buildings in the world." (13) On December 8, 1961, approximately 2:30 p.m. a maintenance man noticed smoke coming from a trash chute and attempted to extinguish it. Because previous fires in the chute had been easily controlled, the maintenance man failed to sound the fire alarm. Smoke began to escape from chute doors in the upper stories, but it was not until 2:39 p.m. that a nurse finally alerted the local fire department. At 2:40 p.m. the trash chute door on the ninth floor blew open with a burst of smoke and flame igniting combustible ceiling tiles.

Arriving firemen were unable to extend their ladders to the ninth floor due to the design of an extended front entrance foyer on the ground floor. Sixteen patients died as a result of exposure to heat and smoke. Where patient room doors remained shut, smoke and heat were reduced to tolerable limits.

A review of fire literature indicates that hospital fires are more frequent than suggested. One major facility in Boston reports experiencing 27 fires in one calendar year. (14)

Fortunately, hospital fires of the magnitude of the Hartford fire of 1961 with 16 deaths are not frequent. The National Fire Protection Association (NFPA) estimated that in 1970, 4,180 hospital fires occurred with an average dollar loss of $2,560,000. (15) The NFPA states, "Many hospital fires that occur are not reported to local fire authorities due to the fear of adverse publicity and malpractice suits." Reporting of minor fires to local or state fire authorities is not required in most states. (15)

After a devastating fire in a convalescent home in 1951, the State of Washington required that the State Fire Marshall inspect and approve all health care facilities as part of their licensing process. (16) In an effort to prevent other tragedies similar to the 1951 convalescent home fire, the State Fire Marshall's Office instituted a fire-reporting procedure. The reporting procedure required that

all health care facilities submit detail reports of every fire incident, even those that seem insignificant. Since 1972, the Washington State Fire Marshall's Office has compiled these reports in the form of a quarterly Summary of Fires. The reporting system in Washington has been noted for its efficiency.

A telephonic request to the Washington State Fire Marshall's Office resulted in obtaining a copy of quarterly Summary of Fires for the period January 1972 through June 1977.

During 1977 a total of 164 fires were reported to the Washington State Fire Marshall from health care facilities. A summary of fires reported is shown in Table 1-2. The major cause of fires reported during 1977 was careless smoking. Sixty-two smoking related fires occurred representing 38% of those reported. Patients' bedding and furniture were the most common sites of fires.

TABLE 1-2

SUMMARY OF FIRES REPORTED TO WASHINGTON STATE FIRE MARSHALL DURING 1977

Cause of Fire	Number Reported	Percent
Careless smoking	62	38
Equipment failure	29	18
Human error	30	18
Deliberate acts	28	17
False alarms	15	9

Deliberate acts involved in 17% of the fires reported ranged from outright arson to mental patients angry with a member of the staff. Recent articles show that arson in hospitals is a growing threat. (13, 17, 18) These figures do not represent a picture of the hospital as a safe and secure haven for the sick and injured as assumed by the general public.

Each fire incident reported to the Washington State Fire Marshall is summarized and included in a quarterly report which is distributed to all health care facilities in the state. Hospital names are not used in the reports and individual workers are not identified. Examples of fire incidents reported during 1977 include:

> A patient's bed was ignited as the result of careless smoking. Hospital personnel removed the bedding and soaked it in water. The cigarettes and matches were taken from the patient to prevent a reoccurrence.
>
> A fire occurred in a hospital chemistry lab when an ether base solution, which was being heated on a hot plate, ignited as the result of the heater being accidentally turned on high. An effort by personnel to extinguish the blaze failed because the fire extinguisher had been used the previous week and placed back in its normal location without refilling. City firemen controlled the blaze, limiting damage to the immediate area of origin.
>
> An early evening smoke source was traced to a smoldering sofa cushion in the day room, which had ignited from a dropped cigarette. Hospital personnel extinguished the fire with an extinguisher and removed the cushion from the building.
>
> Clothes were placed in a gas dryer and the unit started. Ten minutes later, a nurses' aid discovered the dryer on fire. She turned it "off" but it continued to burn. She closed the room door and instituted the fire plan. Responding firemen extinguished the fire and ventilated the building of smoke.

> A patient dropped a cigarette into a paper bedside litter bag, which ignited the contents and the bag itself. Staff members sounded the alarm, notified the fire department and proceeded to the room with extinguishers. The fire was smothered and after the fire department arrived and ventilated the room with fans, the room was cleaned and put back in operation without damage or injuries.

Inappropriate employee response can be observed in many of the fire incidents reported to the Fire Marshall's Office. In one instance a fire started from an electrical short in a patient's electrical appliance. The employee responding to this situation used a water fire extinguisher on the fire without unplugging the appliance first. Luckily, the fire was controlled without electrical shock to the patient or employee. Inappropriate response to fire situations may indicate a problem in employee training.

Examples of inappropriate employee response noted in other reported incidents included:

> A nurse, responding to patient's call light in the wee morning hours, discovered a paper bag on fire. She promptly put it out with a glass of water. The alarm was not sounded, nor the fire department called. (Failure to alert fire officials.)

> A hospital lab technician received first and second degree burns on his hand when alcohol boiled over into the Bunsen burner. The fire was extinguished with a CO_2 extinguisher and damage confined to the immediate area. (Failure to recognize hazard of flammable liquid. Use of open flame to heat flammable liquid.)

> A box of old records in an outside records storage building ignited from contact with one of the electric heaters. An employee attempted to put out the fire with the extinguisher provided in the building, but it was empty. The fire department was summoned and controlled the blaze. More emphasis will be placed on proper servicing and filling of extinguishers and all heaters will be screened to prevent contact with combustibles. (Failure to properly inspect fire extinguishers.)

> A volunteer helper carelessly tossed a wooden match into a trash container, which burst into flame shortly afterward. The fire itself never extended beyond the container, but considerable smoke spread throughout the area. The smoky situation was further accentuated by carrying the blazing container through the corridor to the rest room for extinguishment, rather than putting it out where discovered. (Failure to place match in ashtray. Improve procedure used to extinguish fire.)

Even though health care personnel involved in these incidents had received previous training in fire prevention and fire safety, inappropriate response could have resulted in a major fire. In all cases fire and safety training being provided to employees met the requirements of the state fire marshall and the JCAH.

The importance of providing effective fire safety training to hospital employees is evident. The lack of proper training has been cited as the cause of patient death and injury. Nine deaths resulted from the failure of nursing personnel to promptly notify the fire department in a 1974 Osceola, Florida fire. In the same fire, a nurse turned an oxygen valve thinking it to be the fire alarm. This act resulted in a patient dying from the lack of oxygen. (19) A thirteen minute delay in alerting fire officials resulted in six deaths in a 1974 Mississippi nursing home fire. (20) Employees not trained in the use of fire extinguishers was cited as a contributing factor in the loss of six lives in a fire at a New Mexico state hospital (21)

In some cases hospital employees may not be receiving any organized fire safety training. A survey of hospital

occupational safety and health programs in 1972 showed that only slightly more than half of the more than 2,500 hospitals surveyed had a specific training and orientation program in safety for newly hired personnel. (22) This survey conducted by the National Institute for Occupational Safety and Health also indicated that only fifty percent of the surveyed facilities reported having a formally organized training and education program for permanent employees. (23)

CHAPTER II

DESIGN OF A HOSPITAL FIRE AND SAFETY TRAINING (FAST) SYSTEM

Webb has defined training as "a systematic attempt to convey certain knowledges, skills, and attitudes to trainees." (24) The first step in designing a training program should be to identify specific knowledges, skills, and attitudes that the training is to achieve. (25, 26) For each subject of concern, i.e., electrical hazards, flammable liquids, etc., specific training objectives focused on desired employee skills and knowledges should be established.

The purpose of this chapter is to identify specific skills and knowledges which employees should possess and to incorporate these skills and knowledges in the design of an effective and simple to use training program. The first section will provide background information concerning common fire safety subjects while the second section will provide a review of the literature concerning training and instructional systems design.

A review of current fire safety literature was conducted to provide information in the following areas:

1. Emergency Preparedness.
2. Control of Smoking.
3. Flammable Liquids.
4. Compressed Gases.
5. Electrical Safety.
6. Use of Fire Extinguishers.
7. General Safety.

An essential part of a hospital fire safety program is a definite system of employee response for internal fire emergencies. (27) When preventive measures fail and a fire occurs, employees must be adequately prepared to remove endangered patients, notify fire fighting personnel, confine and control the fire when possible, and under certain conditions evacuate patients from the hospital.

The National Fire Protection Association's Life Safety Code requires hospitals to establish written fire emergency and evacuation plans. (28) All employees are required to be instructed and trained in the plan. The JCAH requires twelve fire emergency drills yearly and at least one drill on each work shift per quarter. The JCAH also requires that during the drill a fire alarm be transmitted and other emergency fire conditions be simulated.

The American Hospital Association recommends that the following basic steps be included in a hospital's fire emergency plan: (10)

1. Removal of patients in immediate danger and confinement of the fire. (If an employee observes a fire in a patient's room which cannot be extinguished immediately, the

employee should remove the patient from the room to the safety of the corridor then confine heat and smoke by closing the door. If the fire is in a non-patient area, the employee should close the door to confine heat and smoke.) (29)

2. Notification of firefighting personnel. (To prevent panic a preplanned codeword such as Dr. Red or Dr. Firestone should be used to notify other personnel. The nearest fire alarm should be pulled and the switchboard operator or fire department be called by phone.) (30)

3. Extinguishment. (As soon as other employees hear the code word, trained teams should proceed to the fire location and attempt to extinguish or control the fire.) (27)

4. Evacuation. (Under certain conditions, total evacuation may be necessary.)

In other types of public occupancies the major objective in a fire emergency is rapid evacuation. This is not the case in hospital fire emergencies. Normally, about one-third of the patients in a hospital will be non-ambulatory requiring help. (31) Some patients will not be able to be evacuated (ICU, patients undergoing surgery, etc.). Patients will be in various degrees of dress which may be a critical factor in winter months. Large numbers of personnel to transport patients will normally not be available. Another factor limiting total evacuation is the availability of a relocation site where minimal emergency medical facilities are available.

An evacuation plan must be specifically designed for each facility to allow for structural design, location of fire fighting equipment, and location of exits. Ideally, each work area in the hospital will have a specific protocal to follow for fire emergencies. (32)

Basically, evacuation is movement, either horizontal or vertical, from a dangerous or potentially dangerous area to one of comparative safety. These areas should be separated by fire walls, fire doors, or smoke barriers and all vertical relocation routes (stairwells and elevators) should be properly enclosed. In preparing or using the evacuation plan there are four types that must be considered: partial, horizontal, vertical, and total. (33)

1. Partial Evacuation: (Could also be termed immediate action evacuation.) This is the removal of persons who are in immediate danger. Usually accomplished by a single rescuer and when assistance becomes available the rescued are relocated to another area.

2. Horizontal Evacuation: This type of evacuation takes place when fire or heavy smoke from a single room threatens to spread to adjoining areas. All patients, personnel, and visitors in the affected area should be moved laterally to the nearest area that is protected by fire doors and is adjacent to the exterior exit way (which includes enclosed stairwells). It is preferable not to move patients in their beds. The utilization of gurneys, wheelchairs, stretchers, or blankets to relocate the non-ambulatory creates the least congestion in hallways and assembly areas.

3. Vertical Evacuation: When the fire is out of control or smoke and fumes make the floor untenable, vertical downward movement becomes necessary. Refuge can usually be found one floor below; however, at least two floors are recommended. Ambulatory patients should be grouped forming chains and follow a lead nurse down the stairs. Non-ambulatory patients can be brought to a lower floor by elevator only if the elevator has been deemed safe by the Fire Marshall or Fire Department officer in charge. If the elevators are not safet to use, the best patient carries for use on stairways are the two-man swing carry and the three-four man blanket carries.

For evacuation to be orderly and rapid, employees must be trained in proper patient carries before the emergency occurs. Three considerations may be dominant factors in

selecting a specific patient carry: nature of emergency; weight and condition of the patient; and the strength and adaptability of the rescuer. (33)

Basically there are only six carries in which employees should be trained. (33) The pack strap, hip, and cradle drop carries are for one person. The pack strap is a good carry for turning in any direction, in close quarters or where there is fire on both sides of a doorway. The hip carry can provide more leverage for a small rescuer when handling heavy patients. The cradle drop involves using a blanket on the floor for removing heavy patients from an endangered room. The cradle drop would not be suitable for transporting patients down stairs.

Two person carries which can be used are the swing carry and the extremity carry. The swing carry is one of the easiest removals to use and is suitable for stairs or fire escapes. The extremity carry is useful for rapidly removing a patient from a room into the hallway or when an exit path is too narrow to use the swing carry. When the patient is in critical condition a three person carry may be necessary.

Of all the possible equipment for evacuation, the BLANKET is more important than any other. It can be used to smother fire, drag a patient from a room or on an elevator; it can be made into a stretcher, with or without poles, for carrying in halls, stairs, or fire escapes. Eight or ten infants can be carried easily and safely in it. (33)

All employees should receive continuing in-service training in proper procedures for transporting patients in an emergency situation.

The careless use of smoking materials by patients, visitors, and employees has been identified as a major cause of hospital fires. (34) In hospital fires reported to the Washington State Fire Marshall, careless smoking was related to 38% of reported fires during 1977. (16) Case studies show that most smoking related fires are limited to the patient's room. (35, 36, 37) However, they can spread, endangering all occupants.

JCAH standards require hospitals to have written policies governing the sale and use of smoking materials. Some experts have recommended that hospitals designate specific smoking areas and prohibit patients from smoking unless accompanied by a staff member or responsible visitor. (29) Where smoking policies have been established employees must be able to inform patients and visitors that smoking is prohibited under certain conditions.

Even though employees may be knowledgeable of established smoking policies, they may be reluctant to enforce them. In one experiment conducted in the preliminary phase of this research a smoker was stationed in a hospital hallway next to a "No Smoking" sign. Ten employees passed the smoker without enforcing the "No Smoking" sign. Smoking policies will only work where employees are well informed of the

policies and will enforce them.

Flammable liquids represent a major concern in the hospital whether in storage, transportation, or use. The greatest hazard associated with their use is from the fumes and vapors given off by the liquid. It has been reported that an eight pint bottle of a flammable solvent dropped or spilled on the floor of an average size room can rapidly vaporize and create a highly explosive atmosphere. (38) Safety requirements for the use and storage of flammable liquids are aimed at reducing the volume of liquid being used.

Explosions and fires have resulted from storing flammable liquids such as ether in ordinary refrigerators. (39) Escaping vapors from the container fill the refrigerator and explode when set off by electrical sparks from the interior light coming on or from sparks from electrical relays in the refrigerator motor. Explosion-proof refrigerators developed to safely store flammable liquids should be used where needed. (40)

Under provisions of NFPS standard No. 56C flammable liquids are defined as "any liquid having a flash point below 140^{o}F and having a vapor pressure not exceeding four psi (absolute) at 100^{o}F." (41) Flash points of flammable liquids in the hospital vary from -49^{o}F (ethyl ether) to 139^{o}F (mixtures of alcohol and water). (38) Common flammable liquids which can be found in the hospital environment include:

The hospital laboratory and operating room are the two largest consumers of flammable liquids. (42) The use of flammable anesthetic agents such as ether, chloroform, and halothane in the operating room has led to special safety requirements for fire prevention. Conductive flooring to create an equipotential environment and controlled humidity for operating rooms are required by the JCAH. Conductive flooring while reducing the hazards of flammable anesthetic creates a potential electrical shock hazard to operating room personnel and patients. (43)

The use of nonflammable anesthetic agents has grown in the past few years. Some facilities have attempted to stop using flammable anesthetics altogether. Like many facilities, Reynolds Army Hospital at Fort Sill, Oklahoma, has adopted a policy prohibiting the use of flammable anesthetic agents. However, this policy may lead to other health and safety problems.

Some patients may not be able to be administered these agents due to possible liver, kidney, or cardiovascular problems. In addition, occupational exposure to the newer nonflammable agents has been linked to possible birth defects among operating room employees. (43)

The hospital laboratory utilizes procedures which require large amounts of flammable liquids (tissue preparation, laboratory tests, etc.). The large amounts of flammable liquids used in the hospital lab have resulted in the National

Fire Protection Association to publish a separate fire protection standard 56C on laboratories in health related institutions in 1969. This NFPA standard was revised in 1973 and is currently under revision. (44)

The NFPA standard for hospital laboratories is focused on reducing the amount of flammable liquids being stored and used at any one time. A laboratory unit is required to limit the amount of working flammable liquids outside storage cabinets to ten gallons. The total amount which can be stored in an approved storage container at one time is limited to sixty gallons. The size of containers used is also limited. For liquids classed as IA (flash point below $73^{o}F$ and boiling point below $100^{o}F$) container size is limited to one pint in glass or plastic or one gallon in an approved safety can. Class IB liquids (flash point below $73^{o}F$ and boiling point above $100^{o}F$) are restricted to one quart glass or plastic or a two gallon in an approved safety container. Class IC liquids (flash point above $73^{o}F$ to $1400^{o}F$) may be stored and used in either one gallon glass or plastic containers or two gallon safety containers. (44) In no case should the containers for handling, transporting, or storing flammable liquids in the hospital exceed two gallons.

The Compressed Gas Association defines a compressed gas as "any material or mixture having in the container an absolute pressure exceeding 40 psi at $70^{o}F$, or, regardless of the pressure at $70^{o}F$, having an absolute pressure exceeding

104 psi at 130°F, or any liquid flammable material having a vapor pressure exceeding 40 psi absolute at 100°F." (45) A basic hazard common to all compressed gas usage is the potential destructive force of the cylinder holding the gas. Whenever the integrity of a compressed gas cylinder is jeopardized it is capable of becoming a missile of destruction.

Compressed gases commonly used in hospitals include both flammable and nonflammable materials. Nonflammable gas which support combustion such as oxygen and nitrous oxide can quickly contribute to intense and disastrous fires. Nonflammable agents in use which do not support combustion include: carbon dioxide, helium, and nitrogen. Cyclopropane and other flammable anesthetic agents are extremely flammable. (46)

The use of flammable compressed gas anesthetic agents such as cyclopropane has decreased in recent years due to the extreme hazards in its use. In a widely publicized operating room fire in Santiago, Chile, improper use of cyclopropane caused the death of six personnel and mutilated three others. (15)

An extremely hazardous, but not uncommon practice, is the rapid opening of compressed gas cylinder valves. This practice may result in adiabatic heating resulting in ignition of the cylinder contents. In a 1953 hospital nursery fire one infant died and five others received severe burns

when an employee turned an oxygen cylinder valve too quickly. In a similar incident, one infant was fatally burned in a 1978 nursery fire. (15)

Other sources of ignition for flammable compressed gases include: electrical sparks, friction sparks, open flames, and static electricity. Cylinder valves contaminated with grease and other types of hydrocarbon compounds used to lubricate treads can ignite.

In a 1959 incident, the use of a non-approved oxygen humidifying machine resulted in the death of a two-year-old female patient. (15) The improper use of oxygen is a major cause of fires associated with compressed gases. An investigation of a 1957 oxygen tent fire showed that a patient in a dazed condition attempted to light a cigarette while in an oxygen tent. In another case, the mother of a child brought a birthday cake with lighted candles into the child's room. In both cases the results were fatal. (15)

Compressed gas cylinders can safety be used in hospitals if employees are trained in their safe use and handling. The following safe practices are recommended by the American Compressed Gas Association: (46)

> Never permit oil, grease, or other readily combustible substances to come in contact with cylinders, valves, regulators, gauges, hoses and fittings. Oil and certain gases such as oxygen or nitrous oxide may combine with explosive violence.
>
> Never lubricate valves, regulators, gauges or fittings with oil or any other combustible substances.
>
> Do not handle cylinders or apparatus with oily hands or gloves.

Never use an open flame to detect gas leaks. Leak detection instruments or commercial leak detector solutions should be used.

Prevent sparks or flame from any source from coming in contact with cylinders and equipment.

Never interchange regulators or other appliances used with one gas with similar equipment intended for use with other gases.

Fully open the cylinder valve when the cylinder is in use.

Never attempt to mix gases in cylinders. (Mixtures should be obtained already prepared from recognized suppliers.)

Identify the gas content by the label on the cylinder before using. If the cylinder is not identified to show the gas contained, return the cylinder to the supplier without using.

Do not deface or remove any markings which are used for identification of content of cylinder.

No part of any cylinder containing a compressed gas should be subjected to a temperature above 130°F. A flame should never be permitted to come in contact with any part of a compressed gas cylinder.

Never attempt to repair or to alter cylinders.

Do not place cylinders where they might become part of an electric circuit.

Where caps are provided for valve protection, such caps should be kept on cylinders when cylinders are moved.

Never drop cylinders nor permit them to strike each other violently.

Avoid dragging or sliding cylinders. It is safer to move large cylinders even short distances by using a suitable truck, making sure that the cylinder retain chain or strap is fastened in place.

Smoke and gases produced as a result of the combustion process are not recognized as hazards by many hospital employees. A 1966 study conducted by the Los Angeles Fire

Department showed that most fires, if not controlled, are capable of producing untenable smoke conditions in two to seven minutes. (29) This study also showed that smoke may reach temperatures in excess of 1500°F.

Statistics on the causes of fire deaths show that fatalities from the inhalation of toxic gases and smoke are more common than other causes. (31, 47) The sixteen deaths in the Hartford Hospital fire were attributed to exposure to toxic smoke and gases. A more recent case occurred in the 1976 Beverly Hills Supper Club in Kentucky in which more than 70 percent of the 164 deaths were caused by exposure to toxic combustion products. (48)

Toxic products of combustion that have been identified include: carbon monoxide, methane, chlorine, hydrogen cyanide, phosgene, and bromine to name a few. (49) The interaction of carbon monoxide and other gases have been shown to have a synergistic action in fire related deaths. (50, 51) The increased use of disposable patient care items (admission sets, dietary dishes, bedpans, tubing, etc.) composed of or in part from polyvinyl and polypropylene have added to this problem for hospital employees. (52) As hospitals continue to increase their use of disposable items, employees will need to be trained to recognize smoke as a true hazard and to prevent its spread during an actual fire.

Recognizing the threat that products of combustion constitute in the health care facility, the Life Safety Code

of the National Fire Protection Association requires that smoke stop partitions be provided for every 22,500' and that smoke stop doors have a fire protection rating of at least 20 minutes. (28) The absence of smoke control doors has been a factor in several health facility fires. (19,20) In a 1974 fire report, the lack of smoke stop doors in a Pennsylvania nursing home was identified as a major factor in the death of 15 patients. (53)

Electrical equipment in the hospital has increased both in number and complexity. (54) The increasing use of electrical equipment for diagnosis, therapy, and monitoring techniques that invade the body's natural barriers to electrical shock require extra precautions on the part of attending personnel.

There are four interrelated hazards associated with the use of electrical equipment: electrical shock, arcing and sparking, effect of high frequency current, and the loss of electrical power. (14) Hospital patients who are critically ill and likely to be monitored or connected to electrical therapeutic appliances constitute a higher risk of electrical shock than normal. This is especially true of patients with transvenous or intrahoracia wire such as pacing catheters. Normally, persons can experience electrical shock involving 20 volts for several seconds without adverse effects. However, currents of five millivolts may be fatal to certain hospital patients. (14)

Arcing and sparking are sources of ignition for combustible materials. Of twenty-seven fires reported occurring in Boston's Peter Bent Brigham Hospital in 1970, seven were of electrical origin. (14) Where flammable gases and liquids are used, the hazards of arcing and sparking are apparent. High frequency electrical equipment used in certain types of therapy and treatment may interfere with monitoring devices. Leakage current from high frequency generators and current in proximity to patient leads attached to monitoring equipment can distort or obliterate physiological signals.

During power failures, patients dependent on electrical appliances face a life threatening situation if adequate emergency power is not provided. The NFPA Life Safety Code requires hospitals to provide emergency power sources for critical areas such as ICU, OR, laboratory, etc. In addition, the JCAH requires monthly testing of emergency power sources.

Even with these requirements two of the largest hospitals in New York (Bellevue and the Jewish Hospital and Medical Center) were without any electrical power for 10 hours during a 1977 blackout. (55) Both facilities had emergency power equipment which had been inspected and tested monthly, but in an actual emergency were without power for ten hours.

Power drops or brownouts can also produce potential problems in certain equipment. Low voltage can cause serious

overheating of motors. In one hospital fire low voltage caused a fan in a patient's room to overheat and catch fire. (16) Employees should be aware of hospital areas requiring emergency power and what steps should be taken if power should fail. Personnel throughout the hospital need to be knowledgeable of common electrical hazards associated with faulty extension cords, damaged plugs and outlets, and improper grounding of equipment.

In some cases the hospital bed constitutes a wet environment increasing the likelihood of electrical shock for the patient. (54) Spilled liquids, wetness from perspiration, dressings, or bathing add to the patient's threat of electrical shock.

A tendency observed among hospital staff members is the attitude that electrical hazards associated with medical instruments constitute a problem for the engineer and manufacturer. (14) Employees need to be aware of potential electrical hazards and that the patient requires more protective measures than the well individual.

The proper use of fire extinguishers by hospital personnel has in many cases resulted in effective suppression and control of fires. (56) Likewise, the improper use of fire extinguishers or the inability to operate extinguishers by employees has resulted in major fires in some health care facilities. (15, 21, 57)

Fire extinguishers are essentially first aid devices

provided and maintained in the immediate area for prompt use by employees. Fire extinguishers are not designed to control fires past incipiency stages. Prompt and correct use are required on the part of hospital personnel.

Fire extinguishers are classed according to the type of fire they are designed to control. (58)

1. CLASS "A" FIRES may be defined as fires in ordinary combustible materials where the quenching and cooling effect of water is of first importance.

CLASS "A" EXTINGUISHERS are those which will present greatest cooling effect. This class of extinguisher is primarily designed for fires in ordinary combustibles. They are generally, the hose stream, pump tank, and the 2½ gallon water type extinguisher.

2. CLASS "B" FIRES may be defined as fires in flammable liquids, greases, etc., where a blanketing effect is necessary to extinguish the fire.

CLASS "B" EXTINGUISHERS are those which provide the essential smothering effect of separating the oxygen in the air from the burning fuel. This type of extinguisher is designed for use on fires in flammable liquids, grease, etc. The following types are in general use: carbon dioxide (CO_2), foam, and dry powder.

3. CLASS "C" FIRES may be defined as fires in electrical equipment where the use of non-conducting extinguishing agent is of first importance.

CLASS "C" EXTINGUISHERS are those which utilize a non-conducting medium as an extinguishing agent. Extinguishers utilizing carbon dioxide, and dry powder are classified in this group.

It is important to use the right type extinguisher and to place at each location the type most suitable to combat the class of fire most likely to occur at that location. The wrong extinguisher may fail not only to extinguish the fire, but may cause great personal hazard from electrical shock,

poisonous fumes, or the spreading of fire.

Extinguishers may also be multi-purpose. (58) For instance, a Class AB extinguisher could be used on either a fire involving wood, paper, or cloth, or on a fire involving flammable liquids. A Class BC extinguisher could be used on flammable liquids or a fire of electrical origin. A Class ABC extinguisher could be used on any type of fire. It would be possible that employees in some facilities would need to be trained in using extinguishers in over twelve different situations. By utilizing multi-purpose ABC units throughout the hospital, employee training in this area could be greatly reduced. During 1968-1972, Reynolds Army Hospital at Fort Sill replaced all fire extinguishers with multi-purpose ABC units.

In a 1962 study of 70,048 hospital admissions, Michigan researchers noted the occurrence of 2,036 patient accidents. (59) This study indicates that as many as one out of thirty-four patients entering a hospital may experience an accident during hospitalization which will require medical treatment. Eliminating safety hazards before accidents occur can reduce the number of patient injuries occurring in the hospital.

If hospital employees are aware of general safety hazards, the hazard can be corrected before an accident occurs. The National Institute for Occupational Safety and Health recommends that hospital employees be trained to

recognize the following general safety hazards: (58)

1. Conditions creating a slip or fall hazard. (Spilled liquids, cords, loose carpets, etc. in walkways.)

2. Improper storage of materials that could fall.

3. Faulty equipment with loose, broken, or damaged parts.

4. Use of unsafe ladders or makeshift devices for climbing.

5. Eating or drinking food items where biohazards are used.

6. Proper storage requirements for medications and biologicals.

7. Transmission of infectious agents from failure to thoroughly wash hands.

A safety inspection guide based on NIOSH recommendations is provided in Appendix A. The hospital fire safety training program should include these subjects.

Further information concerning fire safety subjects for use in training programs is available in numerous journals, manuals, and bulletins. (60, 61, 62, 63) However, much of the information is not presented in a manner that can readily be used for training by the average hospital fire safety manager. A 1970 survey showed that personnel responsible for fire safety training in most hospitals do not have sufficient time or training to establish effective training programs. (64) As one safety expert has aptly observed, "There is a great need for a constructive, yet simple, training program which hospitals could conduct themselves for employees." (65)

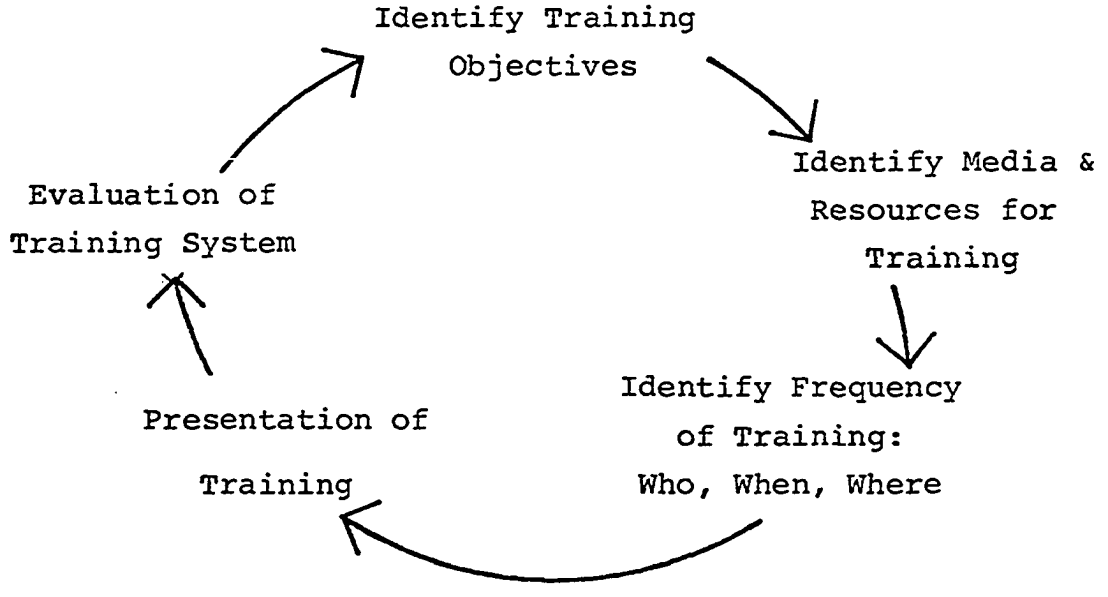
Military experience during WWII showed the importance

of considering the entire instructional system in developing effective training programs. (66) By utilizing an instructional system design approach, improved fire-safety training programs can be developed for hospital employees. Designing an instructional system involves establishing training objectives, selecting training media, preparing new materials when needed, identifying personnel to present training, and developing a means of evaluation to determine if training objectives are being achieved. (67, 68, 69)

The basic elements of a training-instruction system are shown in the model in Figure 2-1.

Figure 2-1

Basic Elements of a Training-Instruction System



Establishment of realistic training objectives is the cornerstone of an effective instructional system. The next

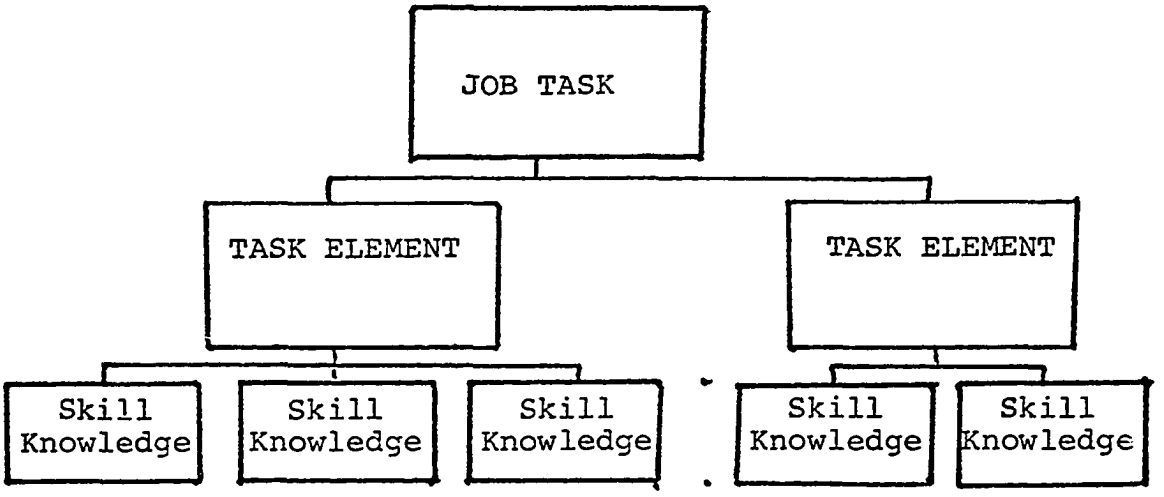
step in designing a training and instruction system is the selection of training media (films, books, etc.) and identifying personnel resources to conduct training. A critical link in the system is the method of presentation of the training message to employees. An often overlooked step is the evaluation of training that has been provided to determine if training objectives are being achieved.

Preparation of instructional objectives is one of the most important steps in training system design. (70) Instructional objectives are statements that describe what employees will be able to do after completing a prescribed unit of instruction. (71) Good objectives will provide a description of desired behavior, conditions under which employees will be expected to demonstrate objectives, and criterion for evaluation. (72)

Before valid instructional objectives can be prepared, an analysis of the employee's job should be accomplished to enable the trainer to focus on specific job tasks. Military training experts subdivide job tasks into elements which are composed of two or more skills and knowledges in which the employee must be trained. (73) This is illustrated in Figure 2-2. Training objectives identified at each subdivision can be effectively included in the instructional system design. If skill and knowledge objectives are not mastered, the employee will not be able to perform the job task successfully. (74)

Figure 2-2

Subdivisions of a Job Task



To effectively perform the job task employee must possess necessary skills and knowledges required for each task element. Training resources are focused on each subdivision level.

By identifying training objectives at each level of the job task, the instructional system designer can identify information which training efforts should be focused upon. Utilizing this approach, the following fire safety training objectives were identified for training employees to respond to a fire emergency.

Level of Training	Training Objective
Job task	During a fire emergency, take necessary steps to protect life safety of patients, visitors, and other employees.
Task element	Upon detecting a fire the employee will remove patients in immediate danger and contain the fire.
Skills and knowledges required	Skill in removing patient from immediate area by proper evacuation technique.
	Knowledge that smoke contains toxic products and that closing door will contain smoke and delay the spread of the fire.
Task element	Sound the alarm to other employees without causing panic.
Skills and knowledges required	Code word used for fire.
	Telephone number for reporting fire.
	Location and method of sound alarm.

This technique was used to identify three major job tasks related to hospital fire safety. More than 10 task elements and 30 specific skills and knowledges that should be included in the design of a hospital fire safety training

program were also identified. Fire safety job tasks identified for hospital employees were:

> During a fire emergency, take necessary steps to protect life safety of patients, visitors, and employees.
>
> Be able to recognize common fire hazards and take necessary steps to correct the hazard.
>
> Be able to recognize common general safety hazards and take necessary steps to correct the hazard.

These job tasks should be included in each employee's job description. Related task elements and skills and knowledges are shown in Appendix B.

Identification of job tasks related to fire safety cannot be over emphasized. Discussions with local hospital administrators in Lawton, Oklahoma, showed that job descriptions written for hospital employees did not normally include specific tasks related to fire safety. The lack of specific job tasks concerning fire safety may be a reason why training programs have not been successful. Fire safety tasks should be identified for hospital personnel and be included in the employee's job description.

Media is the means of presenting training information. (75) Different types of media can convey certain types of information better than others; however, there is little guidance upon which decisions can be made concerning media selection. (76)

The instructional system designer is faced with a myriad of training media from which to choose. Common types of training media include:

Overhead transparencies
Audio tapes
Slide/audio
Filmstrips
Motion pictures
Still pictures
Television
Video tapes
Written text
Programmed texts
Simulators
Models/mock-ups
Charts/chalkboards
Computer-assisted instruction

Each type of training media has certain advantages and disadvantages which should be considered in the selection process. Overhead transparencies are easily prepared and can be quickly modified; however, their use requires an overhead projector which is cumbersome and an instructor is required to present information. Audio tapes are portable and economical. Audio tapes can be used with employees having low reading abilities. The lack of visual stimuli is a major disadvantage of using audio tapes. (77)

Filmstrips provide both audio and visual stimuli. When compared to films or video tapes they are less expensive. Special projectors can be obtained to provide self-pacing of instruction. Training information is presented in a fixed sequence and cannot be easily modified. Filmstrips produced in a 35mm format can be converted to single frames for use in a slide projector. Training posters are convenient to use and are low cost. The use of posters by themselves prevents student interaction with the training message. Posters can be used in conjunction with other training

efforts to help reinforce the training message. (78)

An advantage of using 16mm films is their ability to show employees actual performance required in the job task. The 16mm films are expensive and require an instructor to generate student interaction. Video tapes used with television have the same advantage of 16mm film. (78) Recent advances in video tape technology make it possible for trainers to produce their own tapes and show employees their own performance. The expense and time involved in producing in-house tapes is a major disadvantage.

Simulations, as training media, can range from highly sophisticated and complex multi-variable computer simulation models to those that are simplistic such as role playing and case histories. (79) After simulation, trainees tend to express greater confidence in their ability to cope with a real-life emergency. (80)

A recognized advantage of simulation is its powerful educational and training application. (81) Participation in simulations increases interest in the topics simulated. Participants gain factual information, learn procedural sequences, and can gain increased insight under pressure and in situations where uncertainties exist. (4)

Computer simulations have been used in hospital planning and in other administrative areas. (82) Use of simulations in fire safety training has generally been limited to fire drills. The JCAH requires hospitals to

conduct fire drills at least twelve times a year with at least one drill on each work shift quarterly. Where fire drills are conducted in a realistic manner, training can be improved. In many cases, employees do not take fire drills seriously and consider them a nuisance. During an interview with employees in a local hospital 45% considered fire drills ineffective, and that they were held only to meet accreditation requirements.

Two disadvantages of simulations are the expense and time required for development. There is a need for developing better simulation methods for use in hospital fire safety training programs that can generate employee interest and lead to increased fire safety awareness. (83)

There are several excellent sources of commercially prepared safety training media. (84) Sixteen millimeter films, audio slides, video tapes, and posters are available from the National Fire Protection Association, the National Safety Council, and other private firms. There is little guidance available for selecting commercially prepared training media which can be effectively integrated into a total instructional system for hospital employees.

Discussions with local hospital officials and a review of literature describing existing fire safety training programs showed a tendency to rely upon one or two types of commercial media. (85, 86) In most cases, information presented via the selected media does not parallel or complement

other training efforts. A typical example is the fire safety manager who shows employees a training film about patient evacuation and follows-up with posters concerning prevention of slips and falls.

A written training medium often overlooked is the hospital employee bulletin. This may be a weekly, biweekly, or monthly publication used to keep employees informed of current information. An example of a hospital bulletin is provided in Appendix C.

Use of the hospital bulletin to follow-up and complement other training efforts can help reinforce the training message. The hospital bulletin can also be used to provide information to supervisors for use in in-service group training. Such information should be simple to read, short, and should not require the supervisor to use extensive training aids.

Case histories, a form of simulation, can easily be used in the hospital employee bulletin to generate interest in and increase awareness of fire prevention activities. Case histories used by the work area supervisor can reinforce previous training or be used for retraining after employees have failed to take appropriate procedures in a fire emergency simulation.

The following is an example of how a case history could be used: (this message would appear in the employee bulletin)

All supervisors should insure that their employees discuss the following case history during this week's safety meeting:

A patient was smoking while using oxygen and discarded the cigarette into the paper bag on the side of the bed. It blazed up, but was quickly extinguished by hospital personnel through the use of water.

(1) Could this incident have resulted in a major fire? How?

(2) How could this incident have been prevented?

Having employees discuss the case and think about what they would do in a similar situation can do a great deal toward positive fire prevention attitudes. (87)

The selection of training media is an important part of the instructional system. When the responsible official orders a training film or filmstrip and bases the entire training program on its use, training objectives may not be reached.

Employee training can be enhanced by using a mixture of media in the design of the instruction program. (66) Some employees may have excellent listening comprehension, but low reading ability and retention. Other employees may have excellent reading comprehension, but low listening abilities. The use of parallel media with one complementing the other can help reinforce the training message.

Selecting a training media simply because it is available should be avoided. (26) A single medium of instruction for an entire program should also be avoided where possible. Different mixtures of media can be used to achieve particular objectives for a given job task.

Fire and safety training should not be implemented as a crash effort triggered by an accreditation inspection notice once every two years. Information presented in a one-time crash effort does not tend to be retained for long periods of time. Military trainers have plotted the level of proficiency in relation to frequency of training presentation in the form of "proficiency curve" (Figure 2-3). (88)

Examining the proficiency curve in Figure 2-3 it is suggested that the frequency of presenting training information is a factor that should be considered in training system design. In a 1967 doctoral study of effects of repeated communications, Marvin Light observed that repetition and continuity are valuable for awareness and attitudes. (89) However, too frequent repetition of training communications can lead to loss of attention, boredom, and disregard of the communication. (90)

By providing employees an indepth orientation to fire safety information followed by repetitive reinforcement communications higher levels of task proficiency can be maintained. Utilizing complementary mixed media training activities can help prevent the employee disregard for the training communication. This concept is presented in Figure 2-4.

Normally, the hospital fire-safety manager is singularly responsible for presenting all training and instruction to employees. (85, 86) In such cases all employees, especially

Figure 2-3

Proficiency Curve for Training Presentation

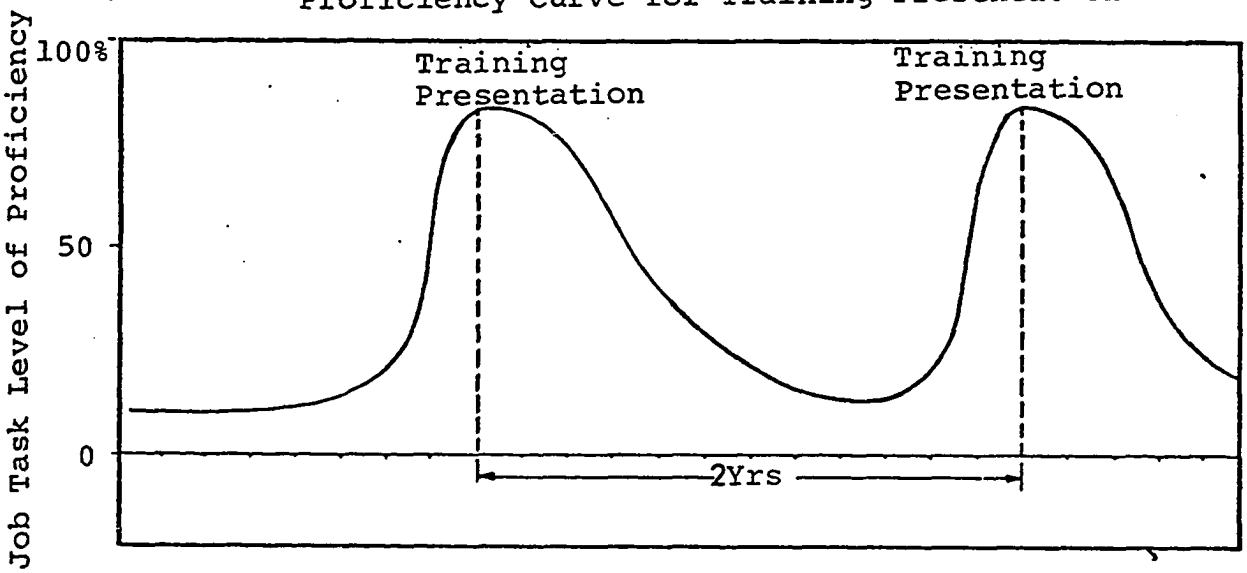
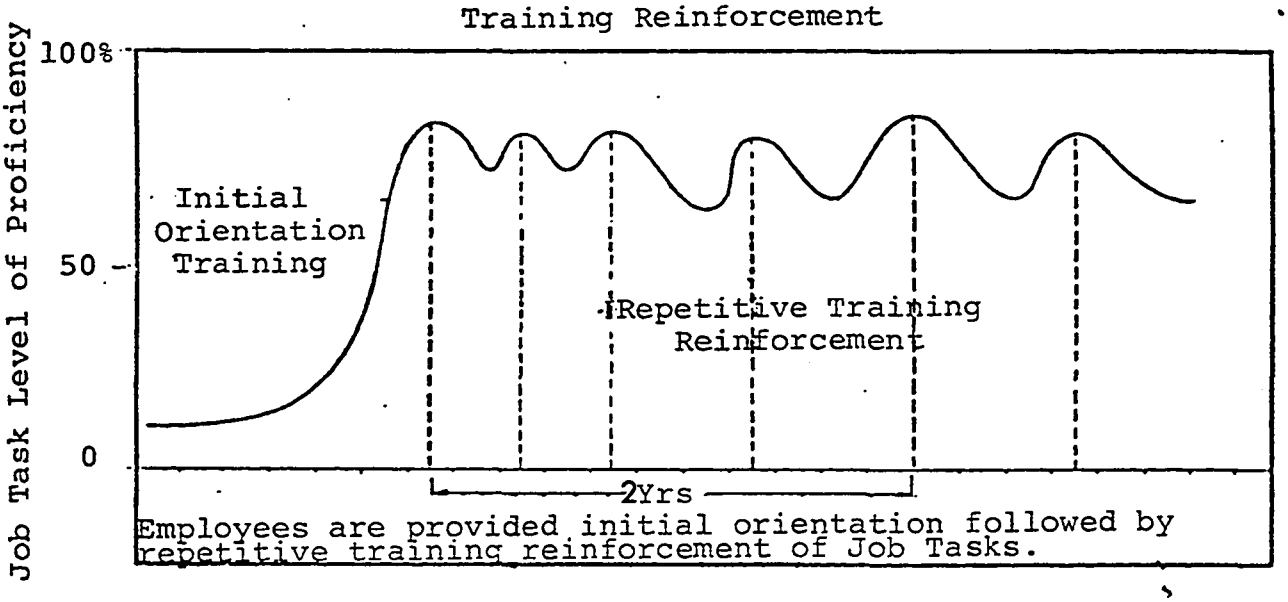


Figure 2-4

Maintaining Proficiency through Repetitive Training Reinforcement



those on the night shift, may not receive adequate training. (91)

In the average size hospital there are several excellent trainer resources that can be utilized in presenting fire safety information to employees. These resources include: the work area supervisor, the nursing education coordinator, the infection control nurse, medical maintenance technicians, and local fire department officials. Other resources can be used depending upon the size and scope of medical services provided.

Personnel responsible for training employees should be identified for each level of instructional objectives (see Appendix One). The fire safety manager should be responsible for coordinating all training efforts and providing training materials.

The final phase in the design of the instructional system design is the development of evaluation methods to determine if the system and subcomponents are fulfilling their objectives. (92) Evaluation is the process of observing performance and operations, analyzing what was observed and injecting the resulting information back into the system. (93)

Evaluation methods used in instructional systems normally consist of written tests and can become complex and time consuming. (94) In the hospital environment, evaluation methods should be easy to use and not require extensive employee time. (69) Evaluation methods which could

be used to determine if hospital fire safety training efforts are effective include: the increase or decrease in fire-safety incidents, observation of employee actions, and written tests.

JCAH requirements for conducting hospital fire drills include written evaluation by a trained observer. (1) A typical form used in evaluating hospital fire drills is shown in Figure 2-5. Observing how employees respond to different fire safety situations can be used as a means of evaluation. For example, to determine if employees are knowledgeable in the requirements for enforcing smoking policies an individual smoking a cigarette can enter a no smoking area. If employees fail to enforce the no smoking policy, training has not been effective. (Care must be taken to insure that this evaluation is performed in a safe area where flammable liquids or gases are not in use.)

A written test instrument can be developed to determine if specific skill and knwoledge objectives are being met. Such a test can be used in conjunction with fire drills by having several employees (selected at random) take the test. Results can be used to evaluate the overall training system.

Utilizing an instructional system design approach, a fire and safety training (FAST) model was developed. The model assumes that the specific job task skills and knowledges that have previously been identified will be used as a basis

Figure 2-5

Fire Drill Evaluation Report

Department Area_____ Date_____

Shift_____ Time_____

COMMUNICATIONS

_____Alarm sounded from fire area to switchboard? Time____
_____Alarm reported from switchboard to fire department? and entire building? Time_____
_____All clear sounded to all areas? Time_____
_____Was Fire Alarm heard? Areas?

ORDERS

_____Personnel responded and performed required duties, reported to respective station and remained there for orders?
_____Someone stationed at telephone for further orders?
_____Someone met the Fire Department?
_____Were elevators brought down to the main floor and held?

CONTAINMENT OF FIRE

_____All doors closed?
_____Extinguisher taken to scene of fire?

EVACUATION

_____All exits and passageways leading to exits kept clear?
_____Employees escorted to safe area?
_____Assisted in calming lobby visitors?

EQUIPMENT AND APPLIANCES

_____Electricity and gas turned off? (Not lights)
_____Oxygen equipment turned off in fire area only?
_____Power machines turned off?

REMARKS AND RECOMMENDATIONS

_____
_____
_____
_____

Signature_____

for the program.

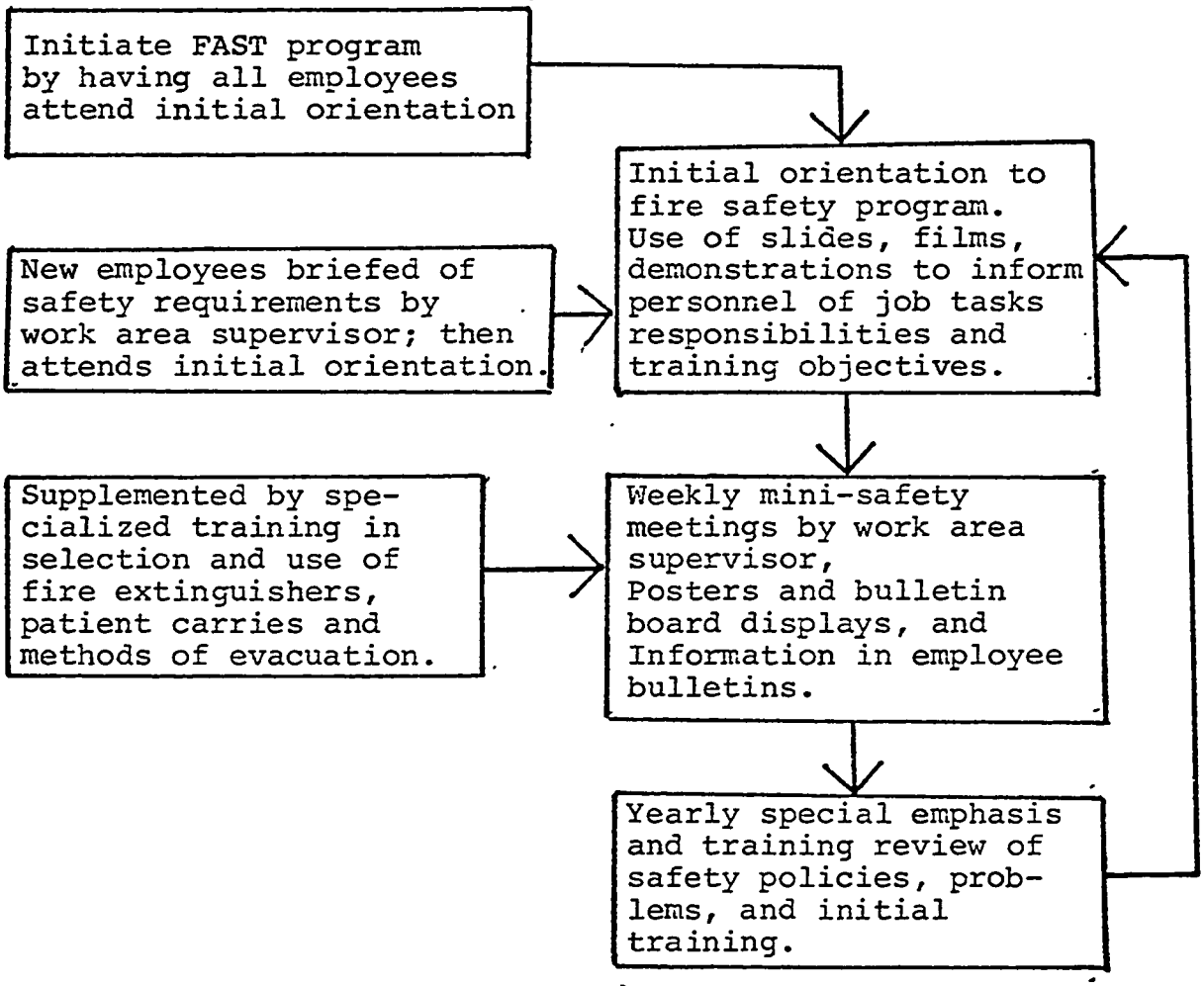
The model shown in Figure 2-6 is simplistic consisting of an initial orientation to inform personnel of required job tasks and responsibilities relating to fire safety. The initial orientation is followed by frequent (weekly) training messages communicated through a mix of media (meetings, posters, bulletins, case histories, role playing, etc.).

This training is supplemented by specialized training in the selection and use of fire extinguishers and patient carries for evacuation of patients. Each year a special emphasis program is provided where employees are again briefed on fire safety responsibilities.

To provide the hospital fire safety manager with a workable tool for implementing the FAST model a training manual has been prepared and is shown as Appendix D. Training aids and materials in the FAST manual were developed by the author while serving as safety officer for Reynolds Army Hospital, Fort Sill, Oklahoma from March 1976 to November 1977. A major objective of this study was to evaluate the effectiveness of the FAST model and training manual.

Figure 2-6

Fire and Safety Training (FAST)
Model for Hospital Employees



The fire safety manager coordinates training activities, provides training aids to supervisors, messages in employee bulletins, posters, etc., monitors fire drills and evaluates training needs to modify training objectives as indicated.

CHAPTER III

RESEARCH DESIGN

A review of the literature in Chapter I showed that present fire safety training programs for hospital employees have been less than satisfactory. Case histories were described in which the training level of health care workers was a major factor in the loss of life, injury, equipment, and buildings. (13, 16, 19, 20) It was also noted that other research in this field has shown that individuals responsible for hospital fire safety training are not normally prepared to develop adequate training programs for employees. (64) A 1972 survey by the National Institute for Occupational Safety and Health showed that as many as one-half of the nation's hospitals did not have a formal organized safety training program for permanent employees. (21, 22)

In Chapter II, general fire safety information of which hospital employees should be knowledgeable was presented. Utilizing methodologies from an instructional system design approach, specific skills, knowledges, and tasks related to hospital fire safety were identified. In addition, instructional and training media for presenting

fire safety information was discussed. A general model for establishing a hospital fire and safety training (FAST) program was developed. In addition, a training manual for hospitals was developed for use in training employees.

The purpose of this chapter is to describe research methods which were used to determine if present fire safety training programs are successful and if methods presented in the fire and safety training manual developed in Chapter II can be used to improve hospital fire safety training programs.

Describing research methods used in evaluating education, job training, health programs, and other social phenomenon, Carol Weiss states that "Research design for evaluating the outcomes of social programs while utilizing traditional research methods must be flexible enough to use in an 'action setting.'" (95) Because of the dynamic nature of the hospital setting, the research design utilized would need to allow for limited participation time for employees.

Experimental research designs used in education and training programs were reviewed by Campbell and Stanley in 1963. (96) These designs included the pre-test/post-test control group design, the Solomon four-group design, and the post-test-only control group. Each of these designs involves a group receiving a single treatment factor being compared with a group not receiving the treatment factor. The random assignment of group participants is critical in each design to control for extraneous variables that could

interfere with the treatment factor. A graphic description of these three experimental designs is shown in Figure 3-1.

Because of the fewer number of measurements required, the post-test-only control group design was selected for use. This design required less participation time for hospital employees.

Campbell and Stanley have identified threats to research design which could affect the validity of research findings. (96) Extraneous variables discussed by Campbell and Stanley that could threaten findings include: history of groups being tested, maturation within the groups, effects of testing and instrumentation, statistical regression, biases in selection, experimental mortality, multiple treatment interference, and interaction of testing.

Use of the post-test-only control group design provides maximum control of the above threats. Random selection of test participants in the test groups was necessary to assure lack of initial biases between test groups. In this study, all participants were selected within each test group on a random basis.

The next problem encountered was to develop a means of collecting data which could measure hospital employees' knowledge of fire safety subjects and provide information concerning their attitudes toward fire safety practices. Measurement instruments recommended by Weiss include: interviews, questionnaires, observations, and institutional records. (95)

Figure 3-1

Common Experimental Designs Used in
Education and Training Program

(R = Random assignment, O = Observation or measurement,
X = Experimental variable)

Pre-Test - Post-Test Control Group

R	O_1	X O_2	(test group)
R	O_3	O_4	(control group)

Solomon Four Group

R	O_1	X O_2	(test group)
R	O_3	O_4	(control group)
R		X O_5	(test group)
R		O_6	(control group)

Post-Test Only

R		X O_1	(test group)
R		O_2	(control group)

An error-choice approach first used by Hammond (1948) was selected for developing a test instrument. Utilizing error-choice test instruments would provide data concerning both knowledge and attitudes of employees. (97)

The error-choice instrument utilizes a survey questionnaire presenting both factual and non-factual questions. Response to non-factual items is used to determine the individual's attitude toward the subject. While response to factual items is used to access the individual's knowledge of fire safety subject.

The following are examples of error-choice statements: (Circle Correct Response)

(1) Which type of fire extinguisher can be used on electrical fires?

A. type I B. type II C. type A D. type C

(2) A recent survey of hospitals showed that ____% employees thought too much time was spent on fire safety training.

A. 8% B. 11%

Statement number one has a correct response: Answer D (type C) and could be used to measure actual knowledge concerning the use of fire extinguishers. Statement number two is a non-factual item. If an individual thought too much time was spent on fire safety training, the answer selection would be B (11%). Response to this item could be used to determine if the individual had a positive attitude toward current training programs. The final instrument consists of items which were pre-tested with known groups and

shown to differentiate between the groups.

In developing factual questions for use in the error-choice instrument a panel of experts from the National Fire Protection Association was used to determine the importance of selected fire safety information and related job tasks. The use of experts and group judgement in research design is recommended by Quade. When quantitative techniques are inapplicable or inadequate. (98)

The expert panel was selected from committee members of the health care facility section of the National Fire Protection Association 1977-1978. The panel consisted of twelve hospital fire safety officials, eleven physicians, ten industrial representatives, four government fire safety professionals, and two representatives from public fire departments. Responses from the panel were obtained by using the survey form shown in Table 3-1. A letter sent with the survey form is shown in Appendix E.

The survey form contained twenty-six (26) statements concerning nine general areas of fire safety information and related job tasks. The nine areas included safe use of flammable liquids, safe use of compressed gases, construction requirements, administrative requirements, response during a fire emergency, reporting of fires, selection and use of fire extinguishers, hazards of smoke, and carries for evacuating patients.

Each member was asked to indicate if the average hospital employee should be expected to be knowledgeable of

TABLE 3-1

SUMMARY OF FIRE SAFETY INFORMATION

Inventory for Hospital Employees
from Panel of Experts

(Number surveyed = 39)
(Number responses= 30)

indicate in this column by Yes or No if employee should be expected to know stated information

Statements concerning fire-safety

EXAMPLE: Water should not be used on an electrical fire.....Yes employee should know

	No. Responding Yes	Rank Order
1. The first person responding to a fire should remove anyone in immediate danger and sound the alarm.	29	2
2. When a fire occurs doors in the affected area should be closed.	30	1
3. Ordinary wood doors offer resistance to the spread of fire when they are closed.	24	6
4. Most gases produced in fires are toxic.	21	9
5. Class "A" fires involve ordinary combustible materials.	21	9
6. Class "B" fires involve flammable liquids.	21	9
7. Class "C" fires involve electrical fires.	21	9
8. If you had a fire in a patient's mattress and put it out the fire department should be called to make sure the fire has been extinguished.	27	4
9. Oxygen is a gas and a supporter of combustion.	28	3
10. Different materials will ignite at different temperatures.	20	10

11. Fuel, heat, and air are the three basic requirements for a fire.	27	4
12. Elevators should not be used during a fire.	27	4
13. Vapors and fumes from flammable liquids may fill a room and ignite from a spark.	27	4
14. Carbon monoxide is a deadly gas found in smoke.	26	5
15. Compressed gas cylinders should be secured in an upright position because of the destructive force released if they fall and break at the valve.	28	3
16. The majority of fires occurring in hospitals are attributed to the use of smoking materials.	24	6
17. Hospitals are required to have 12 fire drills each year by the JCAH.	13	14
18. Oxygen under high pressure if allowed to come in contact with oil or grease may cause a violent explosion.	22	8
19. When used for the storage of flammable liquids safety cans should not exceed a two gallon capacity in hospitals.	18	11
20. Flammable liquids should not be stored in ordinary refrigerators.	23	7
21. Concerning electrical safety the "patient vicinity" represents a space of 6 feet beyond the reach of the patient.	14	13
22. The travel distance between a patient's door and a fire exit should not exceed 100 feet.	8	15
23. Basic one person carries for evacuating patients include the back strap, hip and cradle drop.	17	12
24. Certain patients cannot be evacuated.	22	8
25. Most fires if not controlled will produce untenable smoke conditions in 2 to 7 minutes.	22	8

26. A fire in a patient's bedside light should be extinguished with a class "C" extinguisher.	22	8

Please indicate other information which you feel hospital employees should be aware of:_____

_____

_____

_____

the information presented or be able to perform related job tasks. Thirty (30) panel members returned the survey form for a participation rate of seventy-seven percent (77%). Statements were placed in rank order based on the responses of the panel. Results of this survey are shown in Table 3-1.

All experts responding considered that information and job tasks relating to employee actions during a fire emergency were of primary importance. The panel ranked the following areas of fire safety information in order of importance:

1. Response during a fire emergency.
2. Safe use of compressed gases.
3. Safe use of flammable liquids.
4. Reporting of fires to proper authorities.
5. Hazards of the toxic products of smoke.
6. Selection and use of fire extinguishers.
7. Carries for evacuating patients.
8. Administrative requirements for fire safety.
9. Construction requirements pertaining to fire safety.

Comments and recommendations from panel members included:

> It has been my observation that non-professional hospital employees in many cases are not exposed to any constructive training program dealing with the many materials which they are required to handle.
>
> I believe every person working in a hospital should have instructions about every item listed in your proposed questionnaire.
>
> I would want all employees to know all the above, but I would not expect you to find that true because of lack of training.
>
> . . . information of no value unless employee is trained in these methods by actual demonstrations.
>
> There is a great need for a constructive, yet simple, training program which hospitals could conduct themselves.

Based on the responses from the panel of experts, twenty-four (24) multiple choice, factual questions were written for use in the error-choice instrument. These statements covered the general areas of fire safety considered by the panel of experts to be of importance.

Even though employees might possess the knowledge and needed skills to recognize common fire and safety hazards, they may ignore the hazard and assume the risks involved due to negative attitudes. (99, 100) Training and educational programs may influence employee attitudes to insure appropriate behavioral responses to fire emergencies. (101)

From Lang's early description of "aufgab" (task-attitude) the concept and definition of attitude has been argued and debated in sociological literature. Two sociologists have even suggested that the concept of attitude should be abandoned. Doob (1947) argues that attitude "should be replaced because it has no systematic status as a scientific construct" and Blumer (1955) recommends "abandoning the concept of attitude because it is ambiguous." (102)

Attitude, as derived from the Latin aptitudo, means "fitted" or "fasten". Webster gives the following definition of attitude: "the mental posture or position in relation to some purpose or emotion." Numerous definitions of attitude can be found in literature:

> An attitude is an ideal charged with emotion which predisposes a class of actions to a particular class of social situation. (103)

> An attitude is the sum total of a man's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and convictions about any specified topic. (104)
>
> Attitudes are learned predispositions to respond to an object or class of objects in a favorable or unfavorable way. Beliefs are hypotheses concerning the nature of these objects and the types of actions that should be taken with respect to them. (105)

The subject of safety attitudes was discussed as early as 1930. In describing the factors giving rise to accidents, Dr. H. M. Vernon in 1930 referred to external factors and individual factors. Among the individual factors Vernon classified psychic and stressed the importance of the worker's "psychic" in accident situations. Vernon's reference to the worker's psychic is one of the first attempts to relate safety behavior to psychological phenomenon.

In more recent times, negative safety attitudes have been associated with occupational accidents and injuries. Safety literature is filled with references referring to employee attitudes: "Safety program elements should include safety policy and attitude. . . ." (106); "More attention to 'man' and what motivates him toward or away from functioning safety" (107); "It is essential to understand and work with human factors" (108). Even though a great deal of attention has been focused on safety attitudes, few attempts have been made to systematically define and measure this particular realm of man's environment.

As a method for measuring attitudes, the error-choice instrument has an advantage in that it is disguised. (95)

The test subject not knowing that attitude is being measured is more likely to respond in a truthful manner. (109) Twenty-four (24) statements were written for assessing employee attitudes toward training (length of training, who shall be trained, etc.), attitudes toward effectiveness of training level in hospitals, and attitudes toward fire prevention activities.

To determine if the original multiple choice questions would differentiate between groups of individuals with known effective training and those with little or no training, an item analysis was conducted. A group of fifteen fire and safety officials (safety officers, building fire marshalls, etc.) from Fort Sill, Oklahoma, known to have extensive fire safety training and positive attitudes toward fire prevention, was selected as the known positive group (KPG). A group of fifteen freshman student nurses attending Cameron University, Lawton, Oklahoma, that had not received previous fire safety training was selected as the known negative group (KNG).

The test instrument was administered to both the KPG and the KNG. One point was awarded for a correct response to factual questions and one point was awarded for positive responses to attitude statements.

The T statistic test for independent sample means was used to determine if individual test items distinguished between the KPG and the KNG at the .05 significance level. The formula used for computation of T scores is shown in Figure 3-2.

Figure 3-2

Computation of T Scores

$$T = \frac{\bar{X} - \bar{Y} - D}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \sqrt{\frac{X_i^2 - n_1 X^2 + Y_i - n_2 Y^2}{n_1 + n_2 - 2}}}$$

where:

$\bar{X}$ = mean score for KPG

$\bar{Y}$ = mean score for KNG

D = zero

The null hypothesis tested for each statement was: "that there is no significant difference between the test responses of the KPG and the KNG" (Ho: $\bar{X}$ KPG - $\bar{Y}$ KNG = 0). Results of the item analysis are shown in Appendix F.

Thirty-three (33) statements were found to differentiate between the known positive group and the known negative group. Fifteen (15) were factual questions for measuring knowledge content while sixteen (16) were error-choice statements for measuring fire safety attitudes.

Three other questions were included in the final instrument to provide information concerning the National Fire Protection Association, how employees rated their own training program and how different groups of employees view the cause of hospital fires. In addition, an introductory page was added to inform the employee of the nature of the test and to obtain personnel history data. The introductory

page also asked each employee to give the code word used for alerting others to a fire and for the telephone number used for contacting the local fire department. The final test instrument is shown in Figure 3-3.

The next phase of the research design was to select health care facilities in which the test instrument could be utilized for comparing groups exposed to different types of training programs. Two local hospitals in the community of Lawton, Oklahoma, were chosen due to their proximity and ease of access.

Freshman nursing students attending Cameron University, Lawton, Oklahoma, who had not been exposed to formal fire safety training programs were used as a control group.

A county general hospital in Lawton, Oklahoma, and Reynolds Army Hospital, Fort Sill, Oklahoma, were selected for the study. It was possible that differences due to military and civilian factors could interfere with test findings. Because both facilities are fully accredited by the JCAH, differences were assumed to have minimal interference with findings.

The county general hospital, built in 1951, is a 150-200 bed facility providing care to Comanche County residents. The facility is a four story, concrete and brick structure constructed in accordance with national and safe fire code requirements. The facility is fully accredited by the JCAH.

Figure 3-3

Final Test Instrument

FIRE SAFETY TRAINING INVENTORY

This exercise is part of a University of Oklahoma graduate study of fire safety training for hospital employees. Your participation is appreciated. Complete the following background information and continue to the multiple choice questions on the next page.

Male Female

Occupation (check one):

Nurse	Administrator
LPN	Housekeeping
Aid	Engineering
Physician	Other:_____

Years experience in health care field:

none	6 to 8 yrs	18 to 20 yrs
student	9 to 11 yrs	21 to 23 yrs
less than 3 yrs	12 to 14 yrs	24 to 26 yrs
3 to 5 yrs	15 to 17 yrs	27 yrs +

How would you rate present fire prevention activities in this hospital?

excellent above average average

needs some improvement needs much improvement

How would you rate the construction of this facility?

fire proof fire resistant burnable

What is the code word for reporting a fire in this hospital?

_____

What is the phone number for reporting fires to the fire department? _____

This questionnaire consists of 36 multiple choice questions concerning fire safety information. Select the answer (A, B, C, or D) which you feel is best and place an X on that letter.

1. How many fire drills are hospitals required to have yearly?
   (A) 6
   (B) 3
   (C) 4
   (D) 12

2. The first person responding to a fire should:
   (A) attempt to extinguish the fire immediately
   (B) remove patients in danger and sound the alarm
   (C) remove patients in immediate danger and extinguish the fire
   (D) begin immediate evacuation of all patients on the floor

3. A recent survey of local hospitals showed how many employees could use fire extinguishers in a correct manner?
   (A) less than 50%
   (B) more than 50%

4. Wooden doors:
   (A) offer resistance to the spread of fire when closed
   (B) are required to be vented for air movement in patient rooms
   (C) offer little resistance to the spread of fire
   (D) should be kept open during an actual fire to allow rapid removal of patients

5. What percent of new hospitals (built since 1976) can be considered to be fire proof?
   (A) 1-3% when built according to fire safety construction standards
   (B) None

6. Flammable liquids in hospitals:
   (A) should not be stored in ordinary refrigerators
   (B) should be stored in safety cans
   (C) should not be used unless a vent hood is available
   (D) should be stored in fire proof plastic bottles

7. When the comfort of the patient is in question, fire safety requirements:
   (A) may be modified for the patient's comfort
   (B) should be followed regardless of patient's comfort

8. Class "A" fires involve:
   (A) electrical equipment
   (B) paper and wood
   (C) flammable liquids
   (D) compressed gases

9. Which shift of employees will normally be better trained in fire safety?
   (A) night shift
   (B) day shift

10. If a hospital employee observes smoke, but finds no fire, it is best to:
   (A) call the fire department without delay
   (B) make a thorough search for the fire or flame then call

11. If you had a fire in a patient's mattress and put it out, you should:
   (A) include a written report of the incident in the nursing report
   (B) call the fire department to make sure the fire has been extinguished
   (C) make sure to not alarm other patients
   (D) not call the fire department since the fire is out and patients may be unduly alarmed

12. Flammable liquids are dangerous and a fire hazard because:
   (A) they may be spilled and catch fire
   (B) their low pH will cause them to burn rapidly
   (C) some are caustic and may cause skin burns
   (D) vapors may fill a room and ignite from a spark

13. The cause of most hospital fires is:
   (A) employee negligence
   (B) equipment failure

14. Smoking policies for patients should:
   (A) prohibit all patients from smoking unless a visitor or attendant is present
   (B) prohibit only those patients on certain medication to refrain from smoking without supervision

15. Oxygen is a:
    (A) common flammable gas
    (B) highly flammable gas
    (C) supporter of combustion
    (D) halogen compressed gas

16. The majority of hospital administrators feel that:
    (A) all employees should be required to attend four hours of fire safety training each year
    (B) all employees should be required to attend two hours of fire safety training each year

17. It has been found in several studies that:
    (A) professional personnel need less fire safety training due to their educational backgrounds
    (B) professional personnel should receive the same training as other hospital workers

18. Present fire safety training programs for hospital employees have been:
    (A) shown to be effective in fire prevention
    (B) designed to meet accreditation standards

19. How many hours of formal fire safety training is recommended for new hospital employees:
    (A) four hours
    (B) eight hours

20. A fire in a patient's bedside light should be extinguished with a:
    (A) class "A" extinguisher
    (B) class "B" extinguisher
    (C) class "C" extinguisher
    (D) class "E" extinguisher

21. A recent survey showed that most hospital supervisors inspected work areas for fire hazards:
    (A) monthly
    (B) quarterly

22. Compressed gas cylinders should be secured in an upright position because:
    (A) gas inside the cylinder is toxic
    (B) of the destructive force released if they fall and break at the valve
    (C) leaks are easier to detect in an upright position
    (D) the partial pressure of the gas may increase if not in a vertical position

23. A survey of local hospitals showed how many followed strict enforcement of smoking policies:
    (A) 25%
    (B) 45%

24. Basic one-person carries for evacuating patients include:
    (A) pack strap, Nightengale carry, cross-over
    (B) pack strap, hip and cradle drop
    (C) fireman's carry, cross over
    (D) all of the above

25. Most fires if not controlled will produce untenable smoke conditions in:
    (A) 10-15 minutes
    (B) less than 7 minutes
    (C) the primary stage
    (D) the intermediate stage

26. Current recommendations concerning the reporting of minor fires in hospitals are:
    (A) all fires should be reported to local authorities no matter how small
    (B) only major fires need to be reported to local authorities

27. Which of the following is not a flammable gas or liquid:
    (A) ether
    (B) oxygen
    (C) acetone
    (D) alcohol

28. Flammable liquid fires are best extinguished by:
    (A) carbon dioxide (CO_2) or dry chemicals
    (B) carbon tetrachloride
    (C) water under pressure
    (D) class "A" extinguisher

29. Which carry would be best for taking a patient down stairs:
    (A) hip carry
    (B) extremity carry
    (C) three-person carry
    (D) swing carry

30. In case of power failure, auxiliary power is:
    (A) required to meet all hospital needs
    (B) supply power for air conditioning and elevators
    (C) required for elevators only
    (D) required for operating rooms, ICU, emergency lights and other basic life safety

31. Fire safety inspections should be:
    (A) performed by professional fire safety personnel
    (B) performed by work area supervisors

32. A national organization dedicated to fire prevention activities and fire safety education is:
    (A) American Fire Safety Organization
    (B) National Fire Prevention Organization
    (C) American Association for Fire Prevention
    (D) National Fire Protection Association

33. The number of hospital fires occurring in the U.S. each year is estimated to be:
    (A) 4,000
    (B) 3,500

34. Required fire drills for hospital employees have been shown:
    (A) to have little effect of employee response during an actual fire
    (B) to be very effective in preparing employees for an actual fire

35. How often should fire extinguishers be inspected?
    (A) each month
    (B) bi-monthly
    (C) yearly
    (D) quarterly

36. Which group of people is responsible for the majority of hospital fires:
    (A) engineering
    (B) housekeeping
    (C) nursing
    (D) administrative

Fire safety training presently provided at this facility consists of a two-hour orientation for new employees and quarterly fire drills for each shift. No follow-up training activities are planned or provided on a systematic basis. Work area supervisors are not responsible for routine employee training in fire safety subjects. A fire team consisting of maintenance and housekeeping personnel had received extra training in the use of fire extinguishers. The training program has been evaluated by the JCAH and found to be satisfactory.

Observation of fire drills and administration of the test instrument was coordinated with the hospital fire safety manager. The fire safety manager also serves as hospital executive housekeeper and laundry service manager.

Reynolds Army Hospital is a 150-200 bed facility serving an estimated military population of 400,000 to 50,000 throughout Southwestern Oklahoma. Completed in 1965, the facility is a four story concrete and brick structure built in accordance with national and state fire protection codes. The facility is fully accredited by the JCAH.

The FAST training model has been in use at Reynolds Hospital since 1977. The FAST model was developed by the author while serving as hospital safety manager from 1976 to 1978. In 1977, Reynolds Hospital received an award of recognition in the Learn Not to Burn competition sponsored by the National Fire Protection Association.

Another factor considered in the selection was the use of personnel assigned to hospital units of the 47th Field Hospital. The 47th Field Hospital consists of three 100-bed portable hospital units located at Fort Sill. The 47th Field Hospital is capable of establishing a 100 or 300 bed hospital facility in remote areas within 48 hours of notification. In 1976, this organization provided a 100-bed hospital unit for disaster relief operation in Guatemala after a devastating earthquake.

Personnel assigned to hospital units within the 47th included nurses, nursing aids, LPNs, laboratory and X-ray technicians, operating room personnel, and administrative personnel. One unit consisting of 70 to 90 individuals is assigned to Reynolds Hospital every ninety days to maintain critical technical skills. During this ninety-day period, personnel are exposed to the FAST training model. This made it possible to evaluate the FAST model by comparing a hospital unit with FAST exposure to a hospital unit with no exposure to the FAST model.

To determine if present fire safety training programs were adequate, the test instrument was utilized to compare the following groups:

1. Employees of the county hospital (group X) compared to student nurses without previous fire safety training (group Y).

2. Employees at Reynolds Army Hospital, exposed to the FAST model (group X) compared to student nurses without previous fire safety training (group Y).

If present training programs are adequate, mean test scores for group X in each case should be significantly higher than mean test scores for group Y. The T statistic (Figure 3-2) was used at the 0.05 significance level to determine if there is a significant difference between mean test scores.

The null hypothesis to be tested in each case was "that there is no significant difference between group X and group Y" (Ho: $\bar{X} - \bar{Y} = 0$). Finding and conclusions are presented in Chapter IV.

To determine if the fire and safety training model described in Chapter II can be utilized to improve training programs, the test instrument was to compare the following groups:

1. Employees at Reynolds Army Hospital exposed to the FAST model (group X) compared to employees at the county hospital not exposed to the FAST model (group Y).

2. Field hospital unit exposed to the FAST model (group X) compared to field hospital unit not exposed to FAST model (group Y).

If the FAST model can be used to improve hospital fire safety training programs, the mean test scores for group X in each case should have been significantly higher than mean test scores for group Y. The T statistic (Figure 3-2) was used at the 0.05 significance level to determine if there is a difference between mean test scores. The null hypothesis to be tested in each case was "that the FAST training model has made no significant difference between

test scores for group X and group Y" (Ho: $\bar{X} - \bar{Y} = 0$).

Findings and conclusions are presented in Chapter IV.

CHAPTER IV

FINDINGS AND CONCLUSIONS

During this study, two hundred thirty-four (234) individuals were administered the error-choice test instrument described in Chapter III, Figure 3-3. Data obtained were used to determine if present training programs were effective and if the FAST system could be used to improve training programs.

Sixty-five (65) freshman nursing students attending Cameron University, Lawton, Oklahoma, were randomly selected from class rosters and administered the test instrument. Before taking the test, students were asked if they had been previously employed in the health care field. Twenty (20) of the students in the test group had worked in a health care facility (hospital or nursing home) and had been exposed to some type of formal fire safety training.

It was decided to compare test scores of the group with previous experience to test scores of students with no experience. If the fire safety training received during previous employment was successful, higher test scores will be observed in this group. In comparing these two groups,

the following hypothesis was tested:

Ho: Previous experience and training will not result in a significant difference between the mean test scores (Ho: $\bar{X} - \bar{Y} = 0$).

Hl: Previous experience and training will result in a significant difference between the mean test scores (Hl: $\bar{X} - \bar{Y} \neq 0$).

The test scores for both groups are shown in Table 4-1. The T test ratio was computed to compare the mean test scores. The mean test score for students with previous experience in the health care field was 22.200 while the mean test score for students with no experience was 22.778. The critical T value with 63 degrees of freedom (d.f.) at a 0.05 significance level was 1.671. The test T ratio of the means was found to be -0.564. The data indicated that previous experience and training did not make a significant difference in student knowledge about fire safety or in student attitude toward fire prevention practices.

Of the sixty-five student nurses tested, 12% considered nursing personnel responsible for the majority of hospital fires. Seventeen percent correctly identified the National Fire Protection Association. Eighty-five percent of those with previous experience felt that fire safety training was designed to meet accreditation standards, while only 20% of those with no experience expressed this sentiment. Seventy percent with previous experience agreed that fire safety requirements could be modified for the patient's comfort, while only 47% of those with no experience expressed

TABLE 4-1

TEST SCORES OF STUDENT NURSES WITH EXPERIENCE COMPARED TO STUDENT NURSES WITHOUT EXPERIENCE

Student Nurses With Experience (Group X)		Student Nurses Without Experience (Group Y)			
Respondent	Score	Respondent	Score		
1	27	1	31	27	22
2	26	2	30	28	22
3	26	3	29	29	21
4	25	4	29	30	21
5	25	5	28	31	21
6	25	6	28	32	20
7	24	7	27	33	20
8	24	8	27	34	20
9	24	9	27	35	20
10	23	10	26	36	19
11	22	11	26	37	19
12	22	12	26	38	18
13	21	13	26	39	18
14	20	14	25	40	18
15	20	15	25	41	17
16	19	16	25	42	17
17	19	17	24	43	16
18	18	18	24	44	16
19	17	19	24	45	15
20	17	20	23		
		21	23		
		22	23		
		23	23		
		24	22		
		25	22		
		26	22		

$\bar{X}$ = 22.200

$\bar{Y}$ = 22.778

Critical T Value 63 d.f., 0.05 = 1.670

Test T Ratio of Means = -0.564

this attitude.

These results show that previous fire safety training to which students may have been exposed did not result in a greater knowledge of fire safety subjects. Responses to some of the test items indicated that previous training may have had a negative impact on attitudes toward fire prevention activities. The twenty student nurses with previous experience were not used for further comparisons, for this reason.

As described in Chapter III, employees at the county general hospital are exposed to a typical fire safety training program consisting of an initial orientation for new employees. The only training reinforcement employees receive after the initial orientation is during scheduled fire drills.

Observations made during a routine fire drill showed that training activities need to be imrpoved. During the fire drill, ward personnel failed to simulate pulling the fire alarm and carrying a fire extinguisher to the fire location.

Thirty-six employees were randomly selected from personnel rosters and administered the test instrument. Of the thirty-six employees tested, six were male and thirty were female. The group consisted of three nurses, five licensed practical nurses, and five nursing aides. Of these thirteen employees associated with nursing care, only two considered nursing personnel a major contributor to

hospital fires. Other employees tested included five administrators, two housekeepers, five engineering personnel, and eleven others from food service, laundry, laboratory service, etc. Of these employees, thirty percent considered nursing personnel a major contributor to hospital fires. The majority of employees tested had six to eight years experience in the health care field.

Five percent rated present fire prevention activities as excellent. Seventeen percent rated fire prevention activities above average and fifty-eight percent as average. Eleven percent felt that some improvements were needed in the present program.

The code word used for communicating a fire emergency was "Condition Red". Only sixty-seven percent of those tested were able to recall the correct code word. Other responses for the code word ranged from Dr. Red to Code Blue.

There was some confusion among employees concerning procedures for telephonic reporting of fires to the local fire department. The actual method used was to dial the hospital switchboard operator at "O" to report the location of the fire. The switchboard operator then dials 911 to report the fire to the fire department. Only six employees could recall this procedure.

It was noted that a backup notification system was in use. Fire alarms in the hospital are directly linked to monitors at a nearby fire station. When a fire alarm sounds,

the fire station responds immediately.

To evaluate the fire safety training program, test scores of employees were compared to test scores of the student nursing group. The hypothesis tested was:

Ho: Formal training will not result in a significant difference between the mean test scores (Ho: $\bar{X} - \bar{Y} = 0$).

Hl: Formal training will result in a significant difference between the mean test scores (Hl: $\bar{X} - \bar{Y} \neq 0$).

Test scores for both groups are shown in Table 4-2. Mean test scores were compared utilizing the student T test ratio. The mean test score for employees at the county general hospital was 23.111, while the mean test score for nursing students with no exposure to fire safety training was 22.778. The critical T value with 79 degrees of freedom at a 0.05 significance level was 1.667. The test T ratio of the means was found to be 0.422. The data indicated that training received by county hospital employees did not make a significant difference in test scores concerning fire safety subjects.

Of the thirty-six employees tested, twenty-two percent identified the NFPA. Forty-seven percent indicated that present training was designed to meet accreditation standards. Fifty-three percent felt that fire safety requirements could be modified to allow for the patients' comfort. Sixty-seven percent felt that present fire drills were effective in preparing employees for an actual fire.

TABLE 4-2

TEST SCORES OF EMPLOYEES WITH TRAINING AT COUNTY HOSPITAL COMPARED TO STUDENT NURSES WITHOUT TRAINING

Employees With Training (Group X)				Student Nurses Without Training (Group Y)			
Respondent	Score			Respondent	Score		
1	30	27	21	1	31	27	22
2	28	28	21	2	30	28	22
3	28	29	21	3	29	29	21
4	27	30	21	4	29	30	21
5	27	31	20	5	28	31	21
6	26	32	20	6	28	31	21
7	25	33	20	7	27	33	20
8	25	34	19	8	27	34	20
9	25	35	19	9	27	35	20
10	25	36	19	10	26	36	19
11	24			11	26	37	19
12	24			12	26	38	18
13	24			13	26	39	18
14	24			14	25	40	18
15	24			15	25	41	17
16	23			16	25	42	17
17	23			17	24	43	16
18	23			18	24	44	16
19	22			19	24	45	15
20	22			20	23		
21	22			21	23		
22	22			22	23		
23	22			23	23		
24	22			24	22		
25	22			25	22		
26	22			26	22		

$\bar{X}$ = 23.111 $\bar{Y}$ = 22.778

Critical T Value 79 d.f., 0.05 = 1.667

Test T Ratio of Means = 0.422

To evaluate the FAST system, forty-two employees were randomly selected from personnel rosters at Reynolds Army Hospital. Employees selected consisted of twenty-six military and sixteen civilian employees. Personnel at Reynolds have been exposed to the FAST system since 1977. Training aids and materials similar to those provided in the FAST manual have been used on a routine basis.

Twenty-nine percent of those tested at Reynolds were male while seventy-one percent were female. Twenty-six of the employees worked in nursing care positions. Of these personnel, only five indicated that nursing personnel were responsible for the majority of hospital fires. Other employees in the test group ranged from administrators, x-ray, and laboratory technicians to medical maintenance personnel.

Ten percent rated present fire prevention activities as excellent, thirty-three percent as above average, and fifty-five percent as average. Only one employee felt that some improvements were needed. The code word used for alerting other staff members to a fire emergency was "Code RED". Ninety percent of the employees tested correctly stated the code word.

The method utilized for reporting fires to the fire department was to dial 117. Eighty-eight percent gave the correct number while only 12% failed to do so. One factor which may contribute to such a high percentage of employees knowing the correct telephone procedure is the use of placards posted at each phone. A similar placard shown in Figure 4-1

is included in the FAST manual.

To determine if employees were more knowledgeable of fire safety information than the control group of student nurses, test scores were compared utilizing the following hypothesis:

Ho: Exposure to the FAST system will not result in a significant difference between the mean test scores (Ho: $\bar{X} - \bar{Y} = 0$).

Hl: Exposure to the FAST system will result in a significant difference between the mean test scores (Hl: $\bar{X} - \bar{Y} \neq 0$).

The test scores for both groups are given in Table 4-3. Mean test scores for both groups were compared utilizing the student T test ratio. The mean test score for employees at Reynolds was 27.595 while the mean test score for the student nurses was 22.778. The critical T value with 85 degrees of freedom at a 0.05 significance level was 1.665. The test T ratio of the means was found to be 6.717. These results indicated that employees at Reynolds Hospital, exposed to the FAST system, scored significantly higher on the test instrument than the student nurses with no previous formal training.

Thirty-six percent of the Reynolds employees correctly identified the NFPA. Forty-three percent felt that fire safety training was designed to meet accreditation standards. Only twenty-six percent stated that fire safety requirements could be modified to allow for the patients' comfort. Seventy-nine percent felt that fire drills were effective in preparing employees for an actual fire.

Figure 4-1

TO REPORT A FIRE

CALL:_____

'FIRE ON FL':_____

'AREA':_____

TABLE 4-3

TEST SCORES OF EMPLOYEES AT REYNOLDS ARMY HOSPITAL WITH FAST TRAINING COMPARED TO STUDENT NURSES WITHOUT TRAINING

Reynolds Employees with FAST Training (Group X)				Student Nurses Without Training (Group Y)			
Respondent	Score			Respondent	Score		
1	32	27	27	1	31	27	22
2	31	28	27	2	30	28	22
3	31	29	27	3	29	29	21
4	31	30	26	4	29	30	21
5	30	31	26	5	28	31	21
6	30	32	26	6	28	32	20
7	30	33	26	7	27	33	20
8	30	34	26	8	27	34	20
9	29	35	26	9	27	35	20
10	29	36	25	10	26	36	19
11	29	37	25	11	26	37	19
12	29	38	24	12	26	38	18
13	29	39	24	13	26	39	18
14	29	40	23	14	25	40	18
15	29	41	23	15	25	41	17
16	29	42	22	16	25	42	17
17	28			17	24	43	16
18	28			18	24	44	16
19	28			19	24	45	15
20	28			20	23		
21	28			21	23		
22	28			22	23		
23	28			23	23		
24	28			24	22		
25	28			25	22		
26	27			26	22		

$\overline{X}$ = 27.595 $\overline{Y}$ = 22.778

Critical T Value 85 d.f., 0.05 = 1.665

Test T Ratio of Means = 6.717

To determine if the FAST system was significantly better than other types of formal fire safety training activities test scores of Reynold employees were compared to the test scores of employees at the county general hospital. The hypothesis tested was:

Ho: Exposure to the FAST system will not result in a significant difference between the mean test scores (Ho: $\bar{X} - \bar{Y} = 0$).

H1: Exposure to the FAST system will result in a significant difference between the mean test scores (H1: $\bar{X} - \bar{Y} \neq 0$).

Mean test scores for both groups were compared utilizing the student T ratio. Test scores compared in Table 4-4 show a mean test score for Reynold employees of 27.595. The mean test score for the county general hospital employees was 23.111. The critical T value with 76 degrees of freedom at a 0.05 significance level was 1.667. The test T ratio of the means was found to be 7.826. Employees exposed to the FAST system did have significantly higher test scores indicating they had more knowledge concerning fire safety than employees exposed to a typical fire safety training program.

Test data from this comparison could have been influenced by inherent differences due to a military organization and environment versus a civilian organization and environment. Even though both hospitals are fully accreditated by the JCAH, factors other than exposure to the FAST system could exist which might have caused the differences in observed test scores. To control possible influences which might exist,

TABLE 4-4

TEST SCORES OF REYNOLDS EMPLOYEES EXPOSED TO THE FAST SYSTEM COMPARED TO EMPLOYEES AT COMANCHE COUNTY MEMORIAL NOT EXPOSED TO THE FAST SYSTEM

Reynolds Employees Exposed to FAST (Group X)		Memorial Employees Not Exposed to FAST (Group Y)	
Respondent	Score	Respondent	Score
1	32	1	30
2	31	2	28
3	31	3	28
4	31	4	27
5	30	5	27
6	30	6	26
7	30	7	25
8	30	8	25
9	29	9	25
10	29	10	25
11	29	11	24
12	29	12	24
13	29	13	24
14	29	14	24
15	29	15	24
16	29	16	23
17	28	17	23
18	28	18	23
19	28	19	22
20	28	20	22
21	28	21	22
22	28	22	22
23	28	23	22
24	28	24	22
25	28	25	22
26	27	26	22
27	27	27	21
28	27	28	21
29	27	29	21
30	26	30	21
31	26	31	20
32	26	32	20
33	26	33	20
34	26	34	19
35	26	35	19
36	25	36	19
37	25		
38	24	$\bar{X}$ = 27.595	$\bar{Y}$ = 23.111
39	24		
40	23	Critical T Value 76, d.f., 0.05 = 1.667	
41	23		
42	22	Test T Ratio of Means = 7.826	

two similar groups of hospital workers were selected to further evaluate the FAST model.

Health care workers assigned to Hospital Units (HUs) of the 47th Field Hospital, Fort Sill, Oklahoma, were selected to further evaluate the FAST Model. Each HU consists of 70-100 military personnel composed of nurses, medical corpsmen (LPNs), medical aids (nursing aids), x-ray technicians, laboratory technicians, operating room specialists, and administrative personnel.

Each ninety-day period, one HU is assigned to Reynolds Hospital to provide hands-on medical training and to augment manpower. During this ninety-day period, personnel are exposed to the FAST system. An initial safety orientation is provided followed by weekly work area safety meetings described in the FAST manual. HUs not assigned to Reynolds are engaged in military related training to prepare for possible deployment and operation of a 100-bed hospital in a field environment.

The test instrument was administered to 53 personnel assigned to the 1st HU after exposure to the FAST system for an 80-day period. The test instrument was also administered to 38 personnel of the 2nd HU who had not previously been exposed to the FAST program.

Personnel from the first HU consisted of one nurse, ten LPNs, 15 nursing aids, 8 administrators, and 19 representing other categories. Thirteen percent rated the FAST

program as excellent, twenty-six percent rated the program above average, fifty-one percent rated the program as average, and nine percent felt that some improvement was needed. Seventy-seven percent were able to correctly state the code word for alerting other staff members to a fire emergency. Eighty-seven percent of those tested correctly stated the telephonic reporting procedure for contacting the fire department.

Personnel assigned to the second HU consisted of six LPNs, eleven aids, five administrators, and sixteen representing other categories. Eighty-seven percent of the personnel assigned to the second HU were not aware that a code word was used to alert others to a fire emergency. Fifty-eight percent were able to state the correct telephone number for contacting the fire department. The relatively high number of personnel in the second HU able to state the correct telephone number for contacting the fire department is probably due to the fact that 117 is used Army wide as a fire reporting number.

The following hypothesis was tested to evaluate the FAST system:

Ho: Exposure to the FAST system will not result in a significant difference between the mean test scores (Ho: $\bar{X} - \bar{Y} = 0$).

H1: Exposure to the FAST system will result in a significant difference between the mean test scores (H1: $\bar{X} - \bar{Y} \neq 0$).

Test scores for both groups were compared, utilizing

the student T ratio. Test scores compared in Table 4-5 showed a mean test score for the first HU of 24.132. The mean test scores for personnel assigned to the second HU was 20.816. The critical T value with 89 degrees of freedom at a 0.05 significance level was 1.661. The test T ratio of the means was found to be 4.697. The test data indicated personnel assigned to the first HU and exposed to the FAST system significantly scored higher than the second HU without FAST exposure.

A summary of mean test scores for each test group is shown in Figure 4-2. Personnel exposed to the FAST system tended to score higher than personnel not exposed to the system. The data indicate that typical fire safety training programs being provided to hospital employees are not effective.

Figure 4-3 shows responses on selected test items. The number of employees able to identify the National Fire Protection Association ranged from less than one percent to forty-seven percent. The NFPA is not widely known among hospital workers. Use of the FAST system did not seem to be a factor in knowledge of the NFPA.

Student nurses did not feel that fire safety training programs were solely designed to meet established accreditation standards. Personnel with experience and without exposure to the FAST system tended to feel that training was designed to meet accreditation standards rather than prepare

TABLE 4-5

TEST SCORES OF FIRST HOSPITAL UNIT EXPOSED TO FAST SYSTEM COMPARED TO SECOND HOSPITAL UNIT NOT EXPOSED TO FAST SYSTEM

First H.U. Exposed to FAST (Group X)				Second H.U. Not Exposed to FAST (Group Y)	
Respondent	Score			Respondent	Score
1	31	36	23	1	29
2	29	37	23	2	29
3	29	38	22	3	28
4	29	39	22	4	27
5	28	40	22	5	27
6	28	41	22	6	25
7	28	42	22	7	24
8	28	43	22	8	23
9	28	44	21	9	23
10	27	45	21	10	23
11	27	46	21	11	22
12	26	47	20	12	22
13	26	48	20	13	21
14	26	49	19	14	21
15	26	50	19	15	21
16	26	51	18	16	21
17	26	52	18	17	21
18	25	53	17	18	20
19	25			19	20
20	25			20	20
21	25			21	20
22	25			22	19
23	25			23	19
24	25			24	19
25	25			25	19
26	25			26	19
27	24			27	19
28	24			28	18
29	24			29	18
30	24			30	18
31	24			31	18
32	23			32	18
33	23			33	18
34	23			34	17
35	23			35	17
				36	16
				37	16
				38	16

$\bar{X}$ = 24.132 $\bar{Y}$ = 20.816

Critical T Value 89 d.f., 0.05 = 1.661

Test T Ratio of Means = 4.697

Figure 4-2

Summary of Mean Test Scores

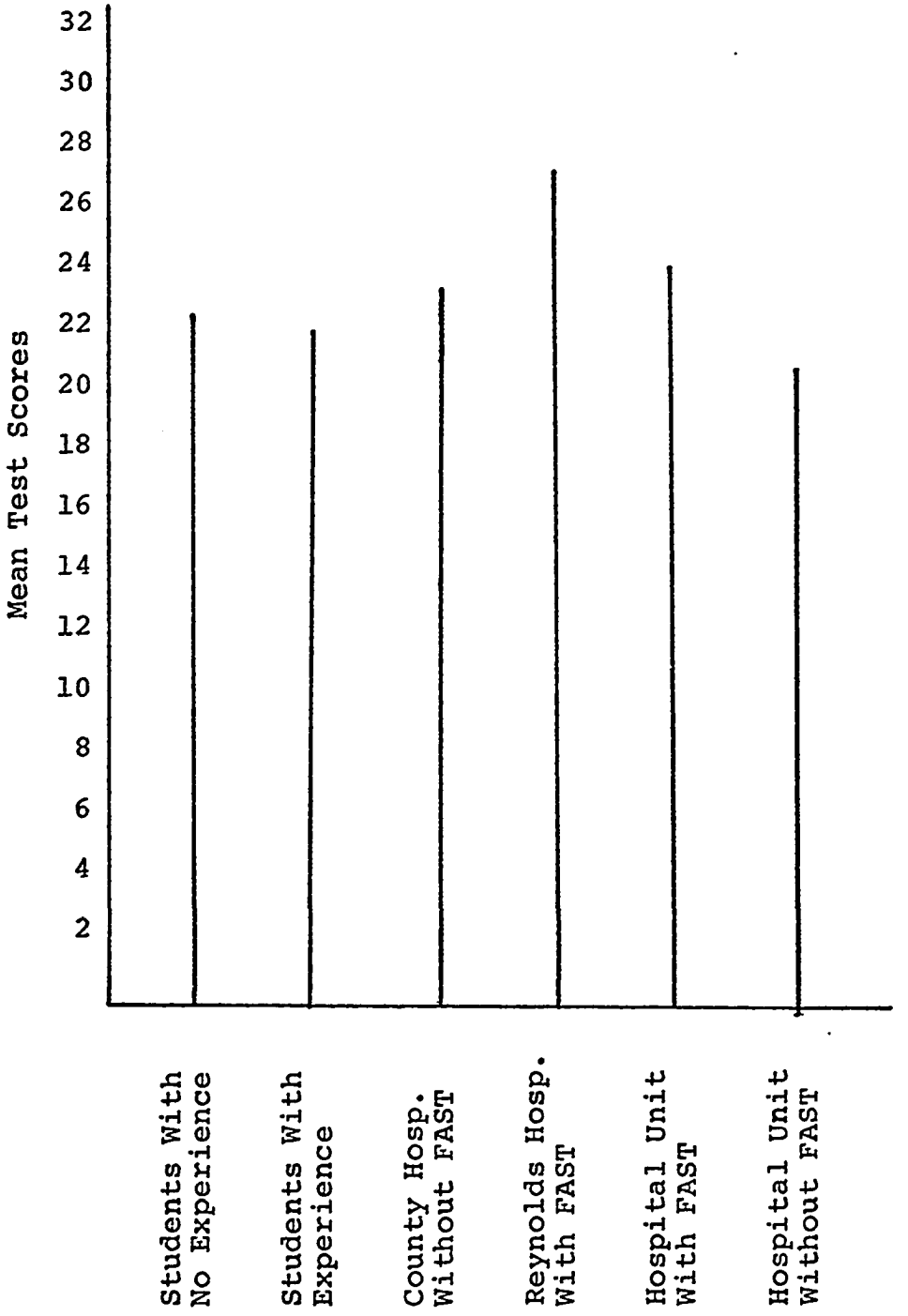
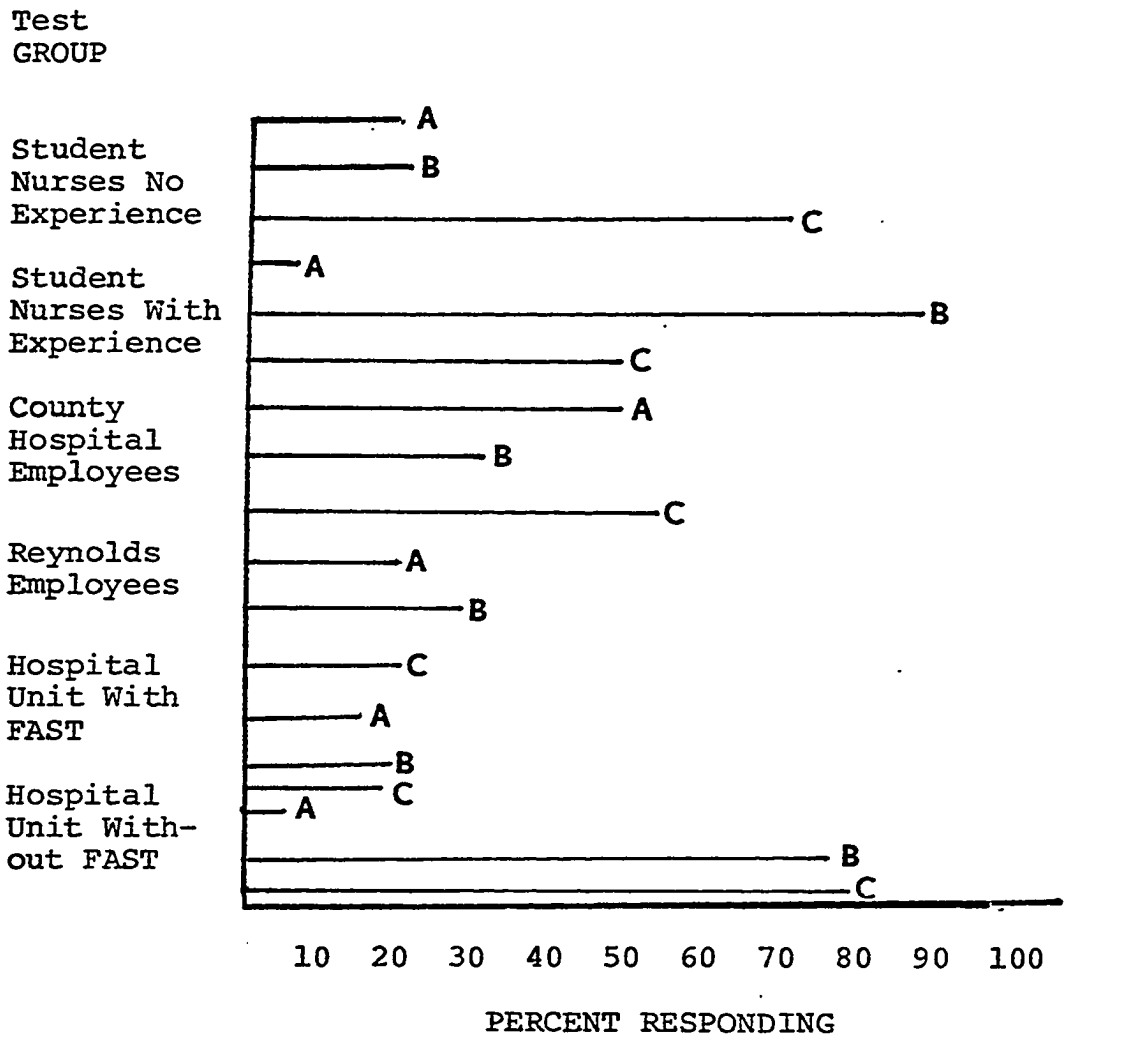


Figure 4-3

Responses to Selected Statements



(A) = percent correctly identifying NFPA
(B) = percent who felt present training programs had been designed to meet accreditation
(C) = percent who felt that fire safety requirements could be modified for patient comfort

employees for an actual fire emergency.

Research data indicated that hospital fire safety training programs utilizing a typical approach (initial orientation followed only by fire drills) are not resulting in employees gaining needed skills and knowledges. The data suggest that employees provided training utilizing the FAST model are more likely to retain fire safety skills and knowledges.

Discussion and Recommendations

The need for hospital employees to be effectively trained in fire safety skills and knowledges has been cited by the Joint Commission on Accreditation of Hospitals and other public and private agencies. (1, 10, 28) Current literature describing hospital fire safety training programs indicates that most consist of an initial employee orientation followed only by required fire drills. (13, 16, 33) In a study conducted by the National Institute for Occupational Safety and Health it was concluded that only fifty percent of the nation's hospitals had formal organized training and education programs for permanent employees. (22, 23)

If hospital fires did not occur, employee fire safety training would not be a problem. The National Fire Protection Association has stated that the actual number of hospital fires that do occur is not well known due to the lack of mandatory reporting requirements. Information from reports in the literature and a hospital fire incident

reporting system in the state of Washington indicates that the number of hospital fires is a growing concern. (16, 20, 30, 34) New and increasing medical technologies are adding to the ever growing complexity and fire threat of the modern hospital environment.

Findings in this study indicate that present fire safety training programs for hospital employees are not providing personnel with needed skills and knowledges. As a member of the NFPA Health Care Committee stated, "There is a great need for a constructive, yet simple, training program which hospitals could conduct themselves." (65)

Utilizing a training system design approach, a fire and safety training (FAST) model for hospital employees was developed. A manual for implementing the FAST model was prepared for establishing effective training programs.

Evaluation of the FAST model showed that employees exposed to the system significantly knew more about fire safety subjects than those not exposed to the system. Findings showed that the instruction system design techniques utilized in the FAST model did improve training outcomes.

As a result of this study the following recommendations are made:

1. The JCAH should develop and utilize a written test instrument to evaluate hospital fire safety training programs as part of their accreditation process.
2. The JCAH should place more emphasis on the experience and qualifications of hospital environmental safety personnel.

3. A nation-wide mandatory fire incident reporting system should be established for health care facilities.

4. Schools of nursing should design specific courses in hospital safety and fire prevention and require such courses to be taken by all students.

5. Hospitals should include specific fire safety tasks in each employee's written job description.

Future plans include the submission of the FAST manual to the Fort Sill printing plant for publication. Copies will be provided to other military and civilian hospitals to help improve their training programs. It is hoped that the FAST manual will not only help prepare employees for a fire emergency, but will be the ounce of prevention that is needed to prevent hospital fires before they occur.

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APPENDIX A

FIRE SAFETY INSPECTION GUIDE

Work Area_____ Supervisor_____
Date_____ Inspector_____

Comments

Are floors, asiles, and passageways kept clean and dry? Are spills cleaned up immediately?

Are carpets kept tight so they will not develop rolls or bunch up?

Are electric cords or phone cords which run across aisles or passageways covered?

Have defective ladders (e.g., with broken rungs, broken steps, or split side rails) been tagged as "DANGEROUS, DO NOT USE" and removed from service for repair or destruction?

Is the use of makeshift ladders prohibited?

Are all doors that must be passed through to reach an exit or way to an exit, always free to access with no possibility of a person being locked inside?

Are personnel aware of the physical, chemical, and biological hazards present in their work area?

Are eye wash fountains and safety showers provided in areas where chemicals, such as caustics, are used?

Are all chemical storage containers labeled to identify their contents?

Are eating, drinking, and smoking prohibited in the laboratories or other areas where toxic materials are used or stored?

Are employees required to wear personal protective equipment (gloves, eye protection, or respirators) when handling hazardous materials?

Is the moving of cylinders done only on a truck or cart equipped with a means for securing them upright?

Are compressed gas cylinders checked regularly for dents, leaks, corrosion, pitting, bulges, and other physical distortions?

Are compressed gas cylinders secured and stored where they cannot be knocked over?

Are compressed gas cylinders kept away from sources of heat, elevators, stairs, or gangways?

Are all compressed gas cylinders legibly marked to identify the contents?

Have exposed wires, frayed cords, and deteriorated insulation been repaired or replaced?

Are electrical appliances such as vacuums, blowers, vending machines, coffee pots, hot plates, toasters, etc. grounded?

Are any flexible cords and cables run through walls, ceilings, doorways, or windows?

Do all extension cords being used have a ground wire?

Are all extension cords in use of appropriate wiring to carry the current being drawn?

Have "NO SMOKING" signs been posted where flammable liquids and gases are in use?

Are flammable liquids kept in closed containers when not in use?

Are combustible waste materials (oily rags, etc.) stored in covered metal receptacles and disposed of daily?

Are flammable liquids stored in approved containers and cabinets?

Are storage cabinets for flammable and combustible liquids labeled "FLAMMABLE--KEEP FIRE AWAY"?

Is there more than one day's supply of flammable liquids outside of approved storage cabinets or rooms?

Are emergency phone numbers posted?

Are the extinguishers selected for the types of combustibles and flammables in the areas where they are to be used?

Class A Ordinary combustible material fires
Class B Flammable liquid, or grease fires
Class C Energized electrical equipment fires

Are extinguishers fully charged and kept in their designated places?

Are extinguishers located along normal paths of travel?

Are extinguisher locations kept free from obstruction or blockage?

Are all extinguishers checked (by management or designated employee) monthly to see if they are in place or if they have been discharged, etc.?

Do fans less than 7 feet above floor have guards with openings of ½ inch or less?

APPENDIX B

JOB TASKS FOR HOSPITAL EMPLOYEES

FIRE SAFETY JOB TASKS FOR

HOSPITAL EMPLOYEES

JOB TASK

1. During a fire emergency take necessary steps to protect the life safety of patients, visitors, and other employees.

Task Elements	Skills and knowledge required to perform task element
1a. Upon detecting a fire the employee will remove patients in immediated danger and contain the fire by closing the door.	1a1. Skill in removing patient from immediate area by using correct patient carry technique.
	1a2. Knowledge that smoke contains toxic products and closing the door will slow the spread of smoke and delay the spread of fire.
1b. Alert other employees to presence of fire emergency without causing panic.	1b1. Knowledge of the established code word used for alerting employees to a fire emergency.
	1b2. Skill in communicating code word to other employees without causing panic.
1c. Sound fire alarm and report location of fire to proper authorities.	1c1. Knowledge of the location of fire alarms and how they operate.
	1c2. Knowledge of telephonic reporting procedures used for contacting local fire department.

Task Elements	Skills and knowledge required to perform task element
1d. Upon hearing code word from another employee close patient room doors.	see 1b1; 1a2
1e. Employee must be able to select and use fire extinguisher for an A, B, or C type fire.	1e1. Knowledge of fire types (A, B, & C).
	1e2. Knowledge of the location and type of fire extinguishers located in work area.
	1e3. Skill in using fire extinguishers to control small fires.
1f. When necessary evacuate patients utilizing correct lift and patient carry techniques.	1f1. Skill in lifting patients without causing injury.
	1f2. Skill in one, two, and three person carries.

JOB TASK

2. Employee must be able to recognize common fire hazards and take necessary steps to correct the hazard.

Task Elements	Skills and knowledge required to perform task element
2a. Enforce hospital smoking policy.	2a1. Knowledge of established smoking policy.
	2a2. Skill in informing patients, visitors, and employees of no smoking areas.
	2a3. Knowledge that smoking is related to a large number of hospital fires.

Task Elements	Skills and knowledge required to perform task element
2b. Be able to recognize hazards associated with flammable liquids.	2b1. Knowledge that the greatest hazard associated with flammable liquids is from the fumes and vapors given off by the liquid.
	2b2. Knowledge that no more than a 48 hour supply of a flammable liquid should be stored in any work area.
	2b3. Knowledge of common flammable liquids used in work area.
2c. Be able to recognize hazards associated with compressed gases.	2c1. Knowledge of which compressed gases are flammable, nonflammable, or supporters of combustion.
	2c2. Knowledge that supporters of combustion should not be stored with flammable compressed gases.
	2c3. Knowledge of the high pressure compressed gases are stored under.
	2c4. Knowledge that safety caps should be on cylinders when not being used.
	2c5. Knowledge that all cylinders should be secured to prevent falling.
	2c6. Skill in the safe handling of compressed gas cylinders.

Task Elements	Skills and knowledge required to perform task element
2d. Be able to recognize common electrical hazards.	2d1. Knowledge that hospital patients are more susceptible to electrical shock.
	2d2. Knowledge that patients with therapeutic or monitoring devices are high risk.
	2d3. Knowledge that electrical arcing and sparking can cause fires.
	2d4. Knowledge of areas requiring emergency power.
	2d5. Skill in identifying damaged/frayed outlets, cords, and plugs.
2e. Be able to recognize persons that may be potential fire threats (mental patients, senile patients, etc.).	2e1. Aware that arson is growing problem in hospitals.
	2e2. Knowledge that older patients need supervised smoking.
	2e3. Skill in handling situations involving persons that may be fire threats.

JOB TASK

3. Be able to recognize general safety hazards and take necessary steps to correct the hazard.

Task Elements	Skills and knowledge required to perform task element
3a. Be able to recognize slip and fall hazards.	3a1. Knowledge that numerous injuries to hospital patients and employees are caused by falls.

Task Elements	Skills and knowledge required to perform task element
	3a2. Knowledge that spills should be cleaned up immediately.
	3a3. Skill in adjusting and erecting bedside rails.
3b. Be able to recognize hazards associated with handling solid waste.	3b1. Knowledge of policies and procedures for handling infectious waste.
	3b2. Knowledge that sharp objects such as needles should not be placed in regular waste containers.
3c. Be able to recognize hazards associated with hot tap water.	3c1. Knowledge that tap water should not be over 100°F to prevent possible patient burns.

APPENDIX C

HOSPITAL EMPLOYEE BULLETIN WITH SAFETY TRAINING MESSAGE

PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark ✓.

1. Glossy photographs _____
2. Colored illustrations _____
3. Photographs with dark background _____
4. Illustrations are poor copy _____
5. Print shows through as there is text on both sides of page _____
6. Indistinct, broken or small print on several pages ✓ throughout _____
7. Tightly bound copy with print lost in spine _____
8. Computer printout pages with indistinct print _____
9. Page(s) _____ lacking when material received, and not available from school or author _____
10. Page(s) _____ seem to be missing in numbering only as text follows _____
11. Poor carbon copy _____
12. Not original copy, several pages with blurred type _____
13. Appendix pages are poor copy _____
14. Original copy with light type _____
15. Curling and wrinkled pages _____
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"Home Safe Home"

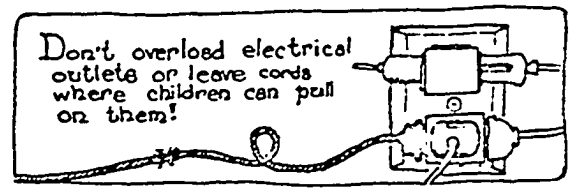
by CPT H. Emery

A man's home may be his castle but it is also a maze of unsafe conditions which can result in an unexpected trip to the emergency room. Turn of the century samplers embroidried with "Home Sweet Home"should have proclaimed "Home Safe Home" instead.

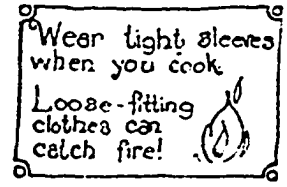
The lack of home safety awareness is a growing problem in today's complex home environment. According to the National Safety Council the American heme contains more potential hazards than the average industrial work area.

A recent five year study by the Indian Health Service concluded that home accidents were one of the greatest health problems faced by the American Indian today. Four-hundred per 1000 individuals substained some form of home injury each year during the five year study. This rate may seem high, but when one considers the number of cut fingers, falls, bruises and accidental cases of poisonings occurring in the family home it becomes clear that man's castle may be in need of "safe proofing".

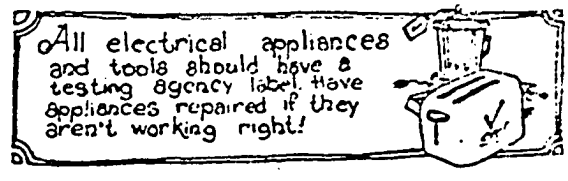
Safe proofing your home can be easily accomplished by finding and correcting hidden hazards which if left unattended could result in injury to a family member or visitor. The following check list can be used to quickly spot the most common home hazards:



1. Are commercial cleaning products stored under the kitchen sink?
2. Are medicines stored in reach of small children?
3. Are flammable liquids stored near open flames (hot water heaters, etc)?
4. Do electrical cords show signs of wear, frayed, broken, or loose plugs?
5. Are sharp cutting knives washed with other utensils?



A yes answer to any of these questions may mean that an accident is waiting to happen in your home. Don't wait, take action now to reduce hidden causes of accidents. Your home may be the location of several accidents this year. You can start now to reduce home injuries by using the safe proofing check list.



APPENDIX D

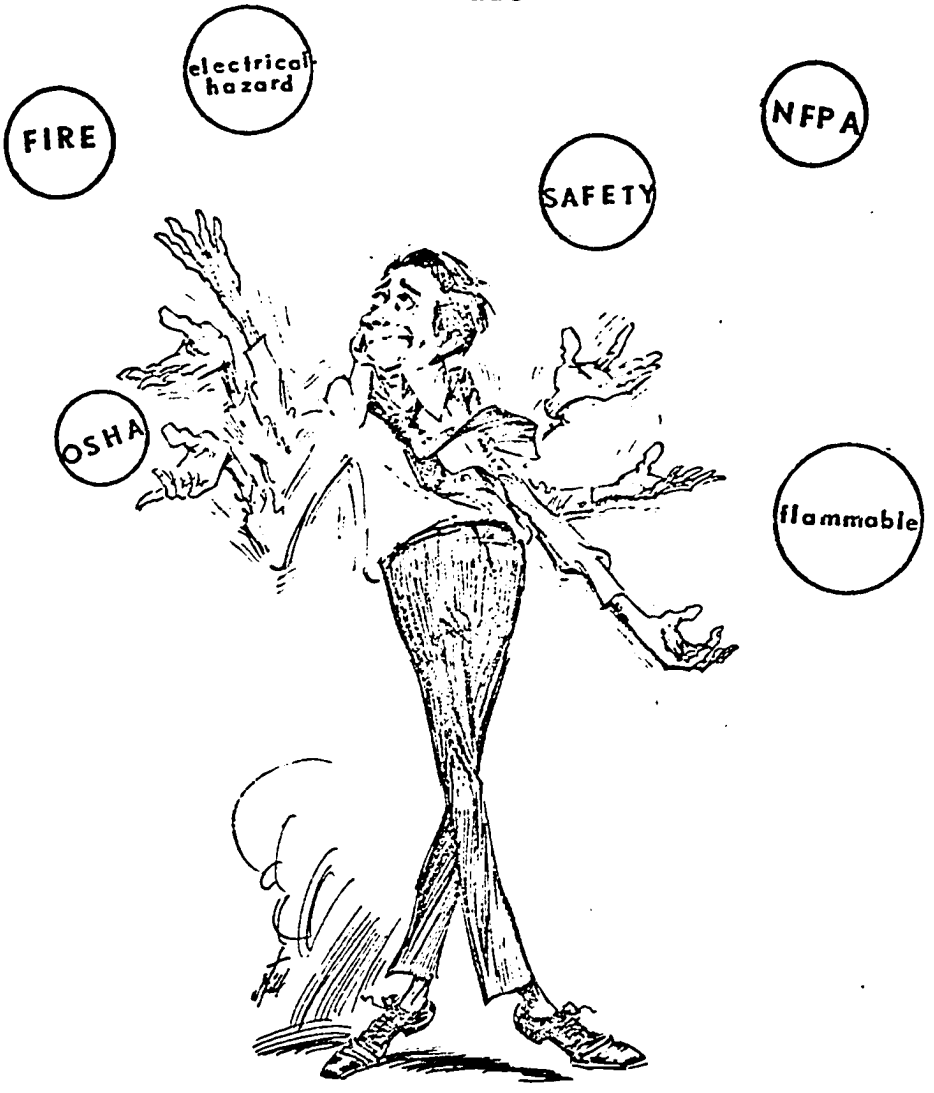
FIRE AND SAFETY TRAINING (FAST)

MANUAL FOR HOSPITAL EMPLOYEES

HOSPITAL »»»»

TABLE OF CONTENTS

(Cartoons utilized in this manual have been obtained from the National Safety Council's Safety News cut out section.)



INTRODUCTION

If you're like many hospital fire safety managers you have to juggle your many training responsibilities and hope for the best. The majority of hospital fire safety managers can only devote part of their time to this vital program since they also have other full-time administrative duties. Even the full time fire safety manager can have a difficult time developing an effective training program.

This manual has been designed as an aid for hospital fire safety managers, both part-time and full-time, to use in establishing effective training programs for hospital employees. It is not intended as a fire safety technical reference but as a guide for developing a training system that works!

The first section describes five steps that the hospital fire safety manager should take in establishing an effective training program. The second section provides a fire and safety training (FAST) model and practical training aids (case histories, role playing, supervisor aids, etc.) that can be used throughout the year.

"If that's the safety man, where's his first aid kit?"

If you face a problem or question that you're not sure about look it up--A delayed right answer is better than a quick wrong answer.

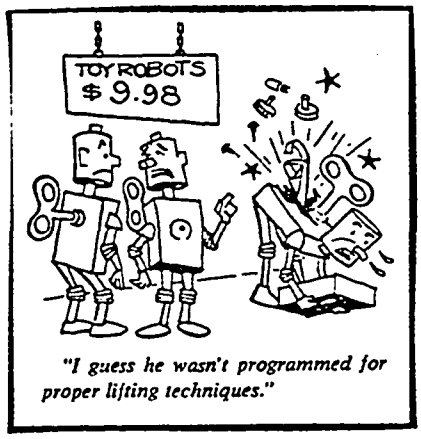
STEP ONE ▷ EQUIP YOURSELF FOR THE JOB

Establish a fire safety technical reference library for your use and for use by supervisory personnel. Recommended reference materials are listed in Appendix One. Even if you are not a full-time safety professional you must become technically qualified.

If you have not had previous fire safety responsibilities it is highly recommended that attendance at a safety short course be planned. To find if local universities offer safety courses contact your state safety council. Other safety training courses which may be available are shown in Appendix One. Many safety short courses are specifically aimed at the hospital environment. Costs for attending such courses should be part of the yearly fire safety budget.

When attendance at a safety short course is not possible for several months an excellent alternative is the use of correspondence courses or programmed safety management texts.

Join a national fire safety organization to keep abreast of new developments. Both the National Safety Council (NSC) and the National Fire Protection Association (NFPA) have specialized committees for hospital fire safety managers.



"I guess he wasn't programmed for proper lifting techniques."

STEP TWO ▷ PROGRAM AND IDENTIFY TRAINING OBJECTIVES

This simple step is often overlooked resulting in wasted time and worse--poorly trained employees.

> What fire safety tasks should hospital employees be able to perform?

A group of thirty full-time fire safety professionals were asked this question. When their responses were analyzed three important job tasks became apparent:

1. Given a fire emergency take appropriate actions to protect the life safety of patients, visitors, and employees.

2. Be able to recognize common fire hazards and take appropriate actions to correct the hazard.

3. Be able to recognize common safety hazards and take appropriate action to correct the hazard.

Each of these job tasks can be subdivided into several elements which each employee must be able to perform. It is recommended that these three job tasks be included in each employee's written job description.

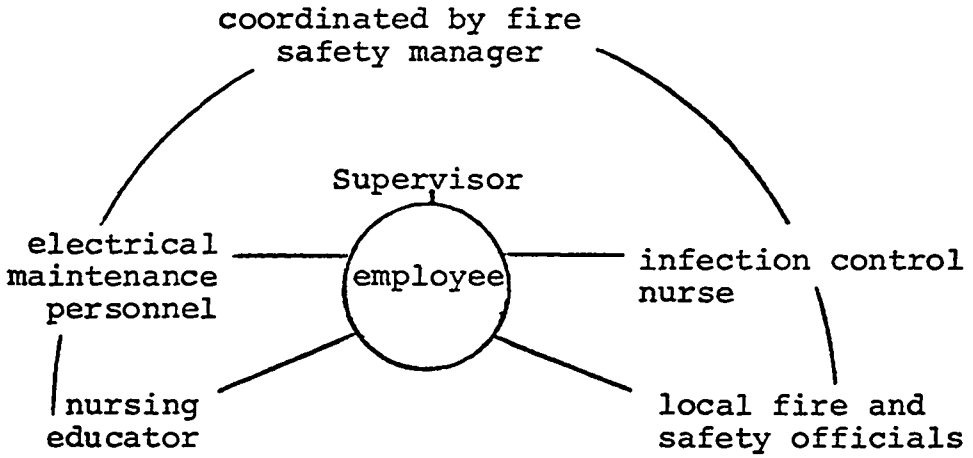
STEP THREE ▷ IDENTIFY WHO TRAINS WHO

All too often the hospital fire safety manager is considered to be responsible for the actual training of all employees in all phases of fire safety information. This may be fine in a 10-20 bed facility but is impossible in larger operations.

If you find that there is a general attitude in your facility that "fire safety training is the total responsibility of the fire safety manager" you have a problem. It is impossible for one person to perform and conduct all training activities that need to be accomplished.

The fire safety manager should be responsible for coordinating training activities but much of the training must be done by the work area supervisor, nursing educator, equipment maintenance personnel, infection control nurse, etc. Community agencies such as the local fire department and related safety organizations may be utilized in certain training activities (fire extinguisher demonstrations, mass disasters, etc.).

For a training program to work a training team must be developed and coordinated by the fire safety manager.

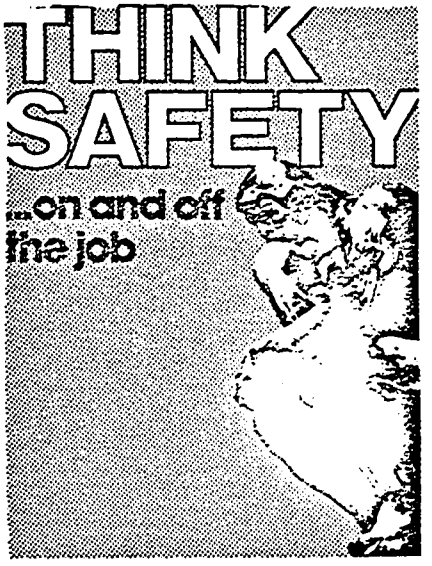


THE HOSPITAL FIRE SAFETY TRAINING TEAM

For this team to get its job done adequate training resources must be available. Training media such as audio tapes, slides, posters, overhead transparencies, filmstrips, motion pictures, video tapes, written texts, programmed texts, models, and simulations can be provided by the fire safety manager. Each training aid will have certain advantages and disadvantages. What may work in one facility may not be suitable for another.

The importance of the supervisor's role in the training program cannot be over-emphasized. The supervisor rarely has time to devote to writing lesson plans and ordering training materials, but by providing the supervisor with training resources effective training can be done by the supervisor.

The main job for the fire safety manager is to get people to think about safety! When employees think SAFETY they tend to perform in a safe manner. You have to be a SAFETY SALESMAN.



Depending upon the size of your facility establish one or several bulletin boards located in high use areas. Utilize these bulletin boards to reinforce training activities and information.

STEP FOUR ▷ ESTABLISH WHEN TO TRAIN

Safety hazards take no vacations. You will need to provide training all the time. This may sound absurd--but when you consider the numerous fire safety skills and knowledges required of each employee training becomes a daily concern. Employees can be exposed to fire safety training information on a daily, weekly, and monthly basis.

In most hospitals supervisors hold section meetings at the beginning of each shift. This is the perfect time to disseminate safety information to employees. Each supervisor can hold a weekly mini-safety meeting 5-10 minutes in length.

KEEP IT SIMPLE--SHORT--AND SINCERE

Effective mini-safety meetings can be held weekly if the fire safety manager provides each supervisor with a training packet each month. Information in the training packet should be simple to read, short in presentation, and sincere in meaning.

To help coordinate training efforts it is advisable to use a yearly training forecast projecting training subjects for each week. A training forecast is provided in section two for use with the FAST system.

All new employees should be required to attend a fire safety orientation of 2-4 hours presented by the fire safety manager. Several excellent commercial films and slide presentations are available for this initial training. The main purpose of this orientation is to inform new employees of their fire safety responsibilities and required job tasks. After initial orientation the work area supervisor will be the vital figure in the employee's training advancement.

STEP FIVE ▷ FIND OUT IF IT IS WORKING

After you establish a training program how can you tell if it is working? How many employees know the established code word for alerting others to a fire? How many employees know the telephone number for reporting fires? During a fire drill how many employees fail to close doors to patient rooms?

Your answers to these questions will tell you if your training efforts are working. More importantly these questions can help you plan future training needs. During fire drills it is important to evaluate employee actions as if their life depended upon it. Don't worry about hurting someone's feelings by identifying training failures.

Observations and notes made during a fire drill can help identify problem training areas. You don't need to wait for scheduled fire drills to evaluate training. Have someone unknown to employees smoke in a no smoking area (be sure it is not a hazardous area). How many employees inform the offender of the violation? Place a container marked flammable in a hallway. How many employees pass and fail to investigate a potential hazard?

So far it has been simple:

1. Equip yourself for the job
2. Program and identify training objectives
3. Identify who trains who
4. Establish when to train
5. Find out if it is working

Now it is time to establish the fire and safety training (FAST) system in your facility. Section two provides a FAST system model and provides simple training aids to use throughout the year.

REMEMBER: Keep it short, simple, and sincere.

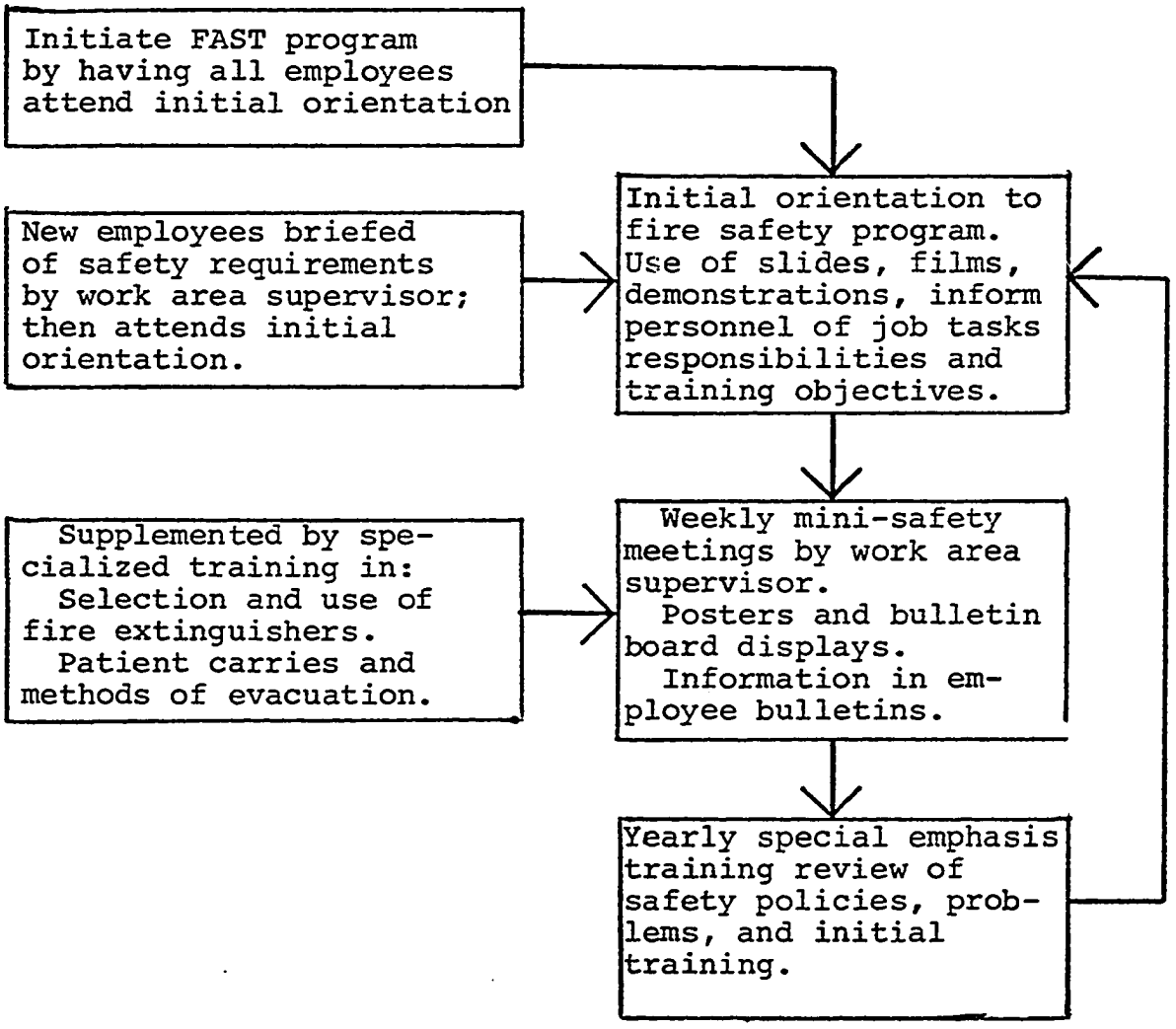
SECTION TWO

FIRE AND SAFETY TRAINING (FAST) MODEL FOR HOSPITALS

This section describes a Fire and Safety Training (FAST) Model which has been successfully used by the author for several years as a hospital safety manager. Figure One presents the basic concepts of the FAST Model.

Figure One

Fire and Safety Training (FAST)
System for Hospital Employees



The fire safety manager coordinates training activities, provides training aids to supervisors, messages in employee bulletins, posters, etc., monitors fire drills and evaluates training needs to modify training objectives as indicated.

This section also provides practical training aids (case histories, role playing, information for employee bulletins, and training outlines for work area supervisors) that can be used throughout the year. Some materials can simply be cut out and directly reproduced for handouts, employee bulletins, and displays. These materials are also recommended for discussion during monthly safety committee meetings.

Training aids are focused on the job task skill. A twelve month training forecast is provided to insure that all training needs are met and to control the frequency of presentation and reinforcement for critical training subjects. A training forecast is shown in Table One.

How well the FAST Model works will depend on how employees are introduced to the training program. All persons presently working should be scheduled to attend an initial orientation. This may seem like an impossible task in an 800-1000 bed facility, but it can be done. In larger facilities it is best to concentrate on only one department at a time.

The purpose of the orientation is to make sure all employees have been informed of their job tasks that they are expected to perform and demonstrate. Information presented during the orientation will be reinforced throughout the year by following the training forecast.

For employees that are presently working it is advisable to begin with hospital managers and administrators. The next group of employees should be at the supervisory level. How well you establish the role of the supervisor as a fire safety trainer may determine the success of your program.

After present employees have attended the initial introduction a monthly orientation should be scheduled for all new employees.

Table One

FAST Training Forecast

Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Initial orientation to fire safety job requirements and duties.	Flammable liquids	Selection & use of fire extinguishers	Inspection & maintenance of fire extinguishers	Patient evacuation	Hazards of smoking

Follow-up and reinforcement of information presented in initial orientation through use of case histories, role play, etc.

Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Compressed gas cylinders	Falls and slips	Electrical safety	General safety	Repeat of months 3 & 4 information	Yearly special emphasis program

Follow-up and reinforcement of information presented in initial orientation through use of case histories, role play, etc.

*All new employees will receive basic orientation during first month of employment.

**Each month a fire drill is scheduled to insure that employees on each shift take part at least quarterly.

OUTLINE FOR INITIAL FAST ORIENTATION

*It is advisable to have employees sign an attendance roster for future reference. This can also be used for JCAH documentation of training.

I. Introduction

A. Make sure employees know who you are and what your job is. (5 minutes)

B. Inform employees of established safety policies. It is recommended that the hospital director establish a general safety policy.

(Sample Policy Letter)

TO: All Employees
SUBJECT: Hospital Safety Policy

It is the policy of this hospital that the safe way is the right way to do each job. Urgency is no cause to neglect safety. Each work area supervisor is responsible for safety in each work area. The supervisor is the vital figure in this hospital's Safety Program.

All employees should be familiar with the following general safety policies.

1. Don't guess. Know your job, if in doubt ask your supervisor.
2. Operate equipment and tools only if authorized.
3. Report faulty equipment. Do not try amateur repairs.
4. Report all unsafe conditions or acts.
5. Report all incidents immediately--whether or not an injury was involved.
6. Obey all warning signs.
7. Wear protective equipment when work requires it.
8. Read and know specific safety procedures for each job.

The only excuse for an accident is "no excuse". Accidents result in injury, lost time, and damaged equipment. Accident prevention must be the goal of every employee--every day.

Hospital Directors
Signature.

C. Inform employees of the objectives of the fire and safety training program.

The objective of the hospital Safety Program is to prevent accidents and injuries by:

1. Increasing the individuals' awareness and motivation for safety.

2. Routine safety inspections by the supervisor, hospital safety manager, safety consultants, and local fire safety agencies.

3. Accurate and timely reporting of accidents.

4. Establishing an on-going fire and safety training (FAST) program.

D. Explain responsibilities and functions within the safety program:

Responsibilities and functions of the safety program include:

1. Hospital Director: Establishing safety objectives and policies.

2. Safety Manager: Coordinating the safety program and assisting supervisory personnel in establishing a workable safety program in each work area.

3. Supervisors: Explaining and stressing safety rules to employees, employee safety training, motivation of employees, demonstration of safe work practices and the enforcement of safety regulations in their work areas.

4. Employees: Following established safety regulations and reporting to their supervisor any perceived safety hazard or problem.

Each employee is expected to be able to perform the following fire safety job tasks:

1. Given a fire emergency take appropriate actions to protect the life safety of patients, visitors, and employees.

2. Be able to recognize common fire hazards and take appropriate actions to correct the hazard.

3. Be able to recognize common safety hazards and take appropriate actions to correct the hazard.

To perform these three job tasks each employee must be able to perform and demonstrate over forty fire safety skills and knowledges. For example: Skills in operating a fire extinguisher, knowledge of phone number for reporting fires; skill in performing patient carries, knowledge of toxic products of smoke, etc.

It is impossible to adequately train in all these subjects in a one day period. Today, you will only be given an overview of these various job tasks. Further fire and safety training will be provided through weekly work area mini-safety meetings on electrical safety, patient safety, flammable materials, compressed gases, fire drills, falls, etc., will be provided by supervisors. Training materials can be furnished by the safety manager. Special emphasis demonstrations will be developed as needed. Departmental and divisional orientations and instructions on specific job safety procedures will be provided when needed. A training calendar which indicates subject areas for each month of the year is used to insure that all subjects are covered.

II. STRESS: No hospital is fireproof or fire safe--hospital fires do occur.

(There are several excellent 16mm films 15-30 minutes in length which can be used to reinforce this message.)

REASONS FOR CARING #FL-42 NFPA

A. Inform employees that in most buildings the main objective during a fire is to get out of the building--BUT--in hospitals patients are not always able to be removed quickly, so emphasis is placed on confining fire and toxic smoke, removing patients in immediate danger, immediate reporting to fire officials and use of fire extinguishers.

Inform employees of code word used to alert other staff members of Fire _____. Inform employees of telephone number used to report fire to local fire department. A card stating phone number, floor and area (see next page) should be placed by each phone.

B. Show employees the types of fire extinguishers used in your facility. Demonstrate their use or use commercial film explaining use (recommend 13 minute film "Using Fire Extinguishers the Right Way," #FL-45 NFPA).

III. Recognizing Hazards and Taking Corrective Actions

This part of the orientation is used to briefly describe typical fire safety hazards and steps that should be taken to correct them. An excellent means of accomplishing this is the use of 45mm slides made in your own facility. Commercial slides with audio tapes can be used (National Safety Council Slide Set #176.18 "Hospital Hazards" and #176.26 "Hospital Employee Safety"; NFPA Audio Slide Set No. SL-24).

IV. SUMMARY

Each employee is expected to be able to recognize common fire hazards and recognize common safety hazards. In most cases when a potential hazard is observed the appropriate action will be to inform the work area supervisor. Your skills, knowledges, and actions can mean the difference between a fire prevented and a fire loss.

Today, you have been provided an overview of our fire and safety training program. Your actual training is not over, but is just starting. During work area safety meetings ask your supervisor questions--bring up potential problems before they become a hazard. Be sure and read safety information on bulletin boards, posters, and handouts.

Remember the code word used for alerting other staff members to a fire is _____. The telephone number for reporting fires is _____.

Follow-up letter to be sent to each employee attending initial orientation.

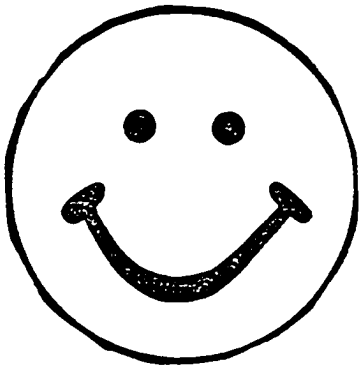
Dear _____:

As hospital director I am sincerely interested in our fire safety program. I expect each employee to be able to expertly perform all job tasks related to the fire and safety program.

You recently attended a fire safety orientation which provided an overview of the many responsibilities you have in maintaining a safe patient environment. There are many skills which must be mastered if you are to successfully protect patients during an actual fire. If each employee takes corrective actions when noticing a potential fire hazard all fires can be prevented.

You will be provided fire and safety training throughout the year by your work area supervisor. I urge you to be responsive and take an active part in this training. Your supervisor should be informed of any safety hazard you observe. If you feel appropriate action has not been taken to correct the hazard or have any questions concerning potential safety problems contact me or our hospital safety manager, _____, personally.

_____
Signed by hospital director



SMILE FOR SAFETY

Report all potential safety problems to your work area supervisor:

_____

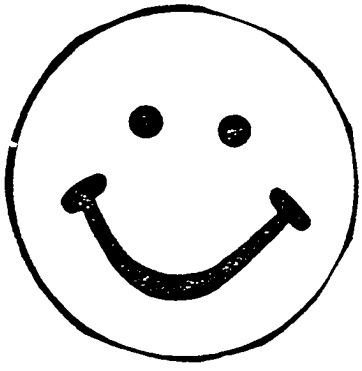
OR

Contact your hospital safety manager:

_____

phone

Cut out and reproduce for posting in each work area



SMILE FOR SAFETY

Smile for safety--Safety depends on you. Report all potential safety problems to your work area supervisor or contact your hospital safety manager

_____

SAFETY CAN'T HAPPEN WITHOUT YOU

Cut out and reproduce for reprint in employee bulletin

FAST Packet for Supervisors

Flammable Liquids

Month of _____

Note for supervisors: This month emphasis will be placed on the hazards associated with flammable liquids. The introductory message concerning flammable liquids should be read during your first monthly safety meeting.

A FAST checklist for the safe use of flammable liquids is also included in the packet. Use this list to check your work area for potential problems. Case histories and role play situations are also provided for use during your other weekly safety meetings.

FAST CHECKLIST FOR SAFE USE OF FLAMMABLE LIQUIDS

		YES	NO
1.	Is any kind of ether used or stored?	___	___
2.	Are flammable liquids used in work area?	___	___
	List types used: _____		
	_____		
3.	Is the amount limited to a 48-hour supply?	___	___
4.	Are any flammable liquids stored in refrigerator?	___	___
5.	Are "NO Smoking" signs posted and enforced where flammable liquids are used?	___	___
6.	Is an approved safety waste can provided?	___	___
7.	Has a written procedure been established for procurement, use, and storage of flammable liquids?	___	___
8.	Have all personnel been instructed in safe handling methods and the hazards of using flammable liquids?	___	___

DANGER

FLAMMABLE LIQUIDS

Flammable liquids in the hospital can create serious fire hazards when improperly used or stored. Where flammable or combustible liquids are used special fire prevention measures are required. Each work area supervisor should know what flammable liquids are being used. The best method of protection is to reduce the volume of flammable liquid being used (no more than a 48-hour supply should be stored in any work area).

Flammable liquids have a flash point below 100°F. Fire hazards are associated with vapors given off by the liquid. Sparks or flames do not have to be in direct contact with the liquid to result in fire. Each employee should be aware of these hazards. A Fire and Safety Training (FAST) checklist is provided--each supervisor should review this checklist with employees and use it on a routine basis.

"I've come to the conclusion, Ralph, that all warning signs mean exactly what they say."

(For use as a handout
and for employee bulletin)

Week 2 Case History for Discussion During Safety Meeting
(Read this case history and have employees discuss it.)

Nurse Robbinson discovers a patient's bed on fire in a private room. Nurse Robbinson immediately alerts others by yelling "Fire--Fire--Fire!"; then attempts to smother the fire with a blanket. Unfortunately, Nurse Robbinson also smothers the patient--by this time the window curtains have caught fire and no one else is on the scene. What should Nurse Robbinson do now? Did this employee take appropriate steps upon discovering a fire? What was done wrong? What steps could have been taken?

Week 3 Role Play Situation
(Select two or three employees--Read the situation and have each to react to it.)

During visiting hours you notice smoke coming from a vacant patient room. You immediately close the door to contain the fire and now proceed to alert other staff members. There are 5 or 10 visitors present at the nursing station. How do you alert others to the fire without causing wide-spread panic?
(Ask other employees what could have been done better.)

Week 4 Code Word for Alerting Other Staff Members to a Fire.
(For reading and discussion)

In this hospital the code word used for fires is _____. Why use a code word--it seems easier to just announce that a fire is in progress. The intended purpose of using a code word is to prevent panic among patients and visitors. If you were a bedfast patient and heard someone yell "Fire," how would you feel?
(Ask several employees.)

Because all fires are different it is nearly impossible to train for every situation. We must be flexible and consider all factors. Our main concern is to remove patients in immediate danger (same room), alert other staff members, sound fire alarm, and telephonically report the fire. Above all, avoid PANIC.

FAST Training Packet for Supervisors

Selection and Use of Fire Extinguishers

Month of _____

Note for FAST Manager:

During this month emphasis will be placed on the selection and use of fire extinguishers. This packet can be used at any time. In larger facilities it may be desirable to rotate this packet through different sections at different times. If possible each employee should attend a fire extinguisher demonstration. Local fire department officials may be able to provide these demonstrations.

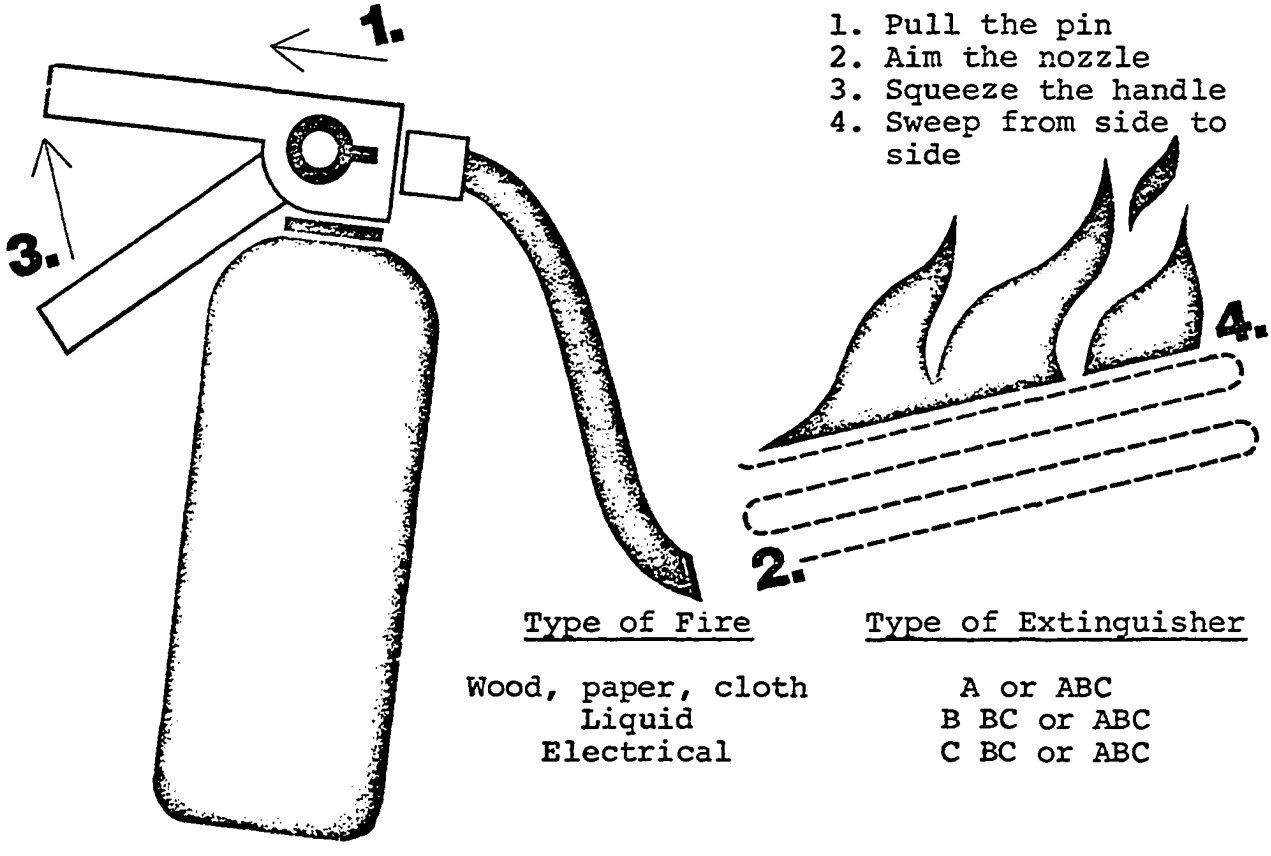
(This can be cut, reproduced, and used on bulletin boards or in the employee bulletin.)

Can you

Pull--Aim--Squeeze--Sweep

PASS this test?

1. Pull the pin
2. Aim the nozzle
3. Squeeze the handle
4. Sweep from side to side



Type of Fire	Type of Extinguisher
Wood, paper, cloth	A or ABC
Liquid	B BC or ABC
Electrical	C BC or ABC

FAST Training Packet for Supervisors

Selection and Use of Fire Extinguishers

Month of _____

In most types of buildings the main objective during an actual fire is to get out as quickly as possible. In a hospital, patients will not be able to move quickly and certain patients may not be able to be moved at all. To protect the life-safety of these patients it is necessary that employees slow the spread of fire and contain toxic smoke by closing room doors. It may be necessary for employees to use fire extinguishers to control small fires before firemen arrive.

This month training is focused on the selection and use of fire extinguishers. Read the attached poster to employees during your first mini-safety meeting. Be sure each individual remembers PASS--Pull--Aim--Squeeze--Sweep.

Some members of your staff may be selected to attend further training and demonstrations concerning fire extinguishers. You can use these employees to help train other staff members.

Pull--Aim--Squeeze--Sweep

Pass it on

Week 2 Role play.

Situation: The fire alarm has been sounded and the evacuation order given. You have a 210 lb. male unable to walk. You must move the patient down the stairs to the next floor. Which patient carry would be best? Hip and Swing carry? Why? Extremity carry or Swing carry? Why?

Week 3 Case history for discussion.

Upon entering Mrs. Miller's room, Nurse Emerson spotted a small blaze in the waste basket. Nurse Emerson helped Mrs. Miller from the room then shut the door. She then went to the nurse's desk to report the fire using the code word "Dr. Red". Housekeeper Collins heard the code word and immediately went to the room with a type A fire extinguisher. Collins opened the door and found the entire room in flames.

Did Nurse Emerson take appropriate action? What could have been done differently? Why?

Week 4 Review information on compressed gas cylinders. (Read to employees.)

Remember the misuse of compressed gas cylinders can cause injury and damage. Don't be guilty of misusing compressed gas cylinders. Never lubricate valves or regulators. Always keep protective caps on when cylinders are secured in storage and during use. Slowly open cylinder valves. Never open quickly.

Since last discussing compressed gases have you noticed any potential hazards associated with their use in our own work area? What can be done to reduce the chances of compressed gas accident in this work area?

FAST Training Packet for Supervisors

Inspection and Maintenance of Fire Extinguishers

Month of _____

Last month training emphasis was placed on the selection and use of fire extinguishers. To be effective, fire extinguishers in your work area must be inspected and properly maintained.

All too often the routine inspection of fire extinguishers consist of putting initials on an inspection tag. The individual making the inspection may fail to notice a damaged hose or clogged nozzle which may make the extinguisher inoperable during emergency use. Each work area supervisor is responsible for insuring that fire extinguishers are properly inspected, maintained and used. This guide has been prepared to assist work supervisors in training personnel to inspect extinguishers in accordance with standards of the National Fire Protection Association.

1. Procedure: The inspection should determine that:

a. The extinguisher is in its designated place.
b. Access to visibility of the extinguisher is not obstructed.
c. Any seals or tamper indicators are not broken.
d. The extinguisher has not been physically damaged.
e. The extinguisher does not have other obvious defects (clogged nozzle, corrosion, leakage, damaged hose, etc.).

2. Accessibility:

a. The sooner a fire extinguisher can be used on a fire, the better the chances for extinguishment. If valuable time is wasted hunting for an extinguisher the fire may spread to a point where it is too large for the extinguisher.

b. An inspection should include a check that the extinguisher is accessible, and that it is visible or its location clearly marked. Sometimes, unthinking employees or outside workmen will hang wearing apparel over the extinguisher or its location marker and thus obscure it. Obstructions should be removed.

3. Seals and Tamper Indicators:

a. Tampering or extinguisher operation is usually indicated by broken seals or tamper indicators. These may consist of wire and lead seals, plastic indicators, paper strips, and the like, that indicate operation of the extinguisher or its movement from its hanger, bracket, or wall cabinet.

Tamper indicators which seal an extinguisher to its mounting may be loosely affixed so that it is possible for an inspector to "Heft" (lift slightly) the extinguisher to determine if it is full or empty without breaking the seal.

b. Foam, water pump tanks, and some cartridge operated water extinguishers do not have seals or tamper indicators. They should be "hefted" (lifted slightly) to determine if they are full.

4. Damage: Extinguishers may be damaged in many ways. Common causes of damage are vehicles or materials striking the extinguisher or dropping of the extinguishers. Any physical damage to the extinguisher shell, hose, valve, cap, gage, or other external parts should be noted while inspecting.

5. Common Impairment:

a. It is advisable to check nozzles for obstructions. Corrosion and insects are common causes of nozzle clogging. Many extinguishers have clear plastic nozzles which make visual observations easier.

b. Extinguishers should be checked for obvious signs of corrosion.

c. Gages exposed to view should be observed to see that the pointer indicates pressure in the operable range. It is advisable to tap the gage gently to secure a movement of the gage pointed as a check that the pointer is not stuck.

6. Records:

a. Personnel charged with the inspection of extinguishers should keep records showing that the inspection work was performed on a certain date, which extinguishers were found defective, and what corrective action was taken.

b. It is recommended that extinguisher locations be identified as to required rating and classification. This will simplify return of a proper extinguisher to a designated location.

c. It is often desirable to provide a durable inspection tag, attached to the extinguisher, to record that an inspection has been made.

7. Corrective Action: Where an inspection reveals that tampering has occurred or that the extinguisher is damaged, impaired, leaking or has obvious corrosion, the location of the extinguisher should be reported to your supervisor. An inspection form for use in inspections is attached.

FIRE EXTINGUISHER INSPECTION

Activity _____ Date _____

Area _____ Person Making Inspection _____

Number of extinguishers in work area _____

	SAT	UNSAT
Are extinguishers in designated location as shown on fire drill evacuation plans?		
Do any extinguishers in the work area have broken seals or tamper indicators?		
Do any extinguishers have signs of corrosion/leakage/or physical damage?		
Are all extinguishers mounted on secure brackets or otherwise protected from falling?		
Do any extinguishers have illegible, loose or missing name plates?		
Do any extinguishers have damaged, cut, cracked or worn hoses?		
Are nozzles on extinguishers free of obstructions/cracks/or damage?		
If gages are present are they in good repair? No immovable jammed or missing pointers.?		
Do gages on extinguishers indicate full containers?		
Are mounting brackets in good repair?		
Does the maintenance tag indicate annual maintenance conducted (extinguishers equipped with pressure indicators or gages are not required to have annual maintenance checks, if gage indicates low pressure unit should be rescheduled for maintenance check).		
Are operation instructions posted by each extinguisher?		
Have all personnel received training in use of fire extinguishers?		

Location of units with unsatisfactory findings should be described: _____

Week 1 Review the information concerning fire extinguisher maintenance and inspection with employees. Emphasize to employees that if they observe a fire extinguisher that has been tampered with or is in need of repair to immediately contact the work area supervisor.

Week 2 Case history for discussion.

Nurse Howell on the evening shift spotted a small liquid spill in the hallway. Nurse Howell made a mental note of the hazard and continued to the dining room for her coffee break. In the mean time a patient has stepped in the small pool of water and slipped. The patient was not wearing shoes at the time of the incident. Could this incident have been prevented? How? What would you have done? Suppose that Nurse Howell had been on her way to check on a nurse's call signal from another room?

Week 3 Role play. "The Obstinate Smoker"

Mrs. Hewitt a 75 year old patient is an avid smoker and insists that she be allowed free use of smoking materials. She has insisted that she is not a child and does not need anyone babysitting with her while she smokes. While making morning rounds to wake patients you notice two small burn holes in Mrs. Hewitt's blanket. What actions should you take? What would you tell Mrs. Hewitt?

Week 4 Review fire extinguisher operations with employees.

Can you PASS the test. Pull the pin; Aim the nozzle; Squeeze the handle; and Sweep from side to side. PASS IT ON.

Ask employees which type of fire extinguisher should be used for

(a) Electrical fires

(b) Wood, paper, cloth fires

(c) Flammable liquid fires

Cut out for employee bulletin or use on bulletin board.

Supervisors Have to be FAST to Prevent Fires

F IRE
A nd
S AFETY
T RAINING

FAST is a supervisory responsibility.

If you have questions concerning the hospital fire safety program contact _____.

FAST Training Packet for Supervisors

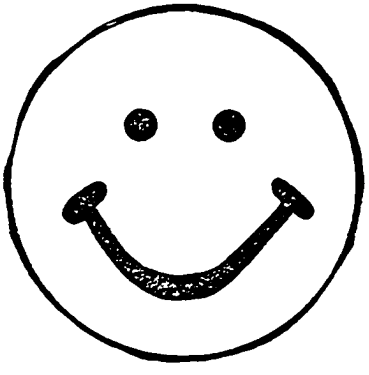
Patient Carries

Month of _____

This month employees will be receiving special training concerning patient carries. Basically there are only six carries: the pack strap carry for one nurse, the hip carry for one nurse, the cradle drop for one nurse, the extremity carry for two nurses, the swing carry for two nurses, and three man carries. There are variations of these depending upon the personnel available and the weight and condition of the patient.

Training material from the Los Angeles Fire Department describing patient carries is provided for use during weekly safety training meetings. Have employees demonstrate these carries and discuss their use. Several of your employees will be selected to attend further training in this area.

Message for employee bulletin



SMILE FOR SAFETY

Make sure you know the correct procedures for patient carries.

Someone's life may depend on it!

CARRIES FOR ONE PERSON: (For Week One)

PACK STRAP CARRY:

Face patient, with your back toward foot of bec. You grip nearest wrist with your nearest hand, palm down. Raising patient's wrist slightly, slip your free hand under this raised wrist and grasp patient's other wrist, palm up.

Pull patient to a sitting position by taking one step backward. Never letting loose of patient's wrist, raise the patient's nearest wrist and slip under patient's arm. Placing your back squarely against patient's chest so that your shoulders are lower than the patient's armpits, you pull the arms over your shoulders and cross them on your chest.

Exerting a downward pull on the arms, lean forward slightly, bending only your shoulders. You turn both your body and feet sharply toward the head of the bed. It is not necessary to drag or lift the patient. Your forward momentum will roll patient out on your back without shock.

(This is a good carry for turning in any direction or in close quarters, or where there is fire on both sides of the doorway.)

To unload in a corridor, the patient's shoulder is placed against wall. Lean against patient and drop on your knee closest to wall. Lean against patient as the person slides down the wall. Use wall to sustain patient's weight and to maintain own balance. The patient is locked between body of rescuer and the wall.

HIP CARRY:

Rescuer faces patient, grasps farthest wrist palm down with hand closest to patient's head. Raises arm and makes half turn toward head of bed placing patient's hand over head and down over shoulder. With free hand, reaches behind patient's back and grasps patient under the armpits. Release patient's wrist. With knees slightly bent and feet apart, reach back with free hand and grasp both knees. The patient is now securely held by the armpit and knees.

Draw the patient up on hips before leaving bedside, if patient is carried on buttocks, he may slide down.

To unload the patient in corridor, place the patient buttocks against wall and drop on knee closest to wall and let patient slide down wall to floor.

CRADLE DROP:

First, double a blanket lengthwise on floor parallel to bed. Slide arm nearest patient's head under the neck and grasp shoulders. Then slide free arm under knees and grasp firmly. Your knee or thigh, depending on height of bed, is placed against bed close to patient's thigh. Both feet are flat on floor, about six inches from bed. The patient is pulled from bed, no lifting is necessary. Pull with both hands, push with knee or thigh against bed. The moment patient starts to leave bed, drop on knee nearest the head.

When patient is clear of bed, the extended knee supports knees of patient and the arm under neck supports arm and shoulders of the patient. The cradle formed by the knee and arm protects the back. Let the patient slide gently to the blanket and pull blanket from the room.

Rescuer cannot maintain the balance necessary if he pulls the patient's buttocks instead of the knees or thighs, out on the knee. This removal is for patients too heavy for one person to carry, for low beds, and for bed or oxygen tent fires.

ANKLE ROLL:

If a person finds a patient lying on the floor, she places blanket, open full length, parallel to the body. For the purpose of removal, it makes no difference whether the patient is lying face down or up.

The rescuer takes the ankle farther from the blanket, and places it on top of other ankle. She then presses down on the top ankle and pulls upon bottom ankle, which will roll patient over on the blanket, and pulls patient from room.

HIP ROLL:

A variation of the ankle roll is the use of the shoulder and hip bone as pulling points. This method is probably easier in most instances and should always be used if the patient is very heavy or has injuries which preclude the use of the ankle roll.

The rescuer places the patient's arm by the side next to the blanket and then drops to one knee on the blanket just above the patient's hips. The other foot is flat on the blanket. Leaning forward she grasps the patient by the far shoulder and hip bone and rolls the patient over toward her with a steady pull, moving back out of the way as she does so.

KNEEL DROP:

Kneel drop is exactly the same as the cradle drop up to the point of pulling the patient from the bed.

The moment the patient starts to leave the bed, the rescuer drops to the knee closest to the patient's head. When the patient is clear of bed, rescuer leans back hugging patient close to the chest and drops to the other knee. Then rescuer leans forward letting patient slide down chest and legs to the blanket.

In other words, rescuer pulls patient out on her chest instead of her knee.

This removal is particularly useful when handling excessive weight, fractures, post-operative, and pregnancy cases when only one person is available.

CARRIES FOR TWO: (For Week Two)

SWING CARRY:

The first rescuer standing with feet together, slips one arm under the patient's neck and grasps the shoulder with same hand. Slide other palm behind the bicep and grip the patient's upper arm with that hand, bring the patient to a sitting position by taking one step toward the foot of the bed.

When patient is sitting, the second rescuer grasps the ankles and swing the feet off the bed.

Both rescuers stand close to the patient's side, facing each other. Each takes one of the patient's wrists, and pulls the arm around his neck and down across his chest. Each rescuer then reaches across the patient's back and places his free hand on the top of the other rescuer's shoulder.

Both rescuers then let go of the patient's wrists. Each reaches under the patient's knees and grasps the wrist of the other.

Patient is removed from the bed by both rescuers pushing up with their shoulders. Weight makes no material difference because the patient is hanging like a pendulum off the rescuer's shoulders. (This is the easiest removal of all, and is the two-man carry used on stairs and fire escapes.) Any two rescuers can carry any patient anywhere.

To unload in the corridor, each rescuer drops on the knee closest to the patient. While leaning against the patient

the rescuers place the individual's buttocks on the floor, and lower the patient to the floor on back.

EXTREMITY CARRY:

The first rescuer brings the patient to a sitting position in the same manner described in the swing carry. When the patient is sitting, place arms through the armpits and grip your own wrists above the patient's chest. The second rescuer approaches from the same side and halts at the patient's feet. With one hand under the patient's heel, pull the ankle clear off the bed as you slide between the patient's legs as far as the patient's knee. Make a half turn toward the patient's feet, grasp patient's knee (the extended one) with arm. Completing the turn, transfer other hand (the one that was holding the heel) to other knee. You now have a leg under each arm.

Both rescuers then take one step away from the bed and carry the patient from the room. Like so many other carries, this involves a hugging action, with the patient's back carried tight against the first rescuer's chest, the patient's shoulders as close to the level of first rescuer as possible.

To unload the patient in the corridor, the second rescuer stoops with one foot slightly behind and about six inches from other foot and lowers the patient's legs to the floor. The first rescuer lets the patient slide down body until the buttocks reach the floor. Then lower the patient to his back. This is a very fast removal. Any two rescuers can carry any patient. The carry is useful when the path of exit is narrow because of furniture or fire.

DOUBLE KNEEL DROP:

The double kneel drop is an expansion of the kneel drop for one nurse and variation of the double cradle. The two nurses place the blanket on the floor. If they work at the patient's right side, the first nurse slips her left arm under the patient's neck and grasps the left shoulder in her left hand. Her other hand goes behind the right biceps. Her left knee or thigh is placed against the bed. The second nurse grips both of the patient's legs, her left hand above the knees and her right hand below the knees. She places her right knee or thigh against bed.

The nurses pull the patient toward the edge of the bed as they push against the bed with knees or thighs. As the patient starts to leave the bed, the first nurse drops to her right knee and the second nurse drops to her left knee. As the patient clears the bed, both nurses drop their other knee to the floor, straighten their backs, and lean slightly forward.

Instead of being pulled out on the extended knees of the nurses as in the double cradle drop, the patient is pulled from the bed to their chests and allowed to slide down their bodies to the blanket. This type of removal has an advantage over the extended knee removal for a fracture or post-operative case, for example, because there may be less risk of aggravating the injury by use of a body slide instead of kneel removal.

DOUBLE CRADLE DROP:

The double cradle drop is an expansion of the drop for one nurse. It is a very fast removal which two people can apply to any size patient. A blanket doubled lengthwise is put on the floor parallel to the bed. Two rescuers face the patient on the same side of bed. The one nearest head slides her hand and arm (nearest to patient's head) under neck and grasps the shoulder.

The free hand is used to grasp the patient's nearest bicep well up close to the arm pit. Rescuer then places thigh or leg closest to the head against bed.

Second rescuer slides both her arms under the patient's legs, above and below the knees. She places hip or leg, closest to foot of bed, against bed.

The two rescuers slide the patient over to and off the edge of the bed, pulling with their hands and pushing with their legs or thighs. No lifting is necessary. As the patient leaves the bed, the first rescuer drops to her knee closest to the head of the bed. Second rescuer drops to her knee closest to the foot of the bed. The patient comes out gently and lies across their extended knees. The rescuer's knees are then withdrawn and patient is lowered to blanket on floor.

Each rescuer then places a hand on the side of the blanket and a hand at the end. They roll the blanket slightly to provide a substantial grasping edge and back out of the room, using a backward pull, rather than lifting.

CARRIES FOR THREE: (For Week Three)

THREE MAN CARRY:

The first rescuer slips arm under the patient's neck and grasps the patient's far shoulder in same hand. Slip other hand under the small of the patient's back, as far as it will go. The second rescuer slips both arms under the patient's body, one above the buttocks and one below, reaching under as far as possible. The third rescuer slips both arms under the patient's legs and grips them above and below the knees. (It is desirable for the tallest rescuer to take

the shoulder position because that is the key point in turning the patient.)

Slide the patient to the edge of the bed, lift together and turn the patient to face them and then carry the individual on their chests. The slide is very important. It greatly simplifies the lifting. The slide and lift should be a continuous action.

In leaving the room, the rescuers swing out with the patient's feet first. They go through the doorway obliquely--that is, in a staggered single file. This line-up allows each rescuer about four or five inches of floor space for fast and safe walking.

If the patient is not too heavy, the three rescuers can drop on the knee closest to the patient's feet and lower the individual, first to their knees and then to the floor. By withdrawing their extended knees.

If the patient is quite heavy, the three should face the corridor wall, place the patient's body against the wall and let it slide down, first to their knees and then to the floor. If the rescuers lean against the patient, the wall will bear most of the weight.

THREE MAN BALNKET CARRY:

A blanket doubled lengthwise can be used as a stretcher. It is easier to drag than to carry a patient from a room, but if conditions require a carry and only three nurses are available, two nurses should be at the shoulders and one at the knees. (A four-nurse blanket carry is explained a few pages later.) The two nurses at the patient's shoulders should grip the blanket above the shoulders and opposite the elbows. With the palms of their hands down, they should roll the blanket toward the patient until the knuckles of their hands are tight against the patient. The third nurse grips the blanket opposite the patient's calves and rolls it under and in toward the body, palms up, until her thumbs are tight against the legs.

When the pick up is made from this position, the patient's feet are slung along outside the third nurse's hips, not pressed uncomfortably against her abdomen. The pick up is made by all the nurses pushing against the floor with their feet--the patient being carried with the nurse's arms extended. When the blanket carry is made on a stairway or fire escape, the bearers must carry with their hands hip high, not at arm's length. When three people carry, the patient should be taken down head first.

CARRIES FOR FOUR NURSES:

FLOOR TO WHEELED STRETCHER:

To pick a person up from the floor or street and put the individual on a wheeled stretcher (or stretcher cart or litter), it is necessary that the patient be on her back. If the patient is lying face down, she should be rolled over. Two ways of doing this have been described in the ankle roll or hip roll. When the patient is on her back, the first three nurses kneel on one knee close to the patient's side. The first nurse slips one arm under the patient's neck and grasps the far shoulder in her hand. With her other hand, she grasps the inside upper part of the near arm. The second nurse slips both arms under the patient's body, one above the buttocks, and one below. The third nurse slips both arms under the patient's legs, one arm above the knees and one below them. The fourth nurse is directly across from the middle nurse and also slips both arms under the patient's body, one above the buttocks and one below.

When all hands are in position, the first nurse should say, "Ready?" Next she commands, "Lift". At this order, the patient is lifted knee high and rests on the extended knees of the nurses. Now the command is, "Ready?" Then, "Stand". At this order, the four nurses come to a standing position by pushing against the floor with their feet.

While the first three nurses hold the patient steady, the fourth rolls the wheeled stretcher under the patient and then resumes her original position to help lower the patient to the wheeled stretcher.

FLOOR TO NONWHEELED STRETCHER:

Up to a point, the positions of the nurses are the same for the floor-to-non-wheeled stretcher removal as they are for the wheeled stretcher procedure just described. However, this time on "Ready?" and "Lift", the patient is brought only knee high and remains stretched across the knees of the first three nurses while the fourth nurse slides the non-wheeled stretcher under the patient's body.

The fourth nurse then assists the first three in lowering the patient. Two, three, or four can carry the nonwheeled stretcher. In this carry, army-type stretchers, or poles in a blanket, or a blanket with edges rolled can be used. The patient can be moved anywhere, in a corridor, on stairs, on fire escapes, in elevators, or in trucks.

FOUR MAN BLANKET CARRY:

If four people are available for carrying, one squats at each of the patient's shoulders and at each of the patient's knees. Those at the shoulders grip the blanket above the shoulders and opposite the elbows. Those at the knees grip the blanket six inches above and six inches below the patient's knees. They roll the blanket toward the patient, with the palms of their hands down, until their knuckles are right against the patient's body.

All the nurses pick up together and make the carry with their arms extended. On a stairway or fire escape, the bearers must carry with their hands hip high, not at arm's length. With four people carrying, the patient is taken down feet first.

CARRIES FOR SIX NURSES: (For Patient with Broken Back, Neck or Pelvis) (For Week Four)

SIX MAN CARRY FROM A BED:

Three nurses take a position on one side of the bed. The other three stand alert in single file at the foot of the bed. The first nurse slips one arm under the patient's neck and grasps the far shoulder in her hand and slips her other arm under the small of the patient's back. The second nurse slips her arms above and below the patient's buttocks, and the third nurse grips the patient's legs above and below the knees. Together, they slide the patient gently to the edge of the bed and carefully lift the individual almost chest high. The three nurses, holding the patient very straight, take one step back from the bed.

The second three nurses place their arms under the patient, alternating their hands with the hands of the first three nurses.

The patient is carried out perfectly straight and placed on the rigid surface of a wheeled stretcher, all nurses working as gently as possible. This is one of the fastest removals of all.

If the patient is on the floor, three nurses should assume positions on each side of the person. All six nurses should kneel on the knee closer to the patient's feet. The two nurses at the head should form a cup for the patient's neck by interlacing the fingers of the hands closer to the head. The other ten hands should be lined up alternately and worked in slowly toward the spine.

At the commands "Ready?" and "Stand", the patient is brought up evenly and gently to chest height. Finally the patient is lowered to the wheeled stretcher. In the absence of a

wheeled stretcher or perhaps at the scene of an accident, a stiff stretcher or a suitably sized piece of plywood placed on a blanket doubled lengthwise might be substituted.

CARRIES OF INFANTS:

The first nurse spreads a blanket fully open on the floor. The second nurse brings out a baby in each arm and hands them to the other nurse, one at a time. If only one nurse is available, she will have to handle both assignments. At the center of the blanket, two babies are placed next to one another, their feet toward one side of the blanket. Also at the center of the blanket, another two babies are placed next to one another, their feet toward the opposite side, and their heads touching the shoulders of the first two infants so that an interlocking arrangement of heads is formed. Four more babies are then placed at each end of the blanket, heads toward the center, feet toward the end.

One nurse can drag a dozen babies at once on a blanket. She first folds the blanket over the legs of the babies on one end and then rolls the sides up so that a pocket is formed. She grasps the open end of the blanket by the rolled edges and pulls. (Two nurses would pull the blanket as they do in any heavy smoke, because the infants are kept under the smoke line which starts about twenty inches from the floor.)

Four nurses can carry a dozen babies anywhere quickly and safely. Both ends of the blanket are turned up over the legs of the babies and the sides are rolled in as far as possible. The four nurses each grasp a corner in one hand and a rolled side in the other. If vertical evacuation becomes necessary, babies can even be carried down stairways safely. The rolled sides and turned-up ends of the blanket form a pocket at each end so that the babies' feet are braced to prevent them from sliding forward no matter which end of the blanket is started down the stairway. If necessary, two or three nurses can make the carry.

FAST Training Packet for Supervisors

Smoking Hazards

Month of _____

Note for Supervisors: Training activities will be focused on alerting employees to the fire hazards of smoking by patients, visitors, and staff members. The training message below should be used in this month's first mini-safety meeting. The other materials can be used for employee discussion and role play.

Careless Smoking--Easy Fires!

The careless use of smoking materials by patients, visitors, and employees is a major cause of hospital fires. In one state 38% of all hospital fires were caused by careless smoking. In this facility the following policies concerning smoking have been established:

(Insert your own hospital's smoking policy.)

It is each employee's job to enforce these policies. Employees must inform patients and visitors of established smoking and no-smoking areas and enforce the established policies.

Be alert for patients trying to "sneak" a smoke. Bedside fires and mattress fires are a common result of patients sneaking a smoke.

If you don't enforce our smoking rules, who will?

Week 2 Role Play Situation for Employees

a. You observe a 60 or 70 year old patient smoking in bed. What actions will you take?

b. You observe a 19 year old visitor smoking in a no-smoking area. How will you inform the visitor to stop smoking? What actions would you take if the visitor is the hospital director?

c. You observe your work area supervisor smoking in a no-smoking area. What actions should you take?

Week 3 Case History for Discussion

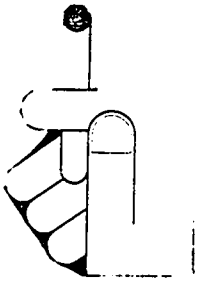
Ten minutes before shift change a supply technician delivers twice the amount of rubbing alcohol that you normally use in a one week period. What actions should you take? Why?

Week 4 Case History for Discussion

A patient had been given a cigarette and while smoking, dropped it igniting the blanket and patient's gown. Employees were able to extinguish the fire before serious injury to the patient.

How could this have been prevented? What policies have been established for this hospital concerning smoking?

MESSAGE FOR EMPLOYEE BULLETIN BOARD



Careless smoking makes for easy fires. Each employee must know smoking policies and enforce them. If you don't enforce smoking policies--Who will?

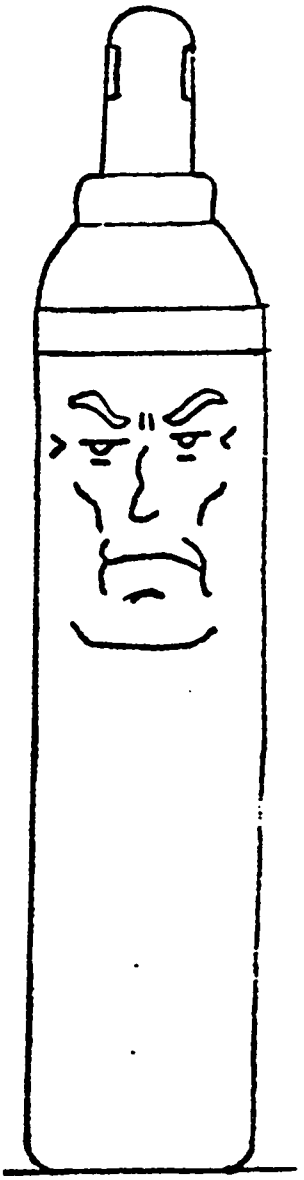
FAST Training Packet for Supervisors

Compressed Gas Cylinders

Month of _____

Note for Supervisors: The hazards associated with the use of compressed gases will be highlighted this month. The compressed gas cylinder is a sleeping giant ready to unleash destructive power when unsafely used. Read the message below during your first mini-safety meeting this month. You can cut out the sleeping giant message and post it on your bulletin board.

A SLEEPING GIANT



I am a compressed gas cylinder.
I weigh in at 175 pounds when filled.
I am pressurized at 2,200 » » » p.s.i.
I have a wall thickness of about ¼".
I stand 57 inches tall.
I am nine inches in diameter.
I wear a cap when not in use.
I wear valves, gages, and hoses when at work.
I wear many colors and bands to tell what tasks I perform.
I am ruthless and deadly in the hands of the careless or uninformed.
I am too frequently left standing alone on my small base, my cap removed and lost by an unthinking workman.
I am ready to be toppled over, where my naked valve can be snapped off, and all of my power released through an opening no larger than a lead pencil.
I am proud of my capabilities--Here are a few:

I have been known to jet away faster than a dragster.
I smash my way through brick walls with the greatest of ease.
I fly through the air and reach distances of a half mile or more.
I spin, ricochet, crash and slash through anything in my path.
I scoff at the efforts of puny human flesh, bone, and muscle, to alter my erratic course.
I can, under certain conditions, rupture or explode.
You can be my master only under my terms:

Full or empty, see to it that my
cap is on, straight and snug.
Never--repeat--Never leave me
standing alone.
Keep me in a secure rack or tie
me so I cannot fall.
TREAT ME WITH RESPECT.
I AM A SLEEPING GIANT.

Week 2 More About Compressed Gases

Read the following to employees: Compressed gases include both flammable and non-flammable types. Non-flammable gases which support combustion include oxygen and nitrous oxide. These two gases are not flammable but will support rapid combustion. Common safety rules which must be followed include:

RECOMMENDED SAFE PRACTICES FOR HANDLING MEDICAL GASES

General Rules.

1. Never permit oil, grease, or other readily combustible substances to come in contact with cylinders, valves, regulators, gauges, hoses and fittings. Oil and certain gases such as oxygen or nitrous oxide may combine with explosive violence.

2. Never lubricate valves, regulators, gauges, or fittings with oil or any other combustible substances.

3. Do not handle cylinders or apparatus with oily hands or gloves.

4. Never use an open flame to detect gas leaks. Leak detection instruments or commercial leak detector solutions should be used.

5. Prevent sparks or flame from any source from coming in contact with cylinders and equipment.

6. Never interchange regulators or other appliances used with one gas with similar equipment intended for use with other gases.

7. Fully open the cylinder valve when the cylinder is in use.

8. Never attempt to mix gases in cylinders. (Mixtures should be obtained already prepared from recognized suppliers.)

9. Identify the gas content by the label on the cylinder before using. If the cylinder is not identified to show the gas contained, return the cylinder to the supplier without using.

10. Do not deface or remove any markings which are used for identification of content of cylinder.

11. No part of any cylinder containing a compressed gas should be subjected to a temperature above 130°F. A flame should never be permitted to come in contact with any part of a compressed gas cylinder.

12. Never attempt to repair or to alter cylinders.

13. Do not place cylinders where they might become part of an electric circuit.

14. Never drop cylinders nor permit them to strike each other violently.

15. Where caps are provided for valve protection, such caps should be kept on cylinders when cylinders are moved.

16. Avoid dragging or sliding cylinders. It is safer to move large cylinders even short distances by using a suitable truck, making sure that the cylinder retaining chain or strap is fastened in place.

Week 3 Case Histories
(Read and have employees discuss.)

A green oxygen cylinder has been brought to a patient's room. The nursing aid notices that no identifying tag is on the cylinder, but the container is green and marked oxygen. What should the nursing aid do? Why?

Recently an infant was fatally burned when an employee was connecting an oxygen cylinder to an incubator. For some reason a fire started while the employee connected the cylinder. What could have caused this tragic incident? How could it have been prevented?

Week 4 Simulated Emergency Situation for Discussion:

At 3:15 you hear a co-worker broadcasting the code word for fire. After closing room doors in your area you check the regular fire exit and find it blocked by several cases of medical supplies. What should you do now? Could this happen on your floor? Why not?

FAST Training Packet for Supervisors

Falls and Slips

Month of _____

The theme for this month is "Fall for safety--not from the lack of it." Falls and trips are a major cause of hospital employee injuries. Objects out of place, spilled liquids, not using stair handrails, etc., can make you and patients fall.

Week 1 Review the attached leaflet with employees. Ask how many personnel have experienced near falls. Have several employees describe their incidents.

Week 2 Give each employee a small piece of paper. Ask them to write down the code word used for reporting fires and the telephonic procedure used to contact the fire department.

If you get 100% correct, you are excellent, 95% outstanding, 90% not bad, 80% need review, and below 80% communication gap.

Make sure each employee knows the established code word and the telephone number for reporting fires.

Week 3 Case history.

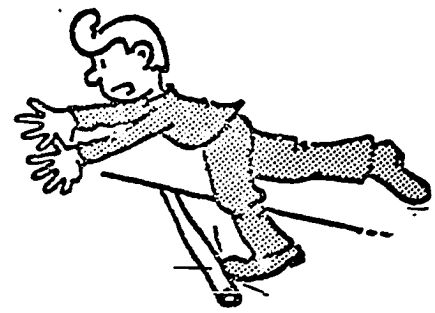
You are investigating a patient accident involving a 72 year old male who is hospitalized for several tests. The accident resulted in a fractured skull from the patient falling while taking a bath. Your investigation shows: (1) the patient slipped after getting out of the tub; (2) he was alone at the time; (3) he was wearing his own houseslippers with smooth rubber soles. Do you feel this accident could have been prevented? What could have been done to prevent it?

Week 4 Role play situation.

At 10:15 p.m. a nursing aid reports smelling what appears to be smoke. Upon investigation you notice a distinct odor of smoke but can't determine its source. You report the situation to your supervisor who says, "It probably isn't anything serious and there's no reason for exciting everyone. Go back and find out where it's coming from. What should you do?

(Cut out for employee bulletin)

FALL FOR SAFETY--Not from the Lack of It!



Report all falling and tripping hazards to your supervisor. When possible take immediate action to correct the problem. Pick up all obstacles on the floor and clean up all spills at once.

Prevention of Falls

1. Floors should be kept free of tripping hazards, be alert for anything that's in the path of traffic or that makes walking hazardous.

2. Spills should be wiped up immediately or area blocked off until clean. Liquids, paper, even flower petals can be dangerous.

3. Use handrails for extra support when going up or down stairs.

4. Use designated aisles. Shortcuts can be "trip traps."

5. Report floor defects such as loose carpet, tiles. Report broken steps, railings, and doors.

6. Tilted chairs may cause many injuries. Keep four legs on the floor.

7. Be sure ladders are sturdy and set firmly. Do not use "make-shift" ladders.

8. At elevators make sure the floor is level before proceeding.

9. Approach intersections and doorways with caution.

10. Positively NO "horseplay"! Practical jokes can cause serious injury.

FAST Training Packet for Supervisors

Electrical Safety

Month of _____

"Plug into Safety" will be the theme for this month's safety training activities. The main training objective will be to make employees more aware of electrical hazards especially where such hazards may be a threat to patients.

A "Plug into Safety" poster is provided for your bulletin board. You can use information on the poster for your first mini-safety meeting this month. In addition a specific guide for electrical safety in patient care areas is provided for inclusion in your present standard operating procedures.

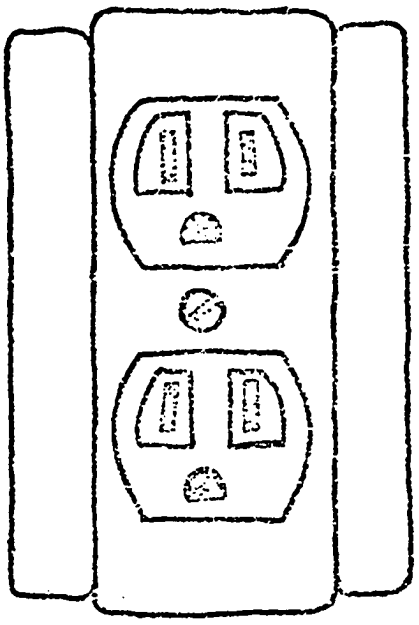
Week 2 During the Mini-Safety meeting review the electrical safety guideline with all employees.

Week 3 Role Play.

As you are walking down the hallway you notice Bill Brothers, a maintenance technician, yanking an electrical cord to unplug a vacuum sweeper. You've seen Bill do this same act several times in past weeks. What should you do? Next week you see Bill yanking the cord again--now, what should you do?

Week 4 Case History.

At 2:15 p.m. Nurse Stephens notices a smell of smoke from room 312. Upon investigating a bedside light is found in flames. Nurse Stephens quickly grabs a pitcher of water and pours it on the lamp. Did Nurse Stephens take appropriate action--what would you have done?



PLUG INTO SAFETY

"Zip" cords will not be used in this hospital.

In patient care areas only extension cords approved by Medical Maintenance service can be used.

National Electrical Safety Code prohibits using extension cords through a wall opening (doorway, etc.) or for a permanent connection.

Extension cords and adapters are subject to damage. Their improper use can introduce errors in polarization and continuity of grounding. Extension cords and adapters are a frequent cause of electric faults and improper grounding. Their use should be restricted.

The use of extension cords from a receptacle on one branch circuit to bring electricity into an area supplied with power by another branch circuit is hazardous. It introduces a different grounding circuit into the patient vicinity, greatly increases spark and shock hazard, and may involve an excessive voltage drop.

(Note to Fire Safety Manager--You can also use this as a notice in the hospital employee bulletin.)

Guidelines for Electrical Safety in Patient Care Areas

Guidelines for safe equipment application:

a. The following general precautions apply to electrically powered equipment:

(1) The use of "cheater adapters" (three to two wire adapters) and multiple outlet adapters is prohibited. Avoid the use of extension cords whenever possible. Ungrounded extension cords are prohibited.

(2) Immediately report electric receptacles that are loose, broken, cracked, or have no power.

(3) Instruct all personnel in the proper means of plugging and unplugging equipment. Explain the hazard created by jerking on a line cord to remove a plug from the wall outlet.

(4) Remove from service and report immediately any device which gives a shocking sensation when touched. That indicates overheating by smell or touch, that has been dropped or subjected to other abuse, or has had liquid spilled into it. Furthermore, discontinue the use of an electric receptacle into which a device is plugged at the time of an electric shock incident until that receptacle can be thoroughly tested.

(5) Emphasize the importance of reporting apparently minor deficiencies which may cause serious electric shocks. Such deficiencies include frayed or cracked line cords and electrical cables, broken or bent plugs, cable connectors which are not securely fastened to the cable, switches which are loose or do not snap firmly into position, burnt out pilot lights, knobs or control dials which are loose or do not turn smoothly, controls which do not produce direct or expected results, or any other unusual or improper performance.

(6) When feasible, connect no more than one electrical device to a patient simultaneously. Disconnect electrocardiographic monitor cables and unplug electric beds before connecting an electrocardiograph. Avoid the use of electric beds in monitoring areas and ESPL's. Instruct appropriate individuals that, when two or more electric devices must be connected to a patient simultaneously, each should be plugged into adjacent receptacles instead of receptacles which are separated by more than two or three feet.

(7) Mop or wipe up liquid spillage in areas where electrical equipment is in use as soon as possible.

(8) When practical, avoid touching an electric device and an electrically susceptible patient (or his conductive catheter, probe, etc.) simultaneously.

(9) Place portable electric equipment out of the immediate reach of the patient when possible. Arrange electric power cords to minimize the possibility of someone tripping over them.

(10) Avoid damaging line cords by dropping heavy objects on them or rolling portable equipment over them.

b. In addition to the general precautions outlined above, the following precautions apply to the safe use of specific devices as indicated:

(1) Report immediately electrocardiographs and electrocardiographic monitors in case of any tracing or sweep irregularity, alarm malfunction or failure, or rate meter inaccuracy. If burn marks are found at the site of patient electrodes, remove the equipment involved, and report it.

(2) Report defibrillators immediately in case of pent paddles, pitted or damaged electrode surfaces, irregular energy meter movement, activation of circuit breaker or blowing of fuses, exceptionally long charging times, or failure to hold a charge. In addition, remove defibrillators from service immediately in case of missing or broken ground pins, spontaneous or asynchronous discharge or the lack of any apparent output (as indicated by failure to elicit patient muscle contractions during discharge).

(3) Instruct each person who may have occasion to use a defibrillator in certain essential practices. The synchronization On-Off switch must always be in "Off" or "Manual" position for defibrillation, and "On" or "Synchronize" position for cardioversion. The individual operating the defibrillator must insure just before discharge that no other personnel are touching the defibrillator case, the patient or the patient's bed frame. The individual holding the defibrillator paddles must exercise extreme caution to avoid contact with any excess electrode paste which may be squeezed up around the edges of the paddles.

(4) Consider ventricular fibrillation occurring in a patient with externalized, foreign electrical connection, one end of which is connected to or terminates in the immediate vicinity of the heart as electrically induced until all testing efforts designed to disclose the cause of fibrillation are exhausted. This action includes measurements of leakage current, ground integrity checks, etc. Leave equipment configuration as is, to the extent possible, for an engineering analysis.

FAST Training Packet for Supervisors

General Safety

Month of _____

This month training activities will be focused on general hospital safety. The objective of training during this period will be to make all employees aware of general safety hazards.

Ask employees to name safety hazards they are aware of. List these hazards on a blackboard or sheet of paper. If the following have not been listed add them to the list: Hot water over 110°, proper footwear for ambulatory patients, proper patient identification on wrist tags, bed tags, room charts and medication orders, use of bedside rails, improper disposal of sharp objects in waste containers.

Ask several employees if they can recall when a patient or employee was injured from any of the hazards listed. Ask other employees how these accidents may have been prevented.

The main point to make during discussion is "When anyone spots a safety hazard, action should be taken to correct the hazard." When all else fails notify your supervisor of the hazard.

Leave the list of general safety hazards on the board or have someone make a list for use next week. Tell employees to be alert to any of these or other hazards for discussion next week.

General Safety Supervisor's Guide

Use the following checklist in your ward or work area. If you observe any of these conditions take immediate corrective actions. Discuss this checklist during your weekly mini-safety meeting.

General Safety Checklist

YES	NO	
		Hot tap water over 110°F.
		Ambulatory patients not wearing safety footgear (slick soled slippers, etc.)
		Patient identifications do not match
		No smoking signs not posted when using oxygen
		Bedside rails not used for elderly or restless patients
		Needles and other sharps in regular waste basket
		Employee failing to wash hands after attending patients

General Safety Supervisor's Guide

Week 2 Read the following case history:

Ann Stark, LPN, was on her way to a patient's room when she spotted a five gallon container marked flammable in the hallway. She continued to the patient's room to perform her duties.

Alvin Barber, visitor, came out of a nearby room. Within three feet of the container marked flammable, Alvin lit a cigarette--turned and fell over the container breaking his hip!

Discuss: Alvin is no longer a visitor, he is a patient. Could this mishap have been prevented? What was the potential for a more serious incident. Who was to blame (who left the container in hte hallway)?

Week 3 Role play simulation:

Have one employee be Dr. Green and another be Nurse Adams.

Nurse Adams: Dr. Green, this medication order is for Charles L. Hopper, not for Charles P. Hopper.

Dr. Green: Nurse, I know who my patients are. Give him the medication and stop wasting time.

What should Nurse Adams do now? Why?

Week 4 Have each employee take a sheet of paper and write the following information:

A--code word used for reporting fires

B--telephone number for contacting fire department

C--name of individual responsible for fire safety in your work area

D--name of individual responsible for fire safety in the hospital.

Collect the sheets of paper and send to the hospital safety manager.

(Note for FAST Manager: You can use results of this survey to evaluate future training needs. If employees in this area don't know who you are this would be a good time to visit the area.)

SMILE FOR SAFETY

Be aware of the following safety hazards. Report any of these to your supervisor.

General Hospital Safety

1. Hot water burns. Report hot tap water if over 110°F. Use extra care with hot liquids.

2. Make sure ambulatory patients wear proper footgear.

3. Patients on crutches need practice. Make sure all patients are familiar with the use of crutches.

4. Do they match? Check the name of patient's wrist tag, bed tag, room chart, and medication order.

5. Read medication labels in good light and make sure they match the medication order.

6. When using oxygen. Post no smoking signs and enforce them; be sure connections are secure, check valves on cylinders, don't use wool or nylon inside oxygen tents.

7. Use bedside rails on both sides for elderly, restless, if coming out of anesthetic and whenever conditions warrant.

8. Caution incoming personnel of chemical, sanitary, and other hazards at each shift change.

9. Lift patients correctly--with your leg power. Get help when needed.

10. Dispose of "sharps" in special containers, do not throw in regular trash.

(Reproduce for bulletin boards and employee bulletin.)

APPENDIX ONE

Technical References for Hospital Fire Safety Officials

Fire Safety Training in Health Care Institutions; published by the American Hospital Association, 840 North Lake Shore Drive, Chicago, Ill., 60611.

The Hospital Safety Compliance Guide; by David Elwing, 740 North Rush Street, Chicago, Ill., 60611 (1977).

Environmental Aspects of the Hospital-Safety Fundamentals; Public Health Service, Publication #930-C-17 (1967).

Characteristics and Safe Handling of Medical Gases; available from Compressed Gas Association (1978).

Publications available from the National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210.

NFPA #	Title
101	*Life Safety Code
56C	*Laboratories in Health-Related Institutions
30	Flammable and Combustible Liquids Code
56A	*Flammable Anesthetics Code
56B	Respiratory Therapy
56D	Hyperbaric Facilities
56E	Hypobaric Facilities
56F	Nonflammable Medical Gases
56HM	Home Respiratory Therapy
70	National Electrical Code
76A	Hospital Electrical Systems
80	Fire Doors, Windows
232	Protection of Records
801	Radioactive Materials Facility
10	*Portable Extinguishers
13	Sprinkler Systems
49	Hazardous Chemical Data
76B	Electricity in Patient Care Facilities

*Health Care Safety--Basic Library HCSL-A
Health Care Safety--Supplemental Library HCSL-B
Health Care Safety SPP-32
Fire Protection Handbook, 14th Edition
Fire Safety for Nursing Home Employees NHTP75
*Catalogue of Fire Safety Literature 1979

Publications available from the National Institute for Occupation Safety and Health, Division of Technical Services, 4676 Columbia Parkway, Cincinnati, Ohio 45226.

Health and Safety Guide for Hospitals; NIOSH Publication No. 78-150.

Effects of Trace Concentrations of Anesthetic Gases on the Behavioral Performance of Operating Room Personnel; NIOSH Publication No. 76-169.

Methods for the Elimination of Waste Anesthetic Gases and Vapors in Hospitals; NIOSH Publication No. 76-137.

Occupational Exposure to Waste Anesthetic Gases; NIOSH Publication No. 77-200.

Hospital Occupational Health Services Study--Summary and Conclusions; NIOSH Publication No. 76-115.

Reprints and publications available from the National Safety Council; 444 North Michigan Avenue, Chicago, Ill. 60611.

Basic Concepts of Ionizing Radiation Safety; #111.17-26.

OSHA Inspections--A Plan of Action; #111.17-81.

OSHAct Primer--Parts I, II, III, and IV; #111.17-94.

OSHAct Primer--Parts V and VI; #111.17-95.

*Portable Fire Extinguisher Guidelines--Selection, Maintenance, and Operation; #111.17-96.

*Communications for the Safety Professional; #113-22.

Guide for Operating Ambulance Fleets; #221-31.

Safety Short Courses

National Safety Council, Safety Training Institute, 444 North Michigan Avenue, Chicago, Ill. 60611, provides short courses in: *Fundamentals of Hospital Safety; Fundamentals of Occupational Safety; Safety Management Techniques; Safety Training Methods; others. Fees vary--contact NSC for time and place.

National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210, provides courses in *Life Safety Code; Flammable Liquids Code; and Hazardous Materials.

International Loss Control Institute; Highway 78, Box 345, Loganville, FA 30429, provides short courses in: Professional Consulting in Safety and Loss Control; Safety Management Fundamentals; Safety Training for Professional Development; Hospital Risk Management.

Courses may be available from local colleges and universities. Contact your state safety council for specific information.

Programmed Courses

Safety Training Observation Program for Non-Supervisory Personnel; E. I. duPont de Nemours and Company, Applied Technology Division, Wilmington, Delaware 19898.

Introduction to OSHA (Slides and tape); Research Media, 4 Midland Avenue, Hicksville, New York 11801.

Occupational Safety and Health for Supervisors; National Institute for Occupation Safety and Health, 4676 Columbia Parkway, Cincinnati, Ohio 45226.

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*Highly recommended.

APPENDIX E

PANEL OF EXPERTS SURVEY LETTER

Letter Used in Surveying Panel

of Fire Safety Experts

As a graduate student at the University of Oklahoma I am developing a research project to evaluate the level of fire-safety knowledge among hospital employees. Part of this project will require the use of a written questionnaire to determine what employees know about fire safety.

The final questionnaire will be prepared from the enclosed listing of fire-safety information. Your assistance is requested in judging if the average hospital employee should be expected to know the stated information. A section is provided for you to include other information which you feel employees should be aware of.

A self-addressed stamped envelope is enclosed for your use. If you would like to receive a copy of the final questionnaire please indicate on the enclosed sheet. Your help in this project is sincerely appreciated.

Truly,

Homer C. Emery
114 S.W. 75th Street
Lawton, Oklahoma 73505

APPENDIX F

RESULTS OF ITEM ANALYSIS

Appendix F

Results of Item Analysis of Original Fifty Statements

Known Position Group (KPG) = Group of fire safety officials from Fort Sill, Oklahoma (n=15)

Known Negative Group (KNG) = Group of freshman nursing students attending Cameron University, Lawton, Oklahoma (n=15

Method: One point was awarded for correct response to factual questions and one point was awarded for positive response to attitude statements. Zero points were awarded for a wrong response to factual questions or a negative response to attitude statements.

The T statistic test for independent sample methods was used to determine if individual items significantly distinguished between the KPG and the KNG. The following computations were used to determine T scores with 28 d.f. at a 0.05 significance level.

$$T = \frac{\bar{X} - \bar{Y} - 0}{\sqrt{\frac{1}{n1} + \frac{1}{n2}} \sqrt{\frac{\Sigma X_i^2 - n_1\bar{X}^2 + \Sigma Y_i - n_2\bar{Y}^2}{n_1 + n_2 - 2}}}$$

$\bar{X}$ = mean score for KPG

$\bar{Y}$ = mean score for KNG

Null hypothesis tested for each item: That there is no significant difference in the KPG mean score and the KNG mean score (Ho: $\bar{X} - \bar{Y} = 0$).

T 28, 0.05 critical value = 1.701. Test items with T scores below this value were rejected and Ho accepted.

1. How many fire drills are hospitals required to have yearly?
   (A) 6
   (B) 3
   (C) 4
   +(D) 12

   KPG 1 1 0 1 1 1 0 1 1 1 1 0 1 0 0
   KNG 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 T = 2.824 Accept

2. The first person responding to a fire should:
   (A) attempt to extinguish the fire immediately
   +(B) remove patients in danger and sound the alarm
   (C) remove patients in immediate danger and extinguish the fire
   (D) begin immediate evacuation of all patients on the floor

   KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
   KNG 0 1 1 0 1 0 1 0 1 1 0 1 1 0 0 T = 3.500 Accept

3. A recent survey of local hospitals showed how many employees could use fire extinguishers in a correct manner?
   (A) less than 50%
   +(B) more than 50%

   KPG 1 1 1 0 1 1 0 0 1 1 0 0 0 1 1
   KNG 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 T = 2.928 Accept

4. As concern electrical safety the "patient vicinity" represents:
   (A) the patient's room
   +(B) a space of 6 feet beyond the reach of the patient
   (C) the patient's bed
   (D) any space within 10 feet of the patient

   KPG 0 1 1 0 1 1 1 0 1 0 1 1 0 0 0
   KNG 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 T = 1.497 Reject

5. The travel distance between a patient's door and a fire exit should not exceed:
   (A) 75 feet
   (B) 50 feet
   (C) 150 feet
   +(D) 100 feet

   KPG 1 0 1 1 0 1 0 1 1 1 0 0 0 1 1
   KNG 1 1 1 1 1 0 0 0 0 0 1 0 0 0 0 T = 0.712 Reject

6. Fire prevention activities in hospitals should be focused on:
   (A) construction standards and equipment
   +(B) employee training

KPG 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
KNG 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 T = 1.555 Reject

7. Wooden doors:
   +(A) offer resistance to the spread of fire when closed
   (B) are required to be vented for air movement in patient rooms
   (C) offer little resistance to the spread of fire
   (D) should be kept open during an actual fire to allow rapid removal of patients

KPG 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1
KNG 0 0 1 1 0 1 1 1 0 0 0 0 1 1 1 T = 2.683 Accept

8. What percent of new hospitals (built since 1976) can be considered to be fire proof?
   (A) 1-3% when built according to fire safety construction standards
   +(B) None

KPG 1 1 1 1 1 1 1 1 1 1 1 1 0 1 0
KNG 1 1 0 1 0 0 1 1 0 0 0 0 1 0 0 T = 2.928 Accept

9. Flammable liquids in hospitals:
   +(A) should not be stored in ordinary refrigerators
   (B) must be stored in safety cans
   (C) should not be used unless a vent hood is available
   (D) should be stored in fire proof plastic bottles

KPG 1 1 0 1 1 1 1 1 1 0 0 1 0 1 0
KNG 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 T = 3.433 Accept

10. If used for the storage of flammable liquids safety cans:
   (A) should not exceed a five gallon capacity
   (B) be constructed of plastic
   +(C) should not exceed a two gallon capacity
   (D) be clearly labeled "Fire Hazard"

KPG 1 1 0 1 1 1 1 0 0 1 0 0 0 0 0
KNG 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 T = 1.560 Reject

11. When the comfort of the patient is in question fire safety requirements:
   (A) may be modified for the patient's comfort
   +(B) should be followed regardless of patient's comfort

KPG 1 1 1 1 0 1 0 1 1 1 1 1 1 1 0
KNG 0 1 1 1 1 0 0 0 0 1 0 0 0 0 0 T = 3.023 Accept

12. Class "A" fires involve:
(A) electrical equipment
+(B) paper and wood
(C) flammable liquids
(D) compressed gases

KPG 1 1 1 1 1 1 1 1 1 1 1 0 0 1 1
KNG 1 1 1 0 0 0 0 0 0 1 0 1 0 0 0 T = 3.433 Accept

13. Oxygen is a:
(A) common flammable gas
(B) highly flammable gas
+(C) supporter of combustion
(D) halogen compressed gas

KPG 1 1 0 1 1 1 1 1 1 0 1 1 1 1 1
KNG 0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 T = 4.752 Accept

14. The number of minor fires occurring in the average hospital is reported to be:
+(A) 3-5 a year
(B) less than one a year

KPG 1 1 1 0 1 1 1 0 0 0 1 1 1 1 1
KNG 1 1 1 1 1 0 0 0 0 1 1 1 0 0 0 T = 1.122 Reject

15. How many hours of formal fire-safety training is recommended for new hospital employees?
+(A) four hours
(B) eight hours

KPG 1 0 0 1 1 1 1 1 0 1 1 1 1 1 1
KNG 1 1 1 0 0 0 0 0 0 0 1 0 0 0 0 T = 3.347 Accept

16. A fire in a patient's bedside light should be extinguished with a:
(A) class "A" extinguisher
(B) class "B" extinguisher
+(C) class "C" extinguisher
(D) class "E" extinguisher

KPG 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
KNG 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 T = 4.000 Accept

17. The three basic requirements for a fire are:
+(A) heat, combustible materials, and fuel
(B) fuel, heat, and air
(C) fire, fuel, and flame
(D) spark, heat, and fuel

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1
KNG 1 0 1 1 1 1 1 1 1 1 1 0 1 1 1 T = 1.058 Reject

18. The temperature at which materials will ignite is:
(A) the ignition index
(B) the fire spread index
(C) the flame index
+(D) different for different materials

KPG 1 1 1 1 1 1 1 0 1 1 1 1 1 1 0
KNG 0 1 1 1 1 1 1 1 0 1 1 1 1 1 1 T = 0.000 Reject

19. As concerns smoking in hospitals it has been found that:
+(A) smoking is a major cause of hospital fires
(B) smoking is not a major cause of hospital fires

KPG 1 1 0 0 1 0 1 1 1 1 0 1 1 0 1
KNG 1 1 1 1 0 1 1 0 0 1 1 1 1 0 1 T = -0.385 Reject

20. Present fire-safety training programs for hospital employees have:
+(A) been shown to be effective in fire prevention
(B) designed to meet accreditation standards

KPG 1 0 0 0 0 1 1 1 1 1 1 1 1 1 1
KNG 0 0 0 1 0 0 0 1 0 1 0 1 1 0 0 T = 2.315 Accept

21. Elevators in the hospital (during a fire):
(A) should be used to transport critically ill patients only
(B) may be used to transport bed-fast patients
(C) should be sent to the fire area to help remove patients
+(D) should not be used during a fire since they may fail

KPG 1 1 1 1 1 1 1 1 1 1 0 0 1 1 1
KNG 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 T = 1.287 Reject

22. Which of the following is not a flammable gas or liquid:
(A) ether
+(B) oxygen
(C) acetone
(D) alcohol

KPG 1 1 1 1 1 1 1 1 1 1 0 0 0 1 0
KNG 1 0 0 0 0 1 0 0 1 0 0 1 0 1 1 T = 1.889 Accept

23. In newer hospitals fire-safety training:
(A) can be reduced because newer construction and equipment will not present the same degree of hazard as older buildings
+(B) should be the same since the basic hazards are the same

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 T = 1.000 Reject

24. If you had a fire in a patient's mattress and put it out you should:
(A) include a written report of the incident in the nursing report
+(B) call the fire department to make sure the fire has been extinguished
(C) make sure to not alarm other patients
(D) not call the fire department since the fire is out and patients may be unduly alarmed

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0
KNG 0 1 0 0 0 1 0 0 1 0 0 0 0 1 1 T = 3.433 Accept

25. Flammable liquids are dangerous and a fire hazard because:
(A) they may be spilled and catch fire
(B) their low pH will cause them to burn rapidly
(C) some are caustic and may cause skin burns
+(D) vapors may fill a room and ignite from a spark

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1
KNG 0 0 0 0 0 1 0 0 1 1 0 0 1 1 1 T = 3.629 Accept

26. The cause of most hospital fires is:
+(A) employee negligence
(B) equipment failure

KPG 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
KNG 1 1 1 0 1 0 0 1 0 1 0 0 0 0 0 T = 1.889 Accept

27. A recent survey showed that most hospital supervisors inspected work areas for fire hazards:
+(A) monthly
(B) quarterly

KPG 0 0 1 0 1 0 1 1 0 1 1 1 1 1 1
KNG 1 0 0 0 0 1 0 0 1 0 1 0 0 1 0 T = 1.870 Accept

28. Compressed gas cylinders should be secured in an upright position because
(A) gas inside the cylinder is toxic
+(B) of the destructive force released if they fall and break at the valve
(C) leaks are easier to detect in an upright position
(D) the partial pressure of the gas may increase if not in a vertical position

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 0 0 1 1 1 1 1 1 0 1 1 1 0 T = 2.256 Accept

29. A survey of local hospitals showed how many followed strict enforcement of smoking policies:
(A) 25%
+(B) 45%

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 0 0 1 1 1 1 1 1 1 0 1 1 1 0 T = 2.566 Accept

30. Basic one person carries for evacuating patients include:
(A) pack strap, nightengale carry, cross-over
+(B) pack strap, hip and cradle drop
(C) fireman's carry, cross-over
(D) all the above

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
KNG 1 1 0 0 1 1 1 0 1 1 1 0 0 1 0 T = 2.269 Accept

31. Most fires if not controlled can produce untenable smoke conditions in:
(A) 10-15 minutes
+(B) less than 7 minutes
(C) the primary stage
(D) the intermediate stage

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1
KNG 0 1 1 0 1 0 1 0 1 0 1 1 1 1 0 T = 2.269 Accept

32. Current recommendations concerning the reporting of minor fires in hospitals are:
+(A) all fires should be reported to local authorities no matter how small
(B) only major fires need to be reported to local authorities

KPG 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1
KNG 1 0 1 1 0 1 0 1 0 1 1 1 1 1 0 T = 1.870 Accept

33. The majority of hospital administrators feel that:
(A) all employees should be required to attend four hours of fire safety training each year
+(B) all employees should be required to attend two hours of fire safety training each year

KPG 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1
KNG 1 1 0 0 1 0 1 1 1 1 0 0 0 1 1 T = 2.269 Accept

34. It has been found in several studies that:
(A) professional personnel need less fire safety training due to their educational backgrounds
+(B) professional personnel should receive the same training as other hospital workers

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 1 1 0 1 1 1 1 1 0 0 0 0 1 T = 2.648 Accept

35. Flammable liquid fires are best extinguished by:
+(A) carbon dioxide (CO_2) or dry chemical
(B) carbon tetrachloride
(C) water under pressure
(D) class "A" extinguisher

KPG 1 0 1 1 1 1 0 1 1 1 1 1 1 1 1
KNG 1 0 0 1 0 1 1 0 1 1 0 0 1 0 1 T = 2.066 Accept

36. Which carry would be best for taking a patient down stairs:
(A) hip carry
+(B) extremity carry
(C) three person carry
(D) swing carry

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 1 0 1 1 1 1 0 0 1 0 0 0 1 T = 3.055 Accept

37. In case of power failure auxiliary power is:
(A) required to meet all hospital needs
(B) supply power for air conditioning and elevators
(C) required for elevators only
+(D) required for operating rooms, ICU, emergency lights, and other basic life safety systems

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 1 1 0 1 1 1 1 1 1 1 1 0 0 T = 1.870 Accept

38. Fire safety inspections should be:
(A) performed by professional fire safety personnel
+(B) performed by work area supervisor

KPG 1 1 1 1 0 0 1 0 1 1 1 1 1 1 0
KNG 1 0 1 1 0 0 0 0 0 0 0 1 1 0 1 T = 1.890 Accept

39. During 1977 how many persons in the U.S. died as a result of fire?
+(A) 9,950
(B) 8,550

KPG 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
KNG 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 T = 0.460 Reject

40. During a fire which factor is responsible for a greater loss of life?
(A) heat and flames resulting in burns
+(B) smoke and toxic gases

KPG 1 1 1 1 1 1 1 1 1 1 0 1 0 1 1
KNG 1 1 1 1 0 1 1 0 1 1 1 1 1 1 0 T = 0.475 Reject

41. Which shift of employees will normally be better trained in fire safety?
(A) night shift
+(B) day shift

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1
KNG 1 0 1 0 1 1 1 1 1 1 1 1 1 1 1 T = 0.591 Reject

*Although this statement did not distinguish between the KPG and the KNG it was retained in the final instrument to provide information concerning level of training on different shifts. It was not used to determine test scores for the final instrument.

42. If a hospital employee observes smoke but finds no fire it is best to:
+(A) call the fire department without delay
(B) make a thorough search for the fire or flame then call

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 0 1 1 1 1 1 0 0 1 0 1 1 1 T = 2.256 Accept

43. Smoking policies for patients should:
+(A) prohibit all patients from smoking unless a visitor or attendant is present
(B) prohibit only those patients on certain medication to refrain from smoking without supervision

KPG 1 0 1 1 1 1 1 1 0 1 1 1 1 1 1
KNG 1 1 0 0 1 1 1 1 0 1 1 0 0 0 0 T = 2.066 Accept

44. A national organization dedicated to fire prevention activities and fire safety education is:
(A) American Fire Safety Organization
(B) National Fire Prevention Organization
(C) American Association for Fire Prevention
+(D) National Fire Protection Association

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 0 0 0 1 0 0 0 0 1 0 0 1 0 T = 5.292 Accept

45. The number of hospital fires occurring in the U.S. each year is estimated to be:
+(A) 4,000
(B) 3,500

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
KNG 0 1 0 1 0 0 1 1 0 1 1 1 1 1 1 T = 1.870 Accept

46. The majority of hospital fires start in:
(A) the laboratory
+(B) the patient's room
(C) equipment rooms
(D) the kitchen

KPG 0 1 1 1 0 0 1 0 0 0 0 1 1 0 0
KNG 1 0 1 1 1 1 0 0 1 1 0 1 0 1 1 T = -1.467 Accept

47. Required fire drills for hospital employees have been shown:
(A) to have little effect on employee response during an actual fire
+(B) to be very effective in preparing employees for an actual fire

KPG 1 1 0 1 0 1 0 1 1 1 0 1 0 1 1
KNG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 T = 2.645 Accept*

*This statement was retained to allow employees to evaluate their own safety training program. This statement was not used to determine test scores.

48. How often should fire extinguishers be inspected?
(A) each month
(B) bimonthly
(C) yearly
(D) quarterly

KPG 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
KNG 1 1 1 1 0 1 0 0 0 1 1 1 1 1 1 T = 2.256 Accept

49. A survey of hospitals showed how many employees could correctly state the phone number for the fire department.
+(A) more than 50%
(B) less than 50%

KPG 1 0 1 1 1 1 0 1 1 1 1 1 1 1 1
KNG 1 0 0 1 0 1 1 0 1 1 0 0 1 0 1 T = 2.066 Accept

50. Which group of people is responsible for the majority of hospital fires?
(A) engineering
(B) housekeeping
(C) nursing
(D) administrative

	A	B	C	D
KPG	1	7	6	0
KNG	4	8	3	2

This statement is intended to obtain information concerning how different groups of hospital employees view who causes hospital fires.