3. RECOMMENDED GUIDELINES FOR CONTROLLING SAFETY HAZARDS IN HOSPITALS

The hospital work environment contains many safety hazards such as wet floors, flammable or explosive liquids, and tasks requiring heavy lifting. The most common hazards are well-recognized, but others can only be recognized and corrected by trained workers. This section covers some of the most common safety hazards in hospitals and the special hazards that can be present in particular hospital departments (see Appendices 5, 6, and 8 for information about needle-puncture wounds)

3.1 TYPES OF SAFETY HAZARDS

3.1.1 Physical Exertion

3.1.1.1 Hernias

Hernias develop when an act of lifting or straining causes increased pressure in the abdomen and bowel or when the tissue that covers the bowel is pushed through a weak area in the abdominal wall. Although pain may be the first symptom, a noticeable bulge in the scrotum, lower abdomen, or thigh may also be observed.

3.1.1.2 Back Injuries

Nearly 50% of all compensation claims for hospital workers involve back injuries (Health Alert 1978). In 1978, back injuries accounted for approximately 25 million lost workdays and about $14 billion in treatment costs among all workers in the United States (Goldberg et al. 1980). Data from the Bureau of Labor Statistics for 1980 indicate that nurses aides, orderlies, and attendants in New York filed workers' compensation claims for back sprains and strains more frequently than did workers in any other occupation (8.26 claims/1000 eligible workers). Claims from licensed practical nurses ranked third (5.62 claims/1000 eligible workers), while those from registered nurses ranked sixth (2.20 claims/1000 eligible workers). Other health care categories ranked in the top ten included health aides (not nursing aides), radiologic technicians, and health-record technicians (Jensen 1986). Frequently, these workers must lift and move patients without adequate help.

3.1.1.2.1 Frequent causes of back pain

Lloyd et al. (1987) list the most common causes of all work-related back pain as (1) job performance by a worker who is unfit or unaccustomed to the task, (2) postural stress, and (3) work that approaches the limit of a worker's strength. Factors that contribute to these causes of back pain are understaffing, the lack of regular training programs in proper procedures for lifting and other work motions, and inadequate general safety precautions.

Specific causes of back problems for hospital workers are listed below by type of worker:

- Food service workers: Pushing or pulling carts, lifting heavy food trays, and moving dishes, racks, and containers
- Housekeepers: Lifting and setting down objects, and using scrubbing machines, brooms, and mops
- Clerical workers: Using chairs that are not designed for desk work and do not provide the proper support
- Laundry workers: Pushing or pulling carts
- Maintenance workers: Lifting, moving, and handling large packs, boxes, or equipment
- Patient-care providers: Assisting patients and raising or lowering beds

3.1.1.2.2 Preventing back injuries

Written guides and programs for preventing back injury are available for all workers and specifically for hospital workers. NIOSH has published a general guide, Work Practices Guide for Manual Lifting (NIOSH 1981b), which contains weight-limit recommendations. The Back Pain Association and the Royal College of Nursing in the United Kingdom have together published a comprehensive guide for nurses entitled The Handling of Patients: A Guide for Nurses (Lloyd et al. 1987). This document contains discussions on the anatomy and physiology of the back, the causes of back pain, preventive approaches, principles for handling patients, and aids for lifting patients.

The primary approach to preventing back injury involves reducing manual lifting and other load-handling tasks that are biomechanically stressful. The secondary approach relies on teaching workers how to (1) perform stressful tasks while minimizing the biomechanical forces on their backs, and (2) maintain flexibility and strengthen the back and abdominal muscles.

The most important elements in a program to prevent back injuries among hospital staff are

- Mechanical devices for lifting patients and transferring cart tops, X-ray tables, and other heavy objects
- Wheels and other devices for transporting heavy, nonportable equipment
- Adequate staffing to prevent workers from lifting heavy patients or equipment alone
- Close supervision for newly trained workers to assure that proper lifting practices have been learned
- In-service education for both new and experienced staff on the proper measures for avoiding back injuries
- Preplacement evaluation of workers. Workers with significant pre-existing back disorders should not be assigned jobs that require lifting. A history of current lower-back pain is the primary basis for excluding workers from jobs that require lifting. Routine lower-back (lumbar) X-rays are not recommended for preplacement evaluations because studies indicate they do not predict which workers will suffer future back injuries. Preplacement strength testing may occasionally help in assigning workers to tasks that routinely involve moving very heavy objects. Several articles listed in the Additional Resources for this section present methods for analyzing the physical demands of a job and the strength of a job applicant.

Training programs for workers should emphasize

- Proper lifting techniques (Lloyd et al. 1987; NIOSH 1981b)
- Preventing initial back injuries. Because a back that has already sustained an injury is much more likely to be reinjured, preventing the first back injury is the most important step.
- Requesting help. When in doubt about whether a task may strain the back, a worker should request help rather than taking a chance.
- Performing back exercises. Some exercises can be used to strengthen the back muscles and help prevent back injuries. A physician or physical therapist should be consulted.

- Transferring patients. Patient transfers are particularly hazardous for hospital workers and are not often covered in general publications on preventing back injury. The following special points should be emphasized to prevent back injuries during transfers

  -- Communicate the plan of action to the patient and other workers to ensure that the transfer will be smooth and without sudden, unexpected moves

  -- Position equipment and furniture effectively (for example, move a wheelchair next to the bed) and remove obstacles

  -- Ensure good footing for the staff and patient (patients should wear slippers that provide good traction)

  -- Maintain eye contact and communication with patient; be alert for trouble signs

  -- If help is needed, request that a co-worker stand by before attempting the transfer

  -- Record any problems on the patient's chart so that other shifts will know how to cope with difficult transfers; note the need for any special equipment, such as a lift.

- Reducing accident hazards such as wet floors, stairway obstructions, and faulty ladders. Wet-floor hazards can be reduced by proper housekeeping procedures such as marking wet areas, cleaning up spills immediately, cleaning only one side of a passageway at a time, keeping halls and stairways clear, and providing good lighting for all halls and stairwells. Workers should be instructed to use the handrail on stairs, to avoid undue speed, and to maintain an unobstructed view of the stairs ahead of them--even if that means requesting help to manage a bulky load.

  Ladders are especially hazardous. Falls from even low stools and step ladders can cause painful and disabling injuries. Ladder hazards can be reduced before use by performing safety checks to ensure that

  -- The ladder is in good condition

  -- The ladder has level and secure footing with nonslip feet and is supported by another worker if necessary

  -- The ladder is fully opened and is not too far from the wall

-- Neither the rungs of the ladder nor the worker's feet are wet

-- The person using the ladder is not working more than a comfortable arm's reach from an upright position

-- Not more than one person occupies a ladder at one time

3.1.2 Fires and Natural Disasters

Hospital fires and natural disasters are especially dangerous because workers must evacuate large numbers of patients and also protect themselves. Thus it is important to know both the most common causes of hospital fires and the most common causes of death in these disaster situations.

3.1.2.1 Fires

A survey conducted by the National Fire Protection Association (NFPA) (Fire Journal 1970) revealed that almost one-third of hospital fires originated in patient rooms or worker quarters, with matches and smoking as the most frequent causes. Fires also originate from malfunctioning or misused electrical equipment such as hot plates, coffeepots, and toaster ovens (See 3.1.5).

Deaths during hospital fires were overwhelmingly due to inhaling the toxic products of combustion rather than to direct exposure to the fire (Fire Journal 1970).

The most common fire hazards by hospital setting are:

Setting	Hazard
Patient rooms	Smoking materials, faulty equipment (including the patient's personal grooming devices)
Storage areas	Linens, maintenance equipment, compressed gas cylinders, flammable liquids, smoking materials, welding, heaters, trash removal
Machinery and equipment areas	Solvents, oily rags, faulty equipment

An effective and ongoing program to educate the staff about the hazards of smoking and electrical fires can help reduce these risks. Patients should be informed about the dangers of smoking when admitted and should be

reminded frequently. Some States prohibit ambulatory patients from smoking in bed and require that bedridden patients be supervised by either staff or family members while smoking.

The use of oxygen in patient areas is another obvious fire hazard. Fires can occur in an oxygen-enriched atmosphere because of patient smoking, electrical malfunctions, and the use of flammable liquids. Procedures should be developed and strictly enforced to prevent fire hazards in patient areas where oxygen is used.

The basic code for fire safety is the NFPA Life Safety Code (NFPA 1983, Volume 9). Many municipal, State, and Federal agencies and nongovernment organizations have also produced regulations, codes, and recommendations for fire safety. Engineering a Safe Hospital Environment (Stoner et al. 1982) and Safety Guide for Health Care Institutions (AHA/NSC 1983) contain summaries and discussions of the latter. Fire drills should be held regularly and should include training to operate fire extinguishers, locate alarms and identify their codes, assign responsibilities for patient safety, and locate exits.

3.1.2.2 Natural Disasters

Although emergency plans for fires are the most important, disaster plans should also be prepared for natural events (e.g., tornadoes, earthquakes, and hurricanes), gas leaks, and bomb threats. Such plans should be written and readily available, and workers should at least know the exit routes. If all workers are informed and trained, they can help avert panic and enhance a rapid and safe evacuation for themselves and others.

3.1.3 Compressed Gases

Because some compressed gases are flammable and all are under pressure, they must be handled with extreme care. An exploding cylinder can have the same destructive effect as a bomb. Compressed gases used in hospitals include acetylene, ammonia, anesthetic gases, argon, chlorine, ethylene oxide, helium, hydrogen, methyl chloride, nitrogen, and sulfur dioxide. Acetylene, ethylene oxide, methyl chloride, and hydrogen are flammable, as are the anesthetic agents cyclopropane, diethyl ether, ethyl chloride, and ethylene. Although oxygen and nitrous oxide are labeled as nonflammable, they are oxidizing gases that will aid combustion.

The proper handling of compressed gas cylinders requires training and a well-enforced safety program. Engineering a Safe Hospital Environment (Stoner et al. 1982) contains a discussion for developing a hospital-based program with special emphasis on the necessary precautions for handling oxygen cylinders and manifolds.

Storage areas for compressed gas cylinders should be well ventilated, fireproof, and dry. Compressed gas cylinders should never be subjected to temperatures higher than 125°F (Stoner 1982). Cylinders should not be stored near steam pipes, hot water pipes, boilers, highly flammable solvents, combustible wastes, unprotected electrical connections, open flames, or other potential sources of heat or ignition. Cylinders should be properly labeled. The valve protection cap should not be removed until the cylinder is secured and ready for use.

Stoner (1982) presents the following general precautions for storing and handling compressed gas cylinders:

1. Secure all cylinders and do not place a cylinder of one type against a cylinder of another type.

2. Smoking should not be permitted in any area where gases are being used or stored.

3. Never drop cylinders or allow them to strike each other.

4. If cylinders are temporarily stored outside in the summer, make sure they are shaded from the rays of the sun.

5. Do not drag, roll, or slide cylinders. Use a hand truck and secure cylinders before moving.

6. Never tamper with cylinder safety devices.

7. Do not store empty cylinders with full ones.

8. Do not allow a flame to come into contact with any part of a compressed gas cylinder.

9. Do not place cylinders where they may come in contact with electricity.

10. Never store flammable gases with nonflammable gases.

Workers responsible for transferring, handling, storing, or using compressed gases should review the requirements of 29 CFR 1910.101 through 1910.105; 49 CFR, Parts 171-179; the National Fire Codes (NFPA 1983, Volume 4); and any applicable State or local regulations. Specific OSHA standards should be consulted for the following compressed gases:

Substance	OSHA Standard in 29 CFR
Acetylene	1910.102
Hydrogen	1910.103
Oxygen	1910.104
Nitrous oxide	1910.105

3.1.4 Flammable and Combustible Liquids, Vapors, and Gases

The widespread use and storage of flammable and combustible liquids presents a major fire hazard in all hospitals. Although workers usually recognize this potential hazard, they should also be aware of important facts about flammable liquids that can help to prevent fires.

Many liquids have vapors that are flammable or combustible and can be ignited by a spark from a motor, friction, or static electricity. A liquid may be classified as either combustible or flammable, depending on its flash point, which is the temperature at which it gives off enough vapor to form an ignitable mixture with air. When a liquid reaches its flash point, contact with any source of ignition (e.g., a cigarette or static electricity) will cause the vapor to burst into flame.

OSHA and NFPA have defined the limits for combustibility and flammability as follows: a combustible liquid has a flash point at or above 100°F (37.8°C) (NFPA 1983, Volume 3); a flammable liquid has a flash point below 100°F (37.8°C) and a vapor pressure at or below 40 pounds per square inch (psia) (276 kPa) at 100°F (37.8°C) (NFPA 1983, Volume 3). Because a flammable liquid can reach its flash point even at room temperature, any unrecognized leak can pose a particular hazard. If escaping vapors are heavier than air, they can move for some distance along the ground in an invisible cloud and settle in low areas.

Examples of flammable and combustible liquids are as follows:

Liquid	Flash point (°F)
Flammable liquids:	
Xylene	81
Most alcohols	50–60
Toluene	40
Benzene	12
Tetrahydrofuran	6
Acetone	1.4
Ethyl ether	–49

Combustible liquids:
- Lubricating oils 250-475
- Ethylene glycol. 232
- Carbolic acid. 175
- Some cleaning solvents 140
- Most oil-based paints. 105-140

Piping systems (including the pipe, tubing, flanges, bolting, gaskets, valves, fittings, and the pressure-containing parts of other components) that contain flammable and combustible liquids must meet the requirements of NFPA 30 (NFPA 1983, Volume 3).

The following precautions must be taken for flammable and combustible liquids:

- The transfer of flammable or combustible liquids from bulk stock containers to smaller containers must be made in storage rooms as described by NFPA 30 or within a fume hood that has a face velocity of at least 100 ft/min (30.5 m/min) (NFPA 1983, Volume 4).

- Spills of flammable and combustible liquids must be cleaned up promptly (NFPA 1983, Volume 3). Cleanup personnel should use appropriate personal protective equipment. If a major spill occurs, remove all ignition sources and ventilate the area. Such liquids should never be allowed to enter a confined space such as a sewer because explosion is possible.

- Flammable or combustible liquids must be used from and stored in approved containers according to NFPA 30 (NFPA 1983, Volume 3).

- Flammable liquids must be kept in closed containers (29 CFR 1910.106).

- Combustible waste material such as oily shop rags and paint rags must be stored in covered metal containers and disposed of daily (29 CFR 1910.106).

- Storage areas must be posted as "NO SMOKING" areas (29 CFR 1910.106).

3.1.4.1 Storage Cabinets

Storage cabinets should be labeled "FLAMMABLE - KEEP FIRE AWAY." The NFPA National Fire Codes (NFPA 1983, Volume 3) details requirements for metal storage cabinets that contain flammable and combustible liquids, including the following:

- Metal cabinets must be constructed of sheet steel that is at least No. 18 gauge. They must be double-walled with a 1.5-in. (38.1-mm) air space, and they must have joints that have been riveted, welded, or otherwise made tight.

- Doors must have a three-point latch arrangement, and the sill must be at least 2 in. (50.8 mm) above the bottom of the cabinet.

3.1.4.2 Inside Storage Areas

Each inside storage area should be prominently posted as a "NO SMOKING" area. The NFPA National Fire Codes (NFPA 1983, Volume 3) details requirements for inside storage areas for flammable and combustible liquids, including the following:

- Openings to other rooms or buildings must be provided with noncombustible, liquid-tight, raised sills or ramps that are at least 4 in. (101.6 mm) high or are otherwise designed to prevent the flow of liquids to adjoining areas. A permissible alternative to a sill or ramp is an open-grated trench that spans the width of the opening inside the room and drains to a safe location.

- General exhaust ventilation (mechanical or gravity) is required.

- Electrical wiring and equipment in inside rooms used to store flammable and combustible liquids must conform to the requirements of NFPA 70, the National Electrical Code (NFPA 1983, Volume 6). A fire extinguisher must be available.

3.1.4.3 Outside Storage Areas

If flammable and combustible liquids are stored outside, the storage area must either be graded to divert spills from buildings and other potential exposure areas, or it must be surrounded by a curb at least 6 in. (152.4 mm) high (NFPA 1983, Volume 3). The storage area should be posted as a "NO SMOKING" area and kept free of weeds, debris, and other combustible material. A fire extinguisher should be available at the storage area.

3.1.4.4 Liquid Propane Gas Storage Areas

Storage areas for liquid propane gas (LPG) tanks should be posted as "NO SMOKING" areas. A fire extinguisher must be available in the area (NFPA 1983, Volume 5).

3.1.5 Electrical Equipment

Electrical malfunction is the second leading cause (after matches and smoking) of fires in hospitals. Violations of standards governing the use of electrical equipment are the most frequently cited causes of fires (Fire Journal 1970). Hospital personnel use a wide variety of electric equipment in all areas--general patient care, intensive care units, emergency rooms, maintenance, housekeeping service, food preparation, and research.

Thorough electrical maintenance records should be kept, and considerable effort should be devoted to electrical safety, particularly in areas where patient care is involved.

3.1.5.1 Food Preparation Areas

NIOSH has published an Alert on the prevention of electrocutions in fast food restaurants (NIOSH 1984). The following recommendations from that document also apply to food preparation areas in hospitals:

- Ground-fault circuit interrupters (GFCI's) of the breaker or receptacle type should be installed wherever there is electricity in wet areas. These devices will interrupt the electrical circuit before current passes through a body in sufficient quantities to cause death or serious injury. GFCI's are inexpensive ($50.00 to $85.00 for the breaker type or $25.00 to $45.00 for the receptacle type), and a qualified electrician can install them in existing electrical circuits with relative ease.

- Exposed receptacle boxes should be made of nonconductive material so that contact with the box will not constitute a ground.

- Plugs and receptacles should be designed so that the plug is not energized until insertion is complete.

- Electrical panels should bear labels that clearly identify the corresponding outlets and fixtures for each circuit breaker or fuse. Breaker switches should not be used as on-off switches.

- Workers should be instructed when hired about safe electrical practices to avoid work hazards. Workers should not contact (1) a victim experiencing electrical shock or (2) the electrical apparatus causing it, until the current has been cut off.

- Workers, whether involved in direct patient care or not, should be encouraged to obtain training in cardiopulmonary resuscitation (CPR) and to know how to call for emergency assistance in their hospital.

3.1.5.2 Unsafe Equipment and Appliances

Equipment and appliances that are frequently ungrounded or incorrectly grounded include

- Three-wire plugs attached to two-wire cords
- Grounding prongs that are bent or cut off
- Ungrounded appliances resting on metal surfaces
- Extension cords with improper grounding
- Cords molded to plugs that are not properly wired
- Ungrounded, multiple-plug "spiders" that are often found in office areas and at nurses' stations
- Personal electrical appliances, such as radios, coffeepots, fans, power tools, and electric heaters--brought by the workers from home--that are not grounded, have frayed cords or poor insulation, or are otherwise in poor repair.

3.1.5.3 National Electrical Code

OSHA has adopted the National Electrical Code (NEC) in NFPA 70 as a national consensus standard. The NEC is designed to safeguard persons and property from the hazards of using electricity. Article 517 of NFPA 70 (NFPA 1983, Volume 6) and NFPA 76A and 76B (NFPA 1983, Volume 7) contain special electrical requirements for health care facilities. In addition, there may be applicable State and local laws and regulations.

3.1.5.3.1 Electrical requirements for service and maintenance areas

Electricians and maintenance personnel should consult OSHA's electrical safety standards found in 29 CFR 1910.301 through 1910.399 and the NEC in NFPA 70 (NFPA 1983, Volume 6). Some general minimum requirements are listed as follows:

- Each device for disconnection (e.g., circuit breaker or fuse box) should be legibly marked to indicate its purpose (unless the purpose is evident).
- Frames of electrical motors should be grounded regardless of voltage.

- Exposed, noncurrent-carrying metal parts of fixed equipment, which may become energized under abnormal conditions should be grounded under any of the following circumstances:
  - -- If the equipment is in a wet or damp location
  - -- If the equipment is operated in excess of 150 volts
  - -- If the equipment is in a hazardous location
  - -- If the equipment is near the ground or grounded metal objects and subject to contact by workers
  - -- If the equipment is in electrical contact with metal
  - -- If the equipment is supplied by metal-clad, metal-sheathed, or grounded metal raceway wiring
- Exposed, noncurrent-carrying metal parts of plug-connected equipment that may become energized should be grounded under any of the following circumstances:
  - -- If the equipment is a portable, hand-held lamp or motor-operated tool
  - -- If the equipment is a refrigerator, freezer, air conditioner, clothes-washing or drying machine, sump pump, electrical aquarium equipment, hedge clippers, lawn mower, snow blower, wet scrubber, or portable and mobile X-ray equipment)
  - -- If the equipment is operated in excess of 150 volts
  - -- If the equipment is in a hazardous location
  - -- If the equipment is used in a wet or damp location
  - -- If the equipment is used by workers standing on the ground or on metal floors
- Outlets, switches, junction boxes, etc., should be covered.
- Flexible cords should not be
  - -- Used as a substitute for fixed wiring
  - -- Run through holes in walls, ceilings, or floors
  - -- Run through doors, windows, etc.

— Attached to building surfaces

- Flexible cords should be connected without any tension on joints or terminal screws.
- Frayed cords or those with deteriorated insulation should be replaced.
- Splices in flexible cords should be brazed, welded, soldered, or joined with suitable splicing devices. Splices, joints, or free ends of conductors must be properly insulated.

3.1.5.3.2 Damp or wet areas

Because hospitals contain many damp or wet areas, electrical safety requirements are particularly important. A switch or circuit breaker in a wet area or outside a building should be protected by a weatherproof enclosure. Cabinets and surface-type cutout boxes in damp or wet areas should be weatherproofed and located to prevent moisture from entering and accumulating in the cabinet or box. The boxes should be mounted with at least 0.25 inches of air space between the enclosure and the wall or supporting surface. Nonmetallic-sheathed cable and boxes made of nonconductive material are recommended.

In areas where walls are washed frequently or where surfaces consist of absorbent materials, the entire wiring system (including all boxes, fittings, conduit, and cable) should be mounted with at least 0.25 inches of air space between the electrical device and the wall or support surface.

3.1.5.3.3 Special requirements

Specific NEC recommendations apply in areas where flammable materials are stored or handled, in operating rooms, and in patient-care areas. Consult Article 517 of the NEC (NFPA 1983, Volume 6) for further details on these requirements.

Orientation and continuing in-service training programs are necessary to maintain worker awareness of electrical hazards. The following work practices can also help prevent shocks to hospital workers:

- Develop a policy for using extension cords; use a sign-out system to list the number and location of all extension cords currently in use.
- Do not work near electrical equipment or outlets when hands, counters, floors, or equipment are wet.

- Consider defective any device that blows a fuse or trips a circuit breaker, and prohibit its use until it has been inspected.

- Do not use any electrical equipment, appliance, or wall receptacle that appears to be damaged or in poor repair.

- Report all shocks immediately (even small tingles may indicate trouble and precede major shocks). Do not use the equipment again until it is inspected and repaired if necessary.

3.1.6 Assault

Protecting workers from assault in and around hospitals has been a growing problem in recent years. The need for increased hospital security was highlighted by a survey that directors of the International Association of Healthcare Security (IAHS) conducted in 1987 (Stultz 1987). Respondents from 418 hospitals reported a total of 2,118 assaults, 426 suicides, 89 robberies, 63 rapes, 18 kidnappings, 551 bomb threats, and 72 arson incidents for 1986. These incidents occurred in inner city, urban, and rural hospitals. Assaults by patients are particularly common in emergency rooms, state institutions, and the psychiatric wards of hospitals. Patient-care staff should be trained to recognize potentially aggressive behavior in patients and to handle such situations when they arise. Staff should be clearly instructed to avoid dealing on their own with acute violence or physical danger. Security officers and staff should receive special training for such situations. Police and other municipal departments can offer on-site training programs in self-defense.

Personal and property crimes are frequent problems because many hospital personnel must work evening and night shifts at hospitals located in high-crime areas. The IAHS directors and the International Healthcare Safety and Security Foundation (IHSSF) have suggested the following steps (Stultz 1987) to help protect workers:

- Improve staffing and training for hospital security to ensure that

  -- security officers and supervisors are trained to meet certain minimum standards within 1 year of employment

  -- security directors and managers are trained in hospital management, hospital security, safety, and risk management

  -- security procedures are written out for patient restraint, use and detection of weapons, prisoner restraint, and emergency responses

- Increase worker safety during arrival and departure by encouraging car and van pools and by providing security escorts and shuttle service to and from parking lots and public transportation.

- Improve lighting and eliminate unnecessary bushes or shrubbery near sidewalks, parking areas, and bus stops.

- Install direct-dial emergency telephones in parking lots, underground tunnels, elevators, and locker-rooms. Mark phone locations by a distinctive red light.

- Install locks on all outside doors to bar entrance to (not exit from) the building.

- Improve visibility with increased lighting, stairwell and elevator mirrors, and other physical changes.

- Increase staffing in areas where assaults by patients are likely.

- Install a panic-button alarm system in areas where assaults by patients are likely.

- Install closed-circuit televisions in common areas and rooms where psychiatric patients are treated.

- Increase control over hospital access areas.

- Provide separate emergency room facilities for mentally disturbed patients.

- Provide a secure reception area that has good visibility.

- Provide a physical barrier between receptionists and patients.

- Install a buzzer at the entrance to emergency facilities.

- Post escape and evacuation routes.

- Increase security in pharmacies, cash or storage areas, emergency rooms, nurseries, exits, and parking lots by

  -- installing closed-circuit televisions, bullet-proof separation windows, pass-through windows with intercoms, panic alarms, and intrusion alarms

  -- locating these areas away from main entrances and major traffic-flow corridors.