

## 2.4 Rehabilitation Facilities

*Appendix material, which appears in shaded boxes at the bottom of the page, is advisory only.*

### 1. General Considerations

Rehabilitation facilities may be organized under hospitals (organized departments of rehabilitation), outpatient clinics, rehabilitation centers, and other facilities designed to serve either single- or multiple-disability categories, including but not limited to cerebrovascular, head trauma, spinal cord injury, amputees, complicated fractures, arthritis, neurological degeneration, genetic, and cardiac.

In general, rehabilitation facilities will have larger space requirements than general hospitals, have longer lengths of stay, and have environments that are less institutional and more residential.

### 2 Nursing Locations

#### 2.1 Nursing Unit

Where inpatients are a part of the facility, each nursing unit shall provide the following:

##### 2.1.1 Patient Rooms

Each patient room shall meet the following standards:

##### 2.1.1.1 Capacity

- (1) Maximum room occupancy shall be four patients.
- (2) Larger units shall be permitted if justified by the functional program.
- (3) At least two single-bed rooms with private toilet rooms shall be provided for each nursing unit.

##### 2.1.1.2 Space requirements

- (1) Area. Minimum room areas exclusive of toilet rooms, closets, lockers, wardrobes, alcoves, or vestibules shall be 140 square feet (13.01 square meters) in single-bed rooms and 125 square feet (11.61 square meters) per bed in multiple-bed rooms.

- (2) Clearances. In multiple-bed rooms, a clearance of 3 feet 8 inches (1.12 meters) shall be maintained at the foot of each bed to permit the passage of equipment and beds.

**2.1.1.3 Window(s).** Each patient sleeping room shall have a window in accordance with Section 2.4-7.2.2.5.

**2.1.1.4 Patient privacy.** Visual privacy shall be provided for each patient in multiple-bed rooms.

**2.1.1.5 Hand-washing station (s).** Hand-washing stations shall be provided in each patient room.

##### 2.1.1.6 Toilet room

- (1) Each patient shall have access to a toilet room without having to enter the general corridor area.
- (2) One toilet room shall serve no more than four beds and no more than two patient rooms.
- (3) The toilet room shall contain a water closet and a hand-washing station. Omission of the hand-washing station shall be permitted where the toilet room serves single-bed and two-bed rooms if each such patient room contains a hand-washing station.
- (4) Each toilet room shall be of sufficient size to ensure that wheelchair users will have access.

##### 2.1.1.7 Patient storage locations

- (1) Each patient shall have a wardrobe, closet, or locker with minimum clear dimensions of 1 foot 10 inches (55.88 centimeters) by 1 foot 8 inches (50.80 centimeters).
- (2) An adjustable clothes rod and adjustable shelf shall be provided.

**2.1.1.8 Nurse call system.** A nurse call system shall be provided.

## 2.4 REHABILITATION FACILITIES

### 2.1.2 Examination/Treatment Room

#### 2.1.2.1 General

- (1) Omission of this room shall be permitted if all patient rooms are single-bed rooms.
- (2) The examination room in the evaluation unit shall be permitted to serve this purpose if it is conveniently located.

#### 2.1.2.2 Space requirements

- (1) This room shall have a minimum floor area of 120 square feet (11.15 square meters), excluding space for vestibules, toilet, closets, and work counters (whether fixed or movable).
- (2) The minimum room dimension shall be 10 feet (3.05 meters).

**2.1.2.3 Facility requirements.** The room shall contain a work counter; hand-washing station; storage facilities; and a desk, counter, or shelf space for writing.

### 2.1.3 Support Areas for the Nursing Unit

#### 2.1.3.1 General

- (1) Location
  - (a) The support areas noted in this section (2.4-2.1.3) shall be provided in or readily available to each nursing unit.
  - (b) Although identifiable spaces are required for each indicated function, consideration shall be given to alternative designs that accommodate some functions without designating specific areas or rooms.
  - (c) Each support area may be arranged and located to serve more than one nursing unit, but at least one such support area shall be provided on each nursing floor.
- (2) Size. The size and disposition of each support area shall meet the needs of the functional program.

#### 2.1.3.2 Administrative center or nurse station

#### 2.1.3.3 Charting facilities for nurses and doctors

#### 2.1.3.4 Nurse office

#### 2.1.3.5 Hand-washing stations

- (1) Hand-washing stations shall be located near the nurse station and the drug distribution station.
- (2) One hand-washing station shall be permitted to serve both areas.

**2.1.3.6 Medication station.** Provisions shall be made for convenient and prompt 24-hour distribution of medicine to patients. Distribution may be from a medicine preparation room, self-contained medicine dispensing unit, or by another approved system.

- (1) A medicine preparation room
  - (a) If used, this room shall be under the visual control of the nursing staff.
  - (b) If used, this room shall contain a work counter, refrigerator, and locked storage for biologicals and drugs.

- (2) A self-contained medicine dispensing unit. Location of such a unit shall be permitted at a nurse station, in the clean workroom, or in an alcove or other space under direct control of nursing or pharmacy staff.

**2.1.3.7 Nourishment area.** The nourishment station shall be accessible to patients and shall contain the following:

- (1) Equipment for serving nourishment between scheduled meals
- (2) Refrigerator
- (3) Storage cabinets
- (4) A hand-washing station

**2.1.3.8 Ice machine.** Ice maker-dispenser units shall be provided for patient service and treatment.

#### 2.1.3.9 Clean workroom or clean holding room

2.1.3.10 Soiled workroom or soiled holding room

otherwise served by bathing facilities within patient rooms.

2.1.3.11 Equipment and supply storage

- (1) Clean linen storage
  - (a) A separate closet or an area within the clean workroom shall be provided for this purpose.
  - (b) If a closed-cart system is used, storage in an alcove shall be permitted.
- (2) Equipment storage room. A storage room shall be provided for equipment such as IV stands, inhalators, air mattresses, and walkers.
- (3) Storage space for stretchers and wheelchairs. Parking for stretchers and wheelchairs shall be located out of the path of normal traffic.
- (4) Storage for administrative supplies

- (2) Each tub or shower shall be in an individual room or privacy enclosure that provides space for the private use of bathing fixtures, for drying and dressing, and for a wheelchair and an assistant.
- (3) Showers in central bathing facilities shall be at least 4 feet (1.22 meters) square, curb-free, and designed for use by a wheelchair patients.

2.1.4 Support Areas for Staff

2.2 Special Patient Care Areas

2.1.4.1 Lounge and toilet room(s)

2.2.1 Airborne Infection Isolation Rooms

2.1.4.2 Staff storage facilities. Individual closets or compartments for safekeeping of the personal effects of nursing personnel shall be located convenient to the duty station or in a central location.

2.2.1.1 Number. The need for and number of required airborne infection isolation rooms in the rehabilitation facility shall be determined by an infection control risk assessment.

2.2.1.2 Location. They may be located within individual nursing units and used for normal acute care when not required for isolation cases, or they may be grouped as a separate isolation unit.

2.2.1.3 Facility requirements. Where required, the airborne infection isolation room(s) shall comply with the general requirements of Section 2.1-3.2.2.

2.1.5 Support Areas for Patients

3 Patient Living Areas

2.1.5.1 Patient toilet facilities

3.1 Dining, Recreation, and Day Spaces

- (1) A toilet room that does not require travel through the general corridor shall be accessible to each central bathing area.
- (2) Doors to toilet rooms shall have a minimum width of 2 feet 10 inches (86.36 centimeters) to admit a wheelchair. The doors shall permit access from the outside in case of an emergency.
- (3) A hand-washing station shall be provided for each water closet in each multi-fixture toilet room.

The following standards shall be met for patient dining, recreation, and day spaces (areas may be in separate or adjoining spaces):

2.1.5.2 Patient bathing facilities

3.1.1 Space Requirements

- (1) Bathtubs or showers shall be provided at a ratio of one bathing facility for each eight beds not

3.1.1.1 Inpatient spaces. A total of 55 square feet (5.11 square meters) per bed shall be provided.

3.1.1.2 Outpatient services. If dining is part of the day care program, a total of 55 square feet (5.11 square meters) per person shall be provided. If dining is not part of the program, at least 35 square feet (3.25 square meters) per person shall be provided for recreation and day spaces.

## 2.4 REHABILITATION FACILITIES

### 3.1.2 Hand-Washing Station

A hand-washing station shall be provided in each dining room.

### 3.1.3 Equipment and Supply Storage

Storage spaces shall be provided for recreational equipment and supplies.

## 3.2 Activity Areas

### 3.2.1 Activities for Daily Living Unit

A unit shall be provided for teaching daily living activities.

**3.2.1.1** Facility requirements. The unit shall include the following:

- (1) A bedroom
- (2) A bath. The bathroom shall be in addition to other toilet and bathing requirements.
- (3) A kitchen
- (4) Space for training stairs

**3.2.1.2** Equipment. Equipment shall be functional. The facilities shall be similar to those in a residential environment so patients can learn to use those at home.

### 3.3 Personal Services (Barber/Beauty) Areas

A separate room with appropriate fixtures and utilities shall be provided for patient grooming. The activities for daily living unit may serve this purpose.

## 4 Diagnostic and Treatment Locations

Functional units and support areas shall include the following:

### 4.1 Medical Evaluation Unit

Each rehabilitation facility shall contain a medical evaluation unit.

#### 4.1.1 Examination Room(s)

**4.1.1.1** Space requirements. Examination rooms shall have a minimum floor area of 140 square feet (13.01 square meters), excluding such spaces as the vestibule, toilet, closet, and work counter (whether fixed or

movable). The minimum room dimension shall be 10 feet (3.05 meters).

**4.1.1.2** Facility requirements. The room shall contain a hand-washing station; a work counter; storage facilities; and a desk, counter, or shelf space for writing.

#### 4.1.2 Evaluation Room(s)

Where the facility is small and workload light, evaluation shall be permitted in examination room(s).

**4.1.2.1** Layout. Evaluation rooms shall be arranged to permit appropriate evaluation of patient needs and progress and to determine specific programs of rehabilitation.

**4.1.2.2** Facility requirements. Rooms shall include a desk and work area for the evaluators; writing and work space for patients; and storage for supplies.

#### 4.1.3 Support Areas for the Medical Evaluation Unit

**4.1.3.1** Office(s). These shall be provided for personnel.

## 4.2 Other Required Units

In addition to the medical evaluation unit, each rehabilitation facility shall contain one or more of the following units:

### 4.2.1 Psychological Services Unit

Office(s) and work space shall be provided for testing, evaluation, and counseling.

### 4.2.2 Social Services Unit

Office space(s) shall be provided for private interviewing and counseling.

### 4.2.3 Vocational Services Unit

Office(s) and work space shall be provided for vocational training, counseling, and placement.

## 4.3 Optional Units

The following units, if required by the functional program, shall be provided as outlined in these sections. The sizes of the various units shall depend upon the requirements of the functional program.

### 4.3.1 Physical Therapy Unit

#### 4.3.1.1 General

- (1) The size of the unit shall depend upon the requirements of the functional program.

- (2) The elements listed in this section (2.4-4.3.1) shall be provided. Shared use of the facilities in Sections 2.4-4.3.1.5 and 4.3.1.6 by occupational therapy patients and staff shall be permitted if the functional program reflects this sharing concept.

#### 4.3.1.2 Treatment area(s)

- (1) Privacy. For thermotherapy, diathermy, ultrasonics, hydrotherapy, etc., cubicle curtains shall be provided around each individual treatment area.
- (2) Hand-washing station(s) shall also be provided. One hand-washing station may serve more than one cubicle.
- (3) Facilities for collection of wet and soiled linen and other material shall be provided.
- (4) As a minimum, one individual treatment area shall be enclosed within walls and have a door for access—minimum size 80 square feet (7.43 square meters). Curtained treatment areas shall have a minimum size of 70 square feet (6.51 square meters).

**4.3.1.3 Exercise area.** Space requirements shall be designed to permit access to all equipment and be sized to accommodate equipment for physical therapy.

**4.3.1.4 Therapeutic pool.** A therapeutic pool shall be provided if required by the functional program. The size of the pool shall depend upon the requirements of the functional program.

#### 4.3.1.5 Support areas for the physical therapy unit

- (1) Waiting space
- (2) Office space
- (3) Equipment and supply storage
  - (a) Storage for clean linen, supplies, and equipment shall be provided.
  - (b) Wheelchair and stretcher storage shall be provided.

**4.3.1.6 Support areas for patients.** Patients' dressing areas, showers, lockers, and toilet rooms shall be provided as required by the functional program.

### 4.3.2 Occupational Therapy Unit

#### 4.3.2.1 General

- (1) The size of the unit shall depend upon the requirements of the functional program.
- (2) The elements listed in this section (2.4-4.3.2) shall be provided. (Facilities in Sections 2.4-4.3.2.3 and 4.3.2.4 may be planned and arranged for shared use by physical therapy patients and staff if the functional program reflects this sharing concept.)

#### 4.3.2.2 Activity areas

#### 4.3.2.3 Support areas for the occupational therapy unit

- (1) Waiting space
- (2) Office space
- (3) Equipment and supply storage

#### 4.3.2.4 Support areas for patients

Patients' dressing areas, showers, lockers, and toilet rooms shall be provided as required by the functional program.

### 4.3.3 Prosthetics and Orthotics Unit

#### 4.3.3.1 General

- (1) The size of the unit shall depend upon the requirements of the functional program.
- (2) The following elements shall be provided:

#### 4.3.3.2 Work space for technician(s)

**4.3.3.3 Space for evaluation and fitting.** This shall include provision for privacy.

**4.3.3.4 Support areas for the prosthetics and orthotics unit.** Space for equipment, supplies, and storage shall be provided.

## 2.4 REHABILITATION FACILITIES

### 4.3.4 Speech and Hearing Unit

#### 4.3.4.1 General

- (1) The size of the unit shall depend upon the requirements of the functional program.
- (2) The unit shall include the following:

#### 4.3.4.2 Space for evaluation and treatment

#### 4.3.4.3 Support areas for the speech and hearing unit

- (1) Office(s) for therapists
- (2) Equipment and supply storage

### 4.3.5 Dental Unit

#### 4.3.5.1 Operatory. This shall contain a hand-washing station.

#### 4.3.5.2 Laboratory and film processing facilities

### 4.3.6 Imaging Suite

**4.3.6.1 Size.** The size of the unit shall depend upon the requirements of the functional program. The sizes of the various areas shall depend on the requirements of the service to be provided.

**4.3.6.2 Facility requirements.** This unit shall contain imaging room(s) as required by the functional program. (See Section 2.1-5.5 for special requirements.) Areas for the following services, if required, shall be provided as outlined in Section 2.1-5.5.5.

- (1) Electromyography
- (2) CAT scan
- (3) MRI
- (4) Nuclear medicine
- (5) Radiography

### 4.3.7 Laboratory Facilities

#### 4.3.7.1 General

- (1) Location. Facilities shall be provided within the rehabilitation department or through contract

arrangement with a nearby hospital or laboratory service for hematology, clinical chemistry, urinalysis, cytology, pathology, and bacteriology.

- (2) Size. The size of the unit shall depend upon the requirements of the functional program.

#### 4.3.7.2 Minimum services

If laboratory facilities are provided through contract, the following minimum laboratory services shall be provided in the rehabilitation facility:

- (1) Laboratory work counter(s). These shall have a sink and gas and electric service.
- (2) Hand-washing stations
- (3) Specimen collection facilities
  - (a) Urine collection rooms shall be equipped with a water closet and hand-washing station.
  - (b) Blood collection facilities shall have space for a chair and work counter.
- (4) Storage cabinet(s) or closet(s)

### 4.3.8 Home Health Service

## 5 Service Areas

The following service areas, if required by the functional program, shall be provided as outlined.

### 5.1 Pharmacy Unit

#### 5.1.1 General

The size and type of services to be provided in the pharmacy will depend on the drug distribution system chosen and whether the facility proposes to provide, purchase, or share pharmacy services.

#### 5.1.2 Facility Requirements

If a pharmacy is required by the functional program, provisions shall be made for the following functional areas:

##### 5.1.2.1 A compounding area

5.1.2.2 A packaging area

5.1.2.3 A quality control area

5.1.2.4 A dispensing area. This shall have a hand-washing station.

5.1.2.5 A drug information area

5.1.2.6 Order review area. An editing or order review area shall be provided.

5.1.2.7 Support areas for the pharmacy

(1) Administrative areas

(2) Storage areas

## 5.2 Dietary Unit

### \*5.2.1 General

Construction, equipment, and installation of food service facilities shall meet the requirements of the functional program.

### 5.2.2 Facility Requirements

The following facilities shall be provided as required to implement the food service selected:

5.2.2.1 Control station. A control station for receiving food supplies shall be provided.

5.2.2.2 Hand-washing station(s). Hand-washing station(s) shall be located in the food preparation area.

5.2.2.3 Food preparation facilities

(1) Conventional food preparation systems require space and equipment for preparing, cooking, and baking.

(2) Convenience food service systems such as frozen prepared meals, bulk packaged entrees, individually packaged portions, and contractual commissary services require space and equipment for thawing, portioning, cooking, and/or baking.

5.2.2.4 Patient meal service facilities. Facilities shall be provided for tray assembly and distribution.

5.2.2.5 Ware-washing space

(1) This shall be located in a room or alcove separate from the food preparation and serving area.

(2) Commercial dish-washing equipment shall be provided.

(3) A hand-washing station shall be conveniently available.

(4) Space shall also be provided for receiving, scraping, sorting, and stacking soiled tableware and for transferring clean tableware to the using areas.

5.2.2.6 Pot-washing facilities

5.2.2.7 Self-dispensing ice-making facilities. These may be in an area or room separate from the food preparation area but shall be easily cleanable and convenient to dietary facilities.

### 5.2.3 Support Areas for the Dietary Unit

5.2.3.1 Office(s). Office(s) or desk spaces shall be provided for the dietitian(s) or the dietary service manager.

5.2.3.2 Equipment storage. Storage areas shall be provided for cans, carts, and mobile tray conveyors.

5.2.3.3 Housekeeping room

(1) This shall be located within the dietary department.

(2) This shall contain a floor receptor or service sink and storage space for housekeeping equipment and supplies.

5.2.3.4 Waste storage facilities. These shall be located in a separate room easily accessible to the outside for direct waste pickup or disposal.

### 5.2.4 Support Areas for Staff

5.2.4.1 Separate dining space for staff

## APPENDIX

**A5.2.1** Services may consist of an on-site conventional food preparation system, a convenience food service system, or an appropriate combination thereof. On-site facilities should be provided for emergency food preparation and refrigeration.

## 2.4 REHABILITATION FACILITIES

**5.2.4.2 Toilets.** Toilets shall be provided for dietary staff. Hand-washing stations shall be immediately available.

### 5.3 Sterilizing Facilities

Where required by the functional program, a system for sterilizing equipment and supplies shall be provided. Its size shall depend upon the requirements of the functional program.

### 5.4 Linen Services

#### 5.4.1 On-Site Processing

If linen is to be processed on site, the following shall be provided:

**5.4.1.1 Soiled linen holding room.** A room shall be provided for soiled linen receiving, holding, and sorting. This shall have a hand-washing station and cart-washing facilities.

**5.4.1.2 Clean linen storage.** A clean linen storage, issuing, and holding room or area shall be provided.

**5.4.1.3 Laundry processing room.** This shall be provided with commercial equipment that can process seven days' laundry within a regularly scheduled work week.

**5.4.1.4 Hand-washing station.** A hand-washing station shall be provided.

**5.4.1.5 Supply storage.** Storage shall be provided for laundry supplies.

**5.4.1.6 Housekeeping room.** This shall contain a floor receptor or service sink and shall provide storage space for housekeeping equipment and supplies.

#### 5.4.2 Off-Site Processing

If linen is processed off the rehabilitation facility site, the following shall be provided:

**5.4.2.1 Soiled linen holding room**

**5.4.2.2 Clean linen storage.** Clean linen receiving, holding, inspection, and storage room(s) shall be provided.

### 5.5 Materials Management

#### \*5.5.1 Waste Management

**5.5.1.1 Collection and storage.** The functional program shall stipulate the categories and volumes of waste for disposal and the methods of handling and disposal of waste.

(1) Location

- (a) Waste collection and storage locations shall be determined by the facility as a component of the functional program.

## APPENDIX

**A5.5.1** The underlying framework of waste management comprises waste minimization and segregation. Facilities should seek both to minimize all components of each waste stream and to separate different components of the total waste stream. At a minimum, the functional program should include consideration of regular trash, medical/infectious waste, hazardous waste, and low-level radioactive waste.

The program should address the development of effective collection, transport, pest control, and storage systems; waste management and contingency planning; protecting the health and safety of workers; and proper siting of all on-site waste treatment technologies.

Optimizing waste management has programmatic and space impacts throughout the facility, at points where waste is generated, collected, and staged for disposal. For facilities or municipalities with recycling programs in place, particular consideration

should be given to sorting and staging areas. The following elements are examples that may be considered:

- a.** Building should include adequate space to accommodate bins/carts for appropriate waste segregation such as recyclables, infectious waste, sharps, etc. Corridors and materials handling systems should be designed to achieve an efficient movement of waste from points of generation to storage or treatment while minimizing the risk to personnel.
- b.** Dedicated storage and flow space and cleaning/sanitation facilities should facilitate reuse of items such as medical products, food service items, and the like to eliminate disposables and reduce waste.
- c.** Space should be included for autoclaves, shredders, and other technologies for processing medical waste prior to removals to landfill. Secure storage should be provided for staging fluorescent lamps for recycling.

- (b) At docks or other waste removal areas, the functional program shall stipulate the location of compactors, balers, sharps, and recycling container staging.
- (c) Red bag waste shall be staged in enclosed and secured areas. Biohazardous and environmentally hazardous materials, including mercury, nuclear reagent waste, and other regulated waste types, shall be segregated and secured.

- (2) Space requirements. The functional program shall outline the space requirements, including centralized waste collection and storage spaces. Size of spaces shall be determined based upon volume of projected waste and length of anticipated storage.

#### 5.5.1.2 Regulated waste storage spaces

- (1) If provided, regulated medical waste or infectious waste storage spaces shall have a floor drain, cleanable floor and wall surfaces, lighting, and exhaust ventilation, and should be safe from weather, animals and unauthorized entry.
- (2) Refrigeration requirements for such storage facilities shall comply with state and/or local regulations.

5.5.1.3 Refuse chutes. The design and construction of trash chutes shall comply with NFPA 82.

## 5.6 Environmental Services

### 5.6.1 Housekeeping Room(s)

In addition to the housekeeping rooms called for in certain departments, housekeeping rooms shall be provided throughout the facility as required to maintain a clean and sanitary environment. Each shall contain the following:

- 5.6.1.1 A floor receptor or service sink
- 5.6.1.2 Storage space for housekeeping supplies and equipment

## 5.7 Engineering Services and Maintenance

### 5.7.1 Equipment Rooms

Rooms for boilers, mechanical equipment, and electrical equipment shall be provided.

### 5.7.2 Storage Room(s)

Storage rooms for building maintenance supplies and yard equipment shall be provided.

## 6 Administrative and Public Areas

### 6.1 Public Areas

#### 6.1.1 Entrance

A grade-level entrance, sheltered from the weather and able to accommodate wheelchairs, shall be provided.

#### 6.1.2 Lobby

The lobby shall include the following:

- 6.1.2.1 A reception and information counter or desk
- 6.1.2.2 Waiting space(s)
- 6.1.2.3 Public toilet facilities
- 6.1.2.4 Public telephone(s)
- 6.1.2.5 Provision for drinking water
- 6.1.2.6 Wheelchair storage space(s)

6.1.2.7 Convenience store. An expanded gift shop with toiletries and other items available to patients during extended stays shall be provided according to the requirements of the functional program.

### 6.2 Administrative and Related Support Areas

#### 6.2.1 Interview Space(s)

Space for private interviews relating to social service, credit, and admissions shall be provided.

#### 6.2.2 General or Individual Office(s)

General or individual offices for business transactions, records, and administrative and professional staff shall be provided.

#### 6.2.3 Multipurpose Room(s)

Multipurpose room(s) for conferences, meetings, health education, and library services shall be provided.

## 2.4 REHABILITATION FACILITIES

### 6.2.4 Patient Storage Locations

Rehab patients' length of stay is longer than that of typical acute care patients. Space for storage of patients' personal effects shall meet the needs of the functional program.

### 6.2.5 General Storage

Separate space shall be provided for office supplies, sterile supplies, pharmaceutical supplies, splints and other orthopedic supplies, and housekeeping supplies and equipment.

### 6.2.6 Employee Facilities

In addition to the employee facilities such as locker rooms, lounges, toilets, or showers called for in certain departments, a sufficient number of such facilities to accommodate the needs of all personnel and volunteers shall be provided.

## 7 Construction Standards

### 7.1 Design and Construction, including Fire-Resistant Standards

#### 7.1.1 Construction Requirements

**7.1.1.1 General.** Except as noted below, construction of freestanding outpatient rehabilitation facilities shall comply with the applicable requirements of NFPA 101, and the standards contained herein, and the requirements of authorities of having jurisdiction. Rehabilitation facilities that accommodate inpatients shall comply with the construction requirements for general hospitals in Section 2.1-8.1.

#### 7.1.1.2 Fire prevention/protection measures

- (1) Compartmentation, exits, automatic extinguishing systems, and other details relating to fire prevention and fire protection in inpatient rehabilitation facilities shall comply with requirements listed in NFPA 101.
- (2) In freestanding outpatient rehabilitation facilities, details relating to exits and fire safety shall comply with the appropriate occupancy chapter of NFPA 101 and the requirements outlined herein.

**7.1.1.2 Interior finishes.** Interior finish materials for inpatient facilities shall comply with the flame-spread limitations and the smoke-production limitations in NFPA 101.

**7.1.1.3 Insulation materials.** Building insulation materials, unless sealed on all sides and edges, shall have a flame-spread rating of 25 or less and a smoke-developed rating of 150 or less when tested in accordance with NFPA 255.

#### 7.1.2 Provisions for Disasters

For design and construction standards relating to hurricanes, tornadoes, and floods, see Section 2.1-8.1.3.

### 7.2 General Standards for Details and Finishes

#### 7.2.1 General

Patients in a rehabilitation facility will be disabled to differing degrees. Therefore, high standards of safety for the occupants shall be provided to minimize accidents. All details and finishes for renovation projects as well as for new construction shall comply with the following requirements insofar as they affect patient services:

#### 7.2.2 Details

**7.2.2.1 Corridor width.** Items such as provisions for drinking water, telephone booths, vending machines, and portable equipment shall not restrict corridor traffic or reduce the corridor width below the required minimum.

**7.2.2.2 Ceiling height.** The minimum ceiling height shall be 7 feet 10 inches (2.39 meters), with the following exceptions:

- (1) Corridors, storage rooms, and toilet rooms. Ceilings in corridors, storage rooms, toilet rooms, and other minor rooms shall be not less than 7 feet 8 inches (2.34 meters).
- (2) Rooms with ceiling-mounted equipment/light fixtures. Ceilings of radiographic and other rooms containing ceiling-mounted equipment, including those with ceiling-mounted surgical light fixtures, shall have sufficient height to accommodate the equipment and/or fixtures.

- (3) Boiler rooms. Boiler rooms shall have a ceiling clearance not less than 2 feet 6 inches (76.20 centimeters) above the main boiler header and connecting piping.
- (4) Clearances. Suspended tracks, rails, and pipes located in the path of normal traffic shall be not less than 6 feet 8 inches (2.03 meters) above the floor.

#### 7.2.2.3 Doors

- (1) Door type
  - (a) Doors between corridors and rooms or those leading into spaces subject to occupancy, except elevator doors, shall be swing-type.
  - (b) Openings to showers, baths, patient toilets, and other small, wet-type areas not subject to fire hazard are exempt from this requirement.
- (2) Door width
  - (a) Minimum width of all doors to rooms needing access for beds shall be 3 feet 8 inches (1.12 meters).
  - (b) Doors to rooms requiring access for stretchers and doors to patient toilet rooms and other rooms needing access for wheelchairs shall have a minimum width of 2 feet 10 inches (86.36 centimeters).
  - (c) Where the functional program states that the sleeping facility will be for residential use (and therefore not subject to in-bed patient transport), patient room doors that are 3 feet (91.44 centimeters) wide shall be permitted if approved by the local authority having jurisdiction.
- (3) Door swing. Doors, except those to spaces such as small closets not subject to occupancy, shall not swing into corridors in a manner that obstructs traffic flow or reduces the required corridor width.
- (4) Door hardware

- (a) Patient bathing/toilet facilities

- (i) Rooms that contain bathtubs, sitz baths, showers, and water closets subject to patient use shall be equipped with doors and hardware that will permit access from the outside in an emergency.
- (ii) When such rooms have only one opening or are small, the doors shall open outward or be otherwise designed to open without pressing against a patient who may have collapsed within the room.

**7.2.2.4** Thresholds and expansion joint covers. These shall be flush with the floor surface to facilitate use of wheelchairs and carts in new facilities.

#### 7.2.2.5 Windows

- (1) Operable windows are not required in patient rooms.
- (2) Windows shall be designed to prevent accidental falls when open or shall be provided with security screens where deemed necessary by the functional program.

**7.2.2.6** Insect screens. Windows and outer doors that may be frequently left open shall be provided with insect screens.

#### 7.2.2.7 Glazing materials

- (1) Doors, sidelights, borrowed lights, and windows glazed to within 1 foot 6 inches (45.72 centimeters) of the floor shall be constructed of safety glass, wired glass, or plastic glazing material that resists breaking or creates no dangerous cutting edges when broken. Similar materials shall be used in wall openings of playrooms and exercise rooms.
- (2) Safety glass or plastic glazing material shall be used for shower doors and bath enclosures.

**7.2.2.8** Hand-washing stations. Location and arrangement of hand-washing stations shall permit proper use and operation and meet the following:

- (1) Particular care shall be given to clearance required for blade-type operating handles.

## 2.4 REHABILITATION FACILITIES

- (2) Lavatories intended for use by disabled patients shall be installed in accordance with Section 1.1-4, Design Standards for the Disabled.
- (3) Mirrors. Mirrors shall be arranged for convenient use by wheelchair patients as well as by patients in a standing position.
- (4) Provisions for hand drying shall be included at all hand-washing stations.
- (5) Lavatories and hand-washing stations shall be securely anchored to withstand an applied vertical load of not less than 250 pounds (113.40 kilograms) on the front of the fixture.

### 7.2.2.9 Grab bars

- (1) Grab bars shall be provided in all patient toilets, bathtubs, showers, and sitz baths with a wall clearance of 1-1/2 inches (3.81 centimeters) clearance to walls.
- (3) Grab bars shall be sufficiently anchored to sustain a concentrated load of 250 pounds (113.40 kilograms).
- (4) Ends of grab bars shall be constructed to prevent snagging the clothes of patients.
- (5) Special consideration shall be given to shower curtain rods that may be momentarily used for support. Recessed soap dishes shall be provided in showers and bathrooms.

### 7.2.2.10 Handrails

- (1) Handrails shall be provided on both sides of corridors used by patients.
- (2) A clear distance of 1-1/2 inches (3.81 centimeters) shall be provided between the handrail and the wall, and the top of the rail shall be about 2 feet 8 inches (81.28 centimeters) above the floor, except for special care areas such as those serving children.
- (3) Ends of handrails shall be constructed to prevent snagging the clothes of patients.

### 7.2.2.11 Radiation protection

- (1) Radiation protection requirements of x-ray and gamma ray installations shall conform to state and local laws.
- (2) Provisions shall be made for testing the completed installation before use. All defects shall be corrected before acceptance.

### 7.2.2.12 Noise control

- (1) Recreation rooms, exercise rooms, and similar spaces where impact noises may be generated shall not be located directly over patient bed areas unless special provisions are made to minimize such noise.
- (2) Noise reduction criteria shown in Table 2.1-1 shall apply to partition, floor, and ceiling construction in patient areas.

**7.2.2.13 Temperature control.** Rooms containing heat-producing equipment (such as boiler or heater rooms and laundries) shall be insulated and ventilated to prevent any floor surface above from exceeding a temperature 10°F (6°C) above the ambient room temperature.

## 7.2.3 Finishes

**7.2.3.1 Noncombustible or flame-retardant materials.** Cubicle curtains and draperies shall be noncombustible or rendered flame retardant and shall pass both the large- and small-scale tests in NFPA 701.

### 7.2.3.2 Floors

- (1) Floor materials shall be readily cleanable and appropriately wear-resistant for the location.
  - (a) In all areas frequently subject to wet cleaning methods, floor materials shall not be physically affected by germicidal and cleaning solutions.
  - (b) Wall bases in kitchens, soiled workrooms, and other areas that are frequently subject to wet cleaning methods shall be monolithic and coved with the floor, tightly sealed within the wall, and constructed without voids that can harbor insects.

- (2) Floor surfaces in patient areas shall be smooth and without irregular surfaces to prevent tripping by patients using orthotic devices.
- (3) Floors subject to traffic while wet, such as shower and bath areas, kitchens, and similar work areas, shall have a nonslip surface.
- (4) Food preparation areas
  - (a) Floors in food preparation or assembly areas shall be water-resistant.
  - (b) Joints in tile and similar material in such areas shall also be resistant to food acids.
  - (c) Floor construction in dietary and food preparation areas shall be free from spaces that can harbor pests.

#### 7.2.3.3 Walls

- (1) Wall finishes. Wall finishes shall be washable and, in the proximity of plumbing fixtures, shall be smooth and moisture-resistant.
- (2) Dietary and food preparation areas. Finish, trim, and wall construction in these areas shall be free from spaces that can harbor pests.

#### 7.2.3.4 Ceilings

- (1) Ceilings throughout shall be readily cleanable.
- (2) All overhead piping and ductwork in the dietary and food preparation area shall be concealed behind a finished ceiling.
- (3) Finished ceilings may be omitted in mechanical and equipment spaces, shops, general storage areas, and similar spaces, unless required for fire-resistant purposes.
- (4) Acoustical ceilings shall be provided for corridors in patient areas, nurse stations, day rooms, recreational rooms, dining areas, and waiting areas.

**7.2.3.5 Penetrations.** Floors and wall areas penetrated by pipes, ducts, and conduits shall be tightly sealed to

minimize entry of pests. Joints of structural elements shall be similarly sealed.

## 8 Special Systems

### 8.1 General

#### 8.1.1 Testing

**8.1.1.1 Testing.** Prior to acceptance of the facility, all special systems shall be tested and operated to demonstrate to the owner or his designated representative that the installation and performance of these systems conform to design intent.

**8.1.1.2 Test results.** Test results shall be documented for maintenance files.

#### 8.1.2 Documentation

**8.1.2.1** Upon completion of the special systems equipment installation contract, the owner shall be furnished with a complete set of manufacturers' operating, maintenance, and preventive maintenance instructions; parts lists; and complete procurement information, including equipment numbers and descriptions.

**8.1.2.2** Operating staff persons shall also be provided with instructions for proper operation of systems and equipment. Required information shall include all safety or code ratings as needed.

#### 8.1.3 Insulation

Insulation shall be provided surrounding special system equipment to conserve energy, protect personnel, and reduce noise.

### 8.2 Elevators

#### 8.2.1 General

All buildings with patient facilities (such as bedrooms, dining rooms, or recreation areas) or critical services (such as diagnostic or therapy) located on other than the main entrance floor shall have electric or hydraulic elevators.

#### 8.2.2 Number

The number of elevators required shall be determined from a study of the facility plan and of the estimated vertical transportation requirements.

## 2.4 REHABILITATION FACILITIES

### 8.2.3 Dimensions

**8.2.3.1** Hospital-type elevator cars shall have inside dimensions that accommodate a patient bed with attendants. Cars shall be at least 5 feet 8 inches (1.73 meters) wide by 9 feet (2.74 meters) deep.

**8.2.3.2** Car doors shall have a clear opening of not less than 4 feet (1.22 meters) wide and 7 feet (2.13 meters) high.

**8.2.3.3** In renovations, existing elevators that can accommodate patient beds used in the facility will not be required to be increased in size.

### \*8.2.4 Elevator Controls

Elevator call buttons and controls shall not be activated by heat or smoke. Light beams, if used for operating door reopening devices without touch, shall be used in combination with door-edge safety devices and shall be interconnected with a system of smoke detectors.

### 8.2.5 Installation and Testing

**8.2.5.1** Standards. Installation and testing of elevators shall comply with ANSI/ASME A17.1 for new construction and ANSI/ASME A17.3 for existing facilities. (See ASCE 7 for seismic design and control systems requirements for elevators.)

**8.2.5.2** Testing. Field inspections and tests shall be made and the owner shall be furnished with written certification stating that the installation meets the requirements set forth in this section as well as all applicable safety regulations and codes.

## 8.3 Waste Processing

### 8.3.1 Waste Treatment and Disposal Technologies

Space and facilities shall be provided for disposal of waste.

**\*8.3.1.1** Incineration. On-site hospital incinerators shall comply with federal, state, and local regulatory and environmental requirements. The design and construction of incinerators shall comply with NFPA 82.

**8.3.1.2** Other technologies. Types of non-incineration waste treatment technology(ies) shall be determined by the facility in conjunction with environmental, economic, and regulatory considerations. The functional program shall describe waste treatment technology components.

#### (1) Location

- (a) Safe transfer routes, distances from waste sources, temporary storage requirements, and space requirements for treatment equipment shall be considered in determining the location for a non-incineration technology.
- (b) The location of the technology shall not cause traffic problems as waste is brought in and out.
- (c) Odor, noise, and the visual impact of medical waste operations on patients, visitors, public access and security shall be considered.

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**A8.2.4** This is so the light control feature will be overridden or disengaged should it encounter smoke at any landing.

**A8.3.1.1** The EPA has identified medical waste incineration as a significant contributor to air pollution worldwide. Health care facilities should seek to minimize incineration of medical waste, consistent with local and state regulations and public health goals.

When incinerators are used, consideration should be given to the recovery of waste heat from on-site incinerators used to dispose of large amounts of waste materials. Incinerators should be designed in a manner fully consistent with protection of public and environmental health, both on-site and off-site, and in compliance with

federal, state, and local statutes and regulations. Toward this end, permit applications for incinerators and modifications thereof should be supported by Environmental Assessments and/or Environmental Impact Statements (EISs) and/or Health Risk Assessments (HRAs) as may be required by regulatory agencies. Except as noted below, such assessments should utilize standard U.S. EPA methods, specifically those set forth in U.S. EPA guidelines, and should be fully consistent with U.S. EPA guidelines for health risk assessment. Under some circumstances, however, regulatory agencies having jurisdiction over a particular project may require use of alternative methods.

- (2) Space requirements. Space needed for such technologies shall be determined by the equipment requirements, including associated area for opening waste entry doors, access to control panels, space for hydraulic lifts, conveyors, and operational clearances. Mobile or portable units, trailer-mounted units, underground installations, or all-weather enclosed shelters at an outdoor site may also be used, subject to local regulatory approvals.
- (3) Ventilation. Exhaust vents, if any, from the treatment technology shall be located a minimum of 25 feet (7.62 meters) from inlets to HVAC systems. If the technology involves heat dissipation, sufficient cooling and ventilation shall be provided.

## 9 Building Systems

### 9.1 Plumbing

#### 9.1.1 General

Unless otherwise specified herein, all plumbing systems shall be designed and installed in accordance with the International Plumbing Code.

#### 9.1.2 Plumbing and Other Piping Systems

##### 9.1.2.1 General piping and valves

- (1) All piping, except control-line tubing, shall be identified.
- (2) All valves shall be tagged, and a valve schedule shall be provided to the facility owner for permanent record and reference.
- (3) No plumbing lines shall be exposed overhead or on walls where possible accumulation of dust or soil may create a cleaning problem or where leaks would create a potential for food contamination.

**9.1.2.2 Hemodialysis/hemoperfusion piping.** Where the functional program includes hemodialysis, continuously circulated filtered cold water shall be provided. Piping shall be in accordance with ANSI/AAMI RD62, *Water Treatment Equipment for Hemodialysis Applications*.

**9.1.2.3 Potable water supply systems.** The following standards shall apply to potable water supply systems:

- (1) Capacity. Systems shall be designed to supply water at sufficient pressure to operate all fixtures and equipment during maximum demand. Supply capacity for hot- and cold-water piping shall be determined on the basis of fixture units, using recognized engineering standards. When the ratio of plumbing fixtures to occupants is proportionally more than required by the building occupancy and is in excess of 1,000 plumbing fixture units, a diversity factor is permitted.
- (2) Valves. Each water service main, branch main, riser, and branch to a group of fixtures shall have valves.
  - (a) Stop valves shall be provided for each fixture.
  - (b) Appropriate panels for access shall be provided at all valves where required.
- (3) Backflow prevention
  - (a) Systems shall be protected against cross-connection in accordance with American Water Works Association (AWWA) Recommended Practice for Backflow Prevention and Cross-Connection Control.
  - (b) Vacuum breakers or backflow prevention devices shall be installed on hose bibs and supply nozzles used for connection of hoses or tubing in housekeeping sinks, bedpan-flushing attachments, etc.
- (4) Bedpan-flushing devices. Bedpan-flushing devices (may be cold water) shall be provided in each inpatient toilet room.
- (5) Potable water storage. Potable water storage vessels (hot and cold) not intended for constant use shall not be installed.

**9.1.2.4 Hot water systems.** See Section 1.6-2.1.2.1.

**9.1.2.5 Drainage systems.** The following standards shall apply to drainage systems:

## 2.4 REHABILITATION FACILITIES

### (1) Piping

- (a) Drain lines from sinks used for acid waste disposal shall be made of acid-resistant material.
- (b) Drain lines serving some types of automatic blood-cell counters shall be of carefully selected material that will eliminate potential for undesirable chemical reactions (and/or explosions) between sodium azide wastes and copper, lead, brass, solder, etc.
- (c) Insofar as possible, drainage piping shall not be installed within the ceiling or exposed in operating rooms, food preparation centers, food serving facilities, food storage areas, central services, electronic data processing areas, electric closets, and other sensitive areas. Where exposed overhead drain piping in these areas is unavoidable, special provisions shall be made to protect the space below from leakage, condensation, or dust particles.

### (2) Floor drains

- (a) Floor drains shall not be installed in operating rooms.
- (b) If a floor drain is installed in cystoscopy, it shall contain a nonsplash, horizontal-flow flushing bowl beneath the drain plate.
- (c) Dietary area floor drains and/or floor sinks
  - (i) Type. These shall be of a type that can be easily cleaned by removing the cover. Removable stainless steel mesh shall be provided in addition to grilled drain covers to prevent entry of large particles of waste that might cause stoppages.
  - (ii) Location. Floor drains or floor sinks shall be provided at all “wet” equipment (as ice machines) and as required for wet cleaning of floors. Location of floor drains and floor sinks shall be coordinated to avoid conditions where locations of equipment make removal of covers for cleaning difficult.

- (3) Autopsy table drain systems. Drain systems for autopsy tables shall be designed to positively avoid splatter or overflow onto floors or back siphonage and for easy cleaning and trap flushing.
- (4) Sewers. Building sewers shall discharge into community sewerage. Where such a system is not available, the facility shall treat its sewage in accordance with local and state regulations.
- (5) Grease traps. Kitchen grease traps shall be located and arranged to permit easy access without the need to enter food preparation or storage areas. Grease traps shall be of capacity required and shall be accessible from outside the building without need to interrupt any services.
- (6) Plaster traps. Where plaster traps are used, provisions shall be made for appropriate access and cleaning.

9.1.2.6 Condensate drains. See Section 1.6-2.1.2.2.

### 9.1.3 Plumbing Fixtures

In addition to the requirements of Section 1.6-2.1.3, the following standards shall apply to plumbing fixtures in a rehabilitation hospital:

#### 9.1.3.1 Clinical sinks

- (1) Handles on clinical sinks shall be at least 6 inches (15.24 centimeters) long.
- (2) Clinical sinks shall have an integral trap wherein the upper portion of the water trap provides a visible seal.

9.1.3.2 Scrub sinks. Freestanding scrub sinks and hand-washing stations used for scrubbing in procedure rooms shall be trimmed with foot, knee, or ultrasonic controls; single lever wrist blades are not permitted.

### 9.1.4 Medical Gas and Vacuum Systems

9.1.4.1 Medical gas and air systems. The installation, testing, and certification of nonflammable medical gas and air systems shall comply with the requirements of NFPA 99. (See Table 2.1-5 for rooms requiring station outlets.)

**9.1.4.2 Clinical vacuum systems.** Clinical vacuum system installations shall be in accordance with NFPA 99. (See Table 2.1-5 for rooms requiring station outlets.)

## 9.2 Heating, Ventilating, and Air-Conditioning (HVAC) Systems

### 9.2.1 General

#### 9.2.1.1 Mechanical system design

- (1) Efficiency. The mechanical system shall be designed for overall efficiency and life-cycle costing. Details for cost-effective implementation of design features are interrelated and too numerous (as well as too basic) to list individually.
  - (a) Recognized engineering procedures shall be followed for the most economical and effective results. A well-designed system can generally achieve energy efficiency at minimal additional cost and simultaneously provide improved patient comfort.
  - (b) Different geographic areas may have climatic and use conditions that favor one system over another in terms of overall cost and efficiency.
  - (c) In no case shall patient care or safety be sacrificed for conservation.
  - (d) Insofar as practical, the facility shall include provisions for recovery of waste cooling and heating energy (ventilation, exhaust, water and steam discharge, cooling towers, incinerators, etc.).
  - \*(e) Use of recognized energy-saving mechanisms such as variable air volume (VAV) systems, load shedding, programmed controls for unoccupied periods (nights and weekends, etc.), and use of natural ventilation shall be considered, site and climatic conditions permitting
  - (f) Facility design considerations. These shall include site, building mass, orientation, configuration, fenestration, and other features relative to passive and active energy systems
- (2) Air-handling systems
  - \*(a) These shall be designed with an economizer cycle where appropriate to use outside air. (Use of mechanically circulated outside air does not reduce need for filtration.)
  - (b) VAV systems. The energy-saving potential of variable air volume systems is recognized, and the standards in this document are intended to maximize appropriate use of such systems. Any system used for occupied areas shall include provisions to avoid air stagnation in interior spaces where thermostat demands are met by temperatures of surrounding areas.
  - (c) Noncentral air-handling systems (i.e., individual room units that are used for heating and cooling purposes) (fan-coil units, heat pump units, etc.). These units may be used as recirculating units only. All outdoor air requirements shall be met by a separate central air-handling system with proper filtration, as noted in Table 2.1-3.
- (3) Vibration isolators. Mechanical equipment, ductwork, and piping shall be mounted on vibration isolators as required to prevent unacceptable structure-borne vibration.
- (4) System valves. Supply and return mains and risers for cooling, heating, and steam systems shall be equipped with valves to isolate the various sections of each system. Each piece of equipment shall have valves at the supply and return ends.
- (5) Renovation. If system modifications affect greater than 10 percent of the system capacity, designers

## APPENDIX

**A9.2.1.1 (1)(e)** Systems with excessive installation and/or maintenance costs that negate long-range energy savings should be avoided.

**A9.2.1.1 (2)(a)** It may be practical in many areas to reduce or shut down mechanical ventilation under appropriate climatic and patient care conditions and to use open windows for ventilation.

## 2.4 REHABILITATION FACILITIES

shall utilize pre-renovation water/air flow rate measurements to verify that sufficient capacity is available and that renovations have not adversely affected flow rates in non-renovated areas.

**9.2.1.2** Ventilation and space conditioning requirements. All rooms and areas in the facility used for patient care shall have provisions for ventilation.

- (1) Ventilation rates. The ventilation systems shall be designed and balanced, as a minimum, according to the requirements shown in Table 2.1-2 and the applicable notes. The ventilation rates shown in Table 2.1-2 do not preclude the use of higher, more appropriate rates.
- (2) Air change rates. Air supply and exhaust in rooms for which no minimum total air change rate is noted may vary down to zero in response to room load. For rooms listed in Table 2.1-2, where VAV systems are used, minimum total air change shall be within limits noted.
- (3) Temperature and humidity levels. Space temperature and relative humidity shall be as indicated in Table 2.1-2.
- (4) Air movement direction. To maintain asepsis control, airflow supply and exhaust shall generally be controlled to ensure movement of air from “clean” to “less clean” areas, especially in critical areas.
- (5) Although natural ventilation for nonsensitive areas and patient rooms (via operable windows) shall be permitted, mechanical ventilation shall be considered for all rooms and areas in the facility.

**9.2.1.3** Testing and documentation

- (1) Upon completion of the equipment installation contract, the owner shall be furnished with a complete set of manufacturers’ operating, maintenance, and preventive maintenance instructions, parts lists, and complete procurement information, including equipment numbers and descriptions. Required information shall include energy ratings as needed for future conservation calculations.

- (2) Operating staff persons shall also be provided with written instructions for proper operation of systems and equipment.

### 9.2.2 Requirements for Specific Locations

**9.2.2.1** Cough-inducing procedure rooms. Rooms used for sputum induction, aerosolized pentamidine treatments, or other cough-inducing procedures shall meet the requirements of Table 2.1-2 for airborne infection isolation rooms. If booths are used, refer to Section 2.1-5.8.1.

**9.2.2.2** ETO sterilizer space. The ventilation system for the space that houses ethylene oxide (ETO) sterilizers shall be designed as follows:

- (1) A dedicated exhaust system (one not connected to a return air or other exhaust system) shall be provided. Refer to 29 CFR Part 1910.1047.
- (2) All source areas shall be exhausted, including the sterilizer equipment room, service/aeration areas, over the sterilizer door, and the aerator.
  - (a) If the ETO cylinders are not located in a well-ventilated, unoccupied equipment space, an exhaust hood shall be provided over the cylinders.
  - (b) The relief valve shall be terminated in a well-ventilated, unoccupied equipment space, or outside the building.
  - (c) If the floor drain which the sterilizer(s) discharges to is not located in a well-ventilated, unoccupied equipment space, an exhaust drain cap shall be provided (coordinate with local codes).
- (3) General airflow shall be away from the sterilizer operator(s).
- (4) A dedicated exhaust duct system for ETO shall be provided. The exhaust outlet to the outside shall be at least 25 feet (7.62 meters) away from any air intake.
- (5) An audible and visual alarm shall activate in the sterilizer work area, and in a 24-hour staffed

location, upon loss of airflow in the exhaust system.

#### 9.2.2.3 Food preparation centers

- (1) Exhaust hoods handling grease-laden vapors in food preparation centers shall comply with NFPA 96.
- (2) All hoods over cooking ranges shall be equipped with grease filters, fire-extinguishing systems, and heat-actuated fan controls.
- (3) Cleanout openings shall be provided every 20 feet (6.10 meters) and at changes in direction in the horizontal exhaust duct systems serving these hoods. Horizontal runs of ducts serving range hoods shall be kept to a minimum.

**9.2.2.4 Fuel-fired equipment rooms.** Rooms with fuel-fired equipment shall be provided with sufficient outdoor air to maintain equipment combustion rates and to limit work station temperatures.

### 9.2.3 Thermal Insulation and Acoustical Provisions

See Section 1.6-2.2.1.

#### 9.2.4 HVAC Air Distribution

**9.2.4.1 Return air systems.** For patient care areas, all return ventilation shall be via ducted systems.

**9.2.4.2 HVAC ductwork.** See Section 1.6-2.2.2.1.

#### 9.2.4.3 Exhaust systems

- (1) General
  - (a) To enhance the efficiency of recovery devices required for energy conservation, combined exhaust systems shall be permitted.
  - (b) Local exhaust systems shall be used whenever possible in place of dilution ventilation to reduce exposure to hazardous gases, vapors, fumes, or mists.
  - (c) Fans serving exhaust systems shall be located at the discharge end and shall be readily serviceable.

#### 9.2.4.4 Air outlets and inlets

- (1) Fresh air intakes
  - (a) Fresh air intakes shall be located at least 25 feet (7.62 meters) from exhaust outlets of ventilating systems, combustion vents (including those serving rooftop air handling equipment), medical-surgical vacuum systems, plumbing vents, or areas that may collect vehicular exhaust or other noxious fumes. (Prevailing winds and/or proximity to other structures may require greater clearances.)
  - (b) Plumbing vents that terminate at a level above the top of the air intake may be located as close as 10 feet (3.05 meters).
  - (c) The bottom of outdoor air intakes serving central systems shall be as high as practical, but at least 6 feet (1.83 meters) above ground level, or, if installed above the roof, 3 feet (91.44 centimeters) above roof level.
- (2) Relief air. Relief air is exempt from the 25-foot (7.62-meter) separation requirement. Relief air is defined as air that otherwise could be returned (recirculated) to an air handling unit from the occupied space, but is being discharged to the outdoors to maintain building pressure, such as during outside air economizer operation.
- (3) Gravity exhaust. Where conditions permit, gravity exhaust shall be permitted for nonpatient areas such as boiler rooms, central storage, etc.

#### 9.2.4.5 Ventilation hoods

- (1) Exhaust hoods and safety cabinets
  - (a) Hoods and safety cabinets may be used for normal exhaust of a space providing minimum air change rates are maintained.
  - (b) If air change standards in Table 2.1-2 do not provide sufficient air for proper operation of exhaust hoods and safety cabinets (when in use), makeup air (filtered and preheated)

## 2.4 REHABILITATION FACILITIES

- shall be provided around these units to maintain the required airflow direction and exhaust velocity. Use of makeup air will avoid dependence upon infiltration from outdoors and/or from contaminated areas.
- (c) Makeup systems for hoods shall be arranged to minimize “short circuiting” of air and to avoid reduction in air velocity at the point of contaminant capture.
- (2) Laboratory fume hoods. Laboratory fume hoods shall meet the following general standards:
- (a) General standards
- (i) An average face velocity of at least 75 feet per minute (0.38 meters per second)
  - (ii) Connection to an exhaust system to the outside that is separate from the building exhaust system
  - (iii) Location of an exhaust fan at the discharge end of the system
  - (iv) Inclusion of an exhaust duct system of noncombustible corrosion-resistant material as needed to meet the planned usage of the hood
- (b) Special standards for use with strong oxidants
- (i) Fume hoods and their associated equipment in the air stream intended for use with perchloric acid and other strong oxidants shall be constructed of stainless steel or other material consistent with special exposures.
  - (ii) These hoods and equipment shall be provided with a water wash and drain system to permit periodic flushing of duct and hood.
  - (iii) Electrical equipment intended for installation within such ducts shall be designed and constructed to resist penetration by water. Lubricants and seals shall not contain organic materials.
- (iv) When perchloric acid or other strong oxidants are only transferred from one container to another, standard laboratory fume hoods and the associated equipment may be used in lieu of stainless steel construction.
- (c) Special standards for use with infectious or radioactive materials. In new construction and major renovation work, each hood used to process infectious or radioactive materials shall meet the following requirements:
- (i) A minimum face velocity of 90 to 110 feet per minute (0.45 to 0.56 meter per second) with suitable pressure-independent air modulating devices and alarms to alert staff of fan shutdown or loss of airflow.
  - (ii) Filters with a 99.97 percent efficiency (based on the DOP test method) in the exhaust stream, and shall be designed and equipped to permit the safe removal, disposal, and replacement of contaminated filters. Filters shall be as close to the hood as practical to minimize duct contamination.
  - (iii) For fume hoods intended for use with radioactive isotopes, construction of stainless steel or other material suitable for the particular exposure. These hoods shall comply with NFPA 801, Facilities for Handling Radioactive Materials. **Note:** Radioactive isotopes used for injections, etc., without probability of airborne particulates or gases may be processed in a clean-workbench-type hood where acceptable to the Nuclear Regulatory Commission.

### 9.2.5 HVAC Filters

#### 9.2.5.1 Filter efficiencies

- (1) All central ventilation or air conditioning systems shall be equipped with filters with efficiencies equal to, or greater than, those specified in Table 2.1-3.

- (2) Noncentral air-handling systems shall be equipped with permanent (cleanable) or replaceable filters with a minimum efficiency of MERV 3 (68 percent weight arrestance).
- (3) Filter efficiencies, tested in accordance with ASHRAE 52.1, shall be average.

**9.2.5.2 Filter bed location.** Where two filter beds are required, filter bed no. 1 shall be located upstream of the air conditioning equipment and filter bed no. 2 shall be downstream of any fan or blowers.

**9.2.5.3 Filter frames.** Filter frames shall be durable and proportioned to provide an airtight fit with the enclosing ductwork. All joints between filter segments and enclosing ductwork shall have gaskets or seals to provide a positive seal against air leakage.

**9.2.5.4 Filter housing blank-off panels.** Filter housing blank-off panels shall be permanently attached to the frame, constructed of rigid materials, and have sealing surfaces equal to or greater than the filter media installed in the filter frame.

**9.2.5.5 Filter manometers.** A manometer shall be installed across each filter bed having a required efficiency of 75 percent or more, including hoods requiring HEPA filters. Provisions shall be made to allow access for field testing.

## 9.2.6 Steam and Hot Water Systems

### 9.2.6.1 Boilers

- (1) Capacity. Boilers shall have the capacity, based upon the net ratings published by the Hydronics Institute or another acceptable national standard, to supply the normal heating, hot water, and steam requirements of all systems and equipment. Their number and arrangement shall accommodate facility needs despite the breakdown or routine maintenance of any one boiler. The capacity of the remaining boiler(s) (reserve capacity) shall be sufficient to provide hot water service for clinical, dietary, and patient use; steam for sterilization and dietary purposes; and space heating for operating, recovery, and general patient rooms.
- (2) Space heating requirements. Reserve capacity for facility space heating is not required in geographic

areas where a design dry-bulb temperature of 25°F (-4°C) or more represents not less than 99 percent of the total hours in any one heating month as noted in the *ASHRAE Handbook—Fundamentals* under the “Table for Climatic Conditions for the United States.”

**9.2.6.2 Boiler accessories.** These, including feed pumps, heat-circulating pumps, condensate return pumps, fuel oil pumps, and waste heat boilers, shall be connected and installed to provide both normal and standby service.

## 9.3 Electrical Systems

### 9.3.1 General

#### 9.3.1.1 Applicable standards

- (1) All electrical material and equipment, including conductors, controls, and signaling devices, shall be installed in compliance with applicable sections of NFPA 70 and NFPA 99.
- (2) All electrical material and equipment shall be listed as complying with available standards of listing agencies or other similar established standards where such standards are required.

**9.3.1.2 Testing and documentation.** The electrical installations, including alarm, nurse call, and communication systems, shall be tested to demonstrate that equipment installation and operation is appropriate and functional. A written record of performance tests on special electrical systems and equipment shall show compliance with applicable codes and standards.

### 9.3.2 Electrical Distribution and Transmission

#### 9.3.2.1 Switchboards

- (1) Location
  - (a) Main switchboards shall be located in an area separate from plumbing and mechanical equipment and shall be accessible to authorized persons only.
  - (b) Switchboards shall be convenient for use, readily accessible for maintenance, away from traffic lanes

## 2.4 REHABILITATION FACILITIES

- (c) Switchboards shall be located in dry, ventilated spaces free of corrosive or explosive fumes, gases, or any flammable material.
- (2) Overload protective devices shall operate properly in ambient room temperatures.

### 9.3.2.2 Panelboards

- (1) Panelboards serving normal lighting and appliance circuits shall be located on the same floor as the circuits they serve.
- (2) Panelboards serving critical branch emergency circuits shall be located on each floor that has major users.
- (3) Panelboards serving life safety emergency circuits may also serve floors above and/or below.

### 9.3.2.3 Ground-fault circuit interrupters

- (1) Ground-fault circuit interrupters (GFCIs) shall comply with NFPA 70.
- (2) Where GFCIs are used in critical areas, provisions shall be made to ensure that other essential equipment is not affected by activation of one interrupter.

## 9.3.3 Power Generating and Storing Equipment

### 9.3.3.1 Emergency electrical service

- (1) As a minimum, nursing units or sections thereof shall have emergency electrical systems as required in NFPA 99, NFPA 101, and NFPA 110.
- (2) Where the nursing unit is a distinct part of an acute-care hospital, it may use the emergency generator system for required emergency lighting and power, if such sharing does not reduce hospital services.
  - (a) Such a shared system shall be designed with the capacity to meet the needs of both the hospital and the rehabilitation facilities.
  - (b) Life support systems and their respective areas shall be subject to applicable standards of Section 2.1-10.

- (3) An emergency electrical source shall provide lighting and/or power during an interruption of the normal electric supply.

## 9.3.4 Lighting

**9.3.4.1** General. Lighting shall be engineered to the specific application. See Section 1.6-2.3.1.1.

**9.3.4.2** Lighting for specific locations in the rehabilitation hospital

- (1) Patient rooms. Patient rooms shall have general lighting and night lighting.
  - (a) Reading light controls shall be accessible to the patient(s) without the patient having to get out of bed.
  - (b) Incandescent and halogen light sources that produce heat shall be avoided to prevent burns to the patient and/or bed linen.
  - (c) Unless specifically designed to protect the space below, the light source shall be covered by a diffuser or lens.
- (2) Nursing unit corridors. Nursing unit corridors shall have general illumination with provisions for reducing light levels at night.

## 9.3.5 Receptacles

**9.3.5.1** Corridors. Duplex-grounded receptacles for general use shall be installed approximately 50 feet (15.24 meters) apart in all corridors and within 25 feet (7.62 meters) of corridor ends.

**9.3.5.2** Patient room. Each patient room shall have duplex-grounded receptacles.

- (1) There shall be one at each side of the head of each bed and one on every other wall.
- (2) Receptacles may be omitted from exterior walls where construction or room configuration makes installation impractical.

**9.3.5.3** Emergency system receptacles. Electrical receptacle cover plates or electrical receptacles supplied from the emergency system shall be distinctively

colored or marked for identification. If color is used for identification purposes, the same color shall be used throughout the facility.

### 9.3.6 Equipment

**9.3.6.1** Data processing and/or automated laboratory or diagnostic equipment, if provided, may require safeguards from power line disturbances.

**9.3.6.2** X-ray equipment. Fixed and mobile x-ray equipment installations shall conform to articles 517 and 660 of NFPA 70.

**9.3.6.3** Special electrical equipment. Special equipment is identified in the sections in this chapter on nursing units, support areas, physical therapy, occupational therapy, and imaging, if applicable. These sections shall be consulted to ensure compatibility between program-matically defined equipment needs and appropriate power and other electrical connection needs.

### 9.3.7 Call Systems

**9.3.7.1** General. Alternate technologies shall be permitted for emergency or nurse call systems. If radio frequency systems are utilized, consideration shall be given to electromagnetic compatibility between internal and external sources.

- (1) A nurse call system shall be provided.
- (2) Each bed shall be provided with a call device. Two call devices serving adjacent beds may be served by one call station.
- (3) Calls shall activate a visible signal in the corridor at the patient's door or other appropriate location. In multicorridor nursing units, additional visible signals shall be installed at corridor intersections.

#### 9.3.7.2 Emergency call system

- (1) The emergency call shall be designed so that a signal activated at a patient's call station will initiate a visible and audible signal distinct from the regular nurse call system that can be turned off only at the patient call station.

- (2) The signal shall activate an annunciator panel at the nurse station or other appropriate location, a visible signal in the corridor at the patient's door, and at other areas defined by the functional program.
- (3) A nurse emergency call shall be provided at each inpatient toilet, bath, sitz bath, and shower room. This emergency call shall be accessible to a collapsed patient lying on the floor. Inclusion of a pull cord will satisfy this standard.

### 9.4 Telecommunications and Information Systems

**9.4.1** Locations for terminating telecommunications and information system devices shall be provided.

**9.4.2** An area shall be provided for central equipment locations. Special air conditioning and voltage regulation shall be provided when recommended by the manufacturer.

### 9.5 Fire Alarm and Detection Systems

Fire alarm and detection systems shall be provided in compliance with NFPA 72 and NFPA 101.