2
Hospitals

2.1 General Hospitals

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

1 General Considerations

1.1 Applicability

The general hospital shall meet all the standards described herein. Deviations shall be described and justified in the functional program for specific approval by authorities having jurisdiction.

1.2 Functional Program

For each project, there shall be a functional program for the facility in accordance with Section 1.2-2.

1.2.1 Size and Layout

Department size and clear floor areas shall depend on program requirements and organization of services within the hospital. Combination or sharing of some functions shall be permitted provided the layout does not compromise safety standards and medical and nursing practices.

*1.2.2 Swing Beds

When the concept of swing beds is part of the functional program, care shall be taken to include requirements for all intended categories.

1.3 Site

*1.3.1 Parking

1.3.1.1 Each new facility, major addition, or major change in function shall have parking space to satisfy the needs of patients, personnel, and the public.

1.3.1.2 A formal parking study is desirable. In the absence of such a study, provide one space for each bed plus one space for each employee normally present on any single weekday shift. This ratio may be reduced in an area convenient to public transportation or public parking facilities, or where carpool or other arrangements to reduce traffic have been developed.

1.3.1.3 Additional parking may be required to accommodate outpatient and other services.

1.3.1.4 Separate and additional space shall be provided for service delivery vehicles and vehicles utilized for emergency patients.

2 Common Elements

2.1 General

The spaces included in this section are common to most hospital facilities and shall be required for a specific hospital unit or location when specified in the Guidelines text for that unit or location.

2.2 Patient Rooms or Care Areas

2.2.1 Toilet Rooms

Each patient shall have access to a toilet room without having to enter a general corridor area.

2.2.1.1 One toilet room shall serve no more than two patient rooms and no more than four beds.

2.2.1.2 The toilet room shall contain a water closet and a hand-washing station.

2.2.1.3 Toilet room doors shall swing outward or be double acting. Where local requirements permit, use of folding doors shall be permitted, provided adequate provisions are made for acoustical and visual privacy.

2.2.2 Patient Storage Locations

Each patient shall have within his or her room a separate wardrobe, locker, or closet suitable for hanging full-length garments and for storing personal effects.

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A1.2.2 Swing Beds

Facility design for swing beds often requires additional corridor doors and provisions for switching nurse call operations from one nurse station to another depending on use.

A1.3.1 Parking

A formal parking/traffic study should be conducted to ensure that adequate parking and traffic flow is provided to accommodate inpatients, outpatients, staff, and visitors.

2.3 Support Areas for Patient Care

2.3.1 Administrative Center or Nurse Station

2.3.1.1 This area shall have space for counters and storage and shall have convenient access to hand-washing stations.

2.3.1.2 This area may be combined with or include centers for reception and communication.

2.3.2 Documentation Area

Charting facilities shall have linear surface space adequate to ensure that staff and physicians can chart and have simultaneous access to information and communication systems.

2.3.3 Multipurpose Room

Multipurpose rooms are provided for staff, patients, and patients' families for patient conferences, reports, education, training sessions, and consultation.

2.3.3.1 These rooms shall be accessible to each nursing unit.

2.3.3.2 These rooms may be on other floors if convenient for regular use.

2.3.3.3 One such room shall be permitted to serve several nursing units and/or departments.

2.3.4 Medication Station

Medication shall be distributed from a medicine preparation room or unit, from a self-contained medicine dispensing unit, or by another approved system.

2.3.4.1 Medicine preparation room

(1) This room shall be under visual control of the nursing staff.

(2) This room shall contain a work counter, a hand-washing station, a lockable refrigerator, and locked storage for controlled drugs.

(3) When a medicine preparation room is to be used to store one or more self-contained medicine-dispensing units, the room shall be designed with adequate space to prepare medicines with the self-contained medicine-dispensing unit(s) present.

2.3.4.2 Self-contained medicine dispensing unit

(1) Location of a self-contained medicine dispensing unit shall be permitted at the nurse station, in the clean workroom, or in an alcove, provided the unit has adequate security for controlled drugs and adequate lighting to easily identify drugs.

(2) Convenient access to hand-washing stations shall be provided. (Standard cup-sinks provided in many self-contained units are not adequate for hand-washing.)

2.3.5 Nourishment Area

2.3.5.1 A nourishment area shall have a sink, work counter, refrigerator, storage cabinets, and equipment for hot and cold nourishment between scheduled meals. This area shall include space for trays and dishes used for nonscheduled meal service.

2.3.5.2 Provisions and space shall be included for separate temporary storage of unused and soiled dietary trays not picked up at mealtime.

2.3.5.3 Hand-washing stations shall be in or immediately accessible from the nourishment area.

2.3.6 Ice Machine

2.3.6.1 Ice-making equipment may be in the clean workroom/holding room or at the nourishment station.

2.3.6.2 Ice intended for human consumption shall be from self-dispensing ice makers.

2.3.7 Clean Workroom or Clean Supply Room

Such rooms shall be separate from and have no direct connection with soiled workrooms or soiled holding rooms.

2.3.7.1 Clean workroom. If the room is used for preparing patient care items, it shall contain a work counter, a hand-washing station, and storage facilities for clean and sterile supplies.

2.3.7.2 Clean supply room. If the room is used only for storage and holding as part of a system for distribution of clean and sterile materials, omission of the work counter and hand-washing station shall be permitted.

2.3.8 Soiled Workroom or Soiled Holding Room

Such rooms shall be separate from and have no direct connection with clean workrooms or clean supply rooms.

2.3.8.1 Soiled workrooms. These shall contain the following:

(1) A clinical sink (or equivalent flushing-rim fixture) and a hand-washing station. Both fixtures shall have a hot and cold mixing faucet.

(2) A work counter and space for separate covered containers for soiled linen and a variety of waste types.

2.3.8.2 Soiled holding rooms. Omission of the clinical sink and work counter shall be permitted in rooms used only for temporary holding of soiled material. If the flushing-rim clinical sink is not provided, facilities for cleaning bedpans shall be provided elsewhere.

2.3.9 Equipment and Supply Storage

2.3.9.1 Clean linen storage

(1) Location of the designated area within the clean workroom, a separate closet, or an approved distribution system on each floor shall be permitted.

(2) If a closed cart system is used, storage of clean linen carts in an alcove shall be permitted. This cart storage must be out of the path of normal traffic and under staff control.

2.3.9.2 Equipment storage room or alcove. Appropriate room(s) or alcove(s) shall be provided for storage of equipment necessary for patient care and as required by the functional program. Each unit shall provide sufficient storage area(s) located on the patient floor to keep its required corridor width free of all equipment and supplies, but not less than 10 square feet (0.93 square meters) per patient bed shall be provided.

2.3.9.3 Storage space for stretchers and wheelchairs. Space shall be provided in a strategic location, without restricting normal traffic.

2.3.9.4 Emergency equipment storage. Space shall be provided for emergency equipment that is under direct control of the nursing staff, such as a cardiopulmonary resuscitation (CPR) cart. This space shall be located in an area appropriate to the functional program but out of normal traffic.

2.3.10 Housekeeping Room

2.3.10.1 Housekeeping rooms shall be directly accessible from the unit or floor they serve and may serve more than one nursing unit on a floor.

2.3.10.2 In nursing locations, at least one housekeeping room per floor shall contain a service sink or floor receptor and provisions for storage of supplies and housekeeping equipment.

2.4 Support Areas for Staff

2.4.1 Staff Lounge Facilities

Lounge facilities shall be sized per the functional program but shall not be less than 100 square feet (9.29 square meters).

2.4.2 Staff Toilet Room(s)

These shall be conveniently located for staff use and may be unisex.

2.4.3 Staff Storage Facilities

2.4.3.1 Securable closets or cabinet compartments for the personal articles of nursing personnel shall be located in or near the nurse station. At a minimum, they shall be large enough for purses and billfolds.

2.4.3.2 If coat storage is provided, coats may be stored in closets or cabinets on each floor or in a central staff locker area.

3 Nursing Locations

3.1 Medical/Surgical Nursing Units

Each medical and surgical nursing unit shall include the following (see Sections 1.1-1.3.5 and 1.1-3 for waiver of standards where existing conditions make absolute compliance impractical):

Note: See other sections of this document for special care areas or units such as recovery rooms, critical care units, pediatric units, rehabilitation units, and skilled nursing care or other specialty units.

3.1.1 Typical Patient Rooms

Each patient room shall meet the following standards:

3.1.1.1 Capacity

(1) In new construction, the maximum number of beds per room shall be one unless the functional program demonstrates the necessity of a two-bed arrangement. Approval of a two-bed arrangement shall be obtained from the licensing authority.

(2) Where renovation work is undertaken and the present capacity is more than one patient, maximum room capacity shall be no more than the present capacity, with a maximum of four patients.

3.1.1.2 Space requirements. Minor encroachments, including columns and hand-washing stations, that do not interfere with functions may be ignored when determining space requirements for patient rooms.

*(1) Area. In new construction, patient rooms shall be constructed to meet the needs of the functional program and have a minimum of 100 square feet (9.29 square meters) of clear floor area per bed in multiple-bed rooms and 120 square feet (11.15 square meters) of clear floor area in single-bed rooms, exclusive of toilet rooms, closets, lockers, wardrobes, alcoves, or vestibules.

(2) Dimensions and clearances. The dimensions and arrangement of rooms shall be such that there is a minimum of 3 feet (91.44 centimeters) between the sides and foot of the bed and any wall or any other fixed obstruction. In multiple-bed rooms, a clearance of 4 feet (1.22 meters) shall be available at the foot of each bed to permit the passage of equipment and beds. (See "bed size" in the glossary.)

(3) Renovation. Where renovation work is undertaken, every effort shall be made to meet the above minimum standards. If it is not possible to meet the above minimum standards, the authorities having jurisdiction shall be permitted to grant approval to deviate from this requirement. In such cases, patient rooms shall have no less than 80 square feet (7.43 square meters) of clear floor area per bed in multiple-bed areas and 100 square feet (9.29 square meters) of clear floor area in single-bed rooms exclusive of the spaces previously noted in this section.

***3.1.1.3** Windows. Each patient room shall have a window in accordance with Section 2.1-8.2.2.5.

3.1.1.4 Patient privacy. In multiple-bed rooms, visual privacy from casual observation by other patients and visitors shall be provided for each patient. The design for privacy shall not restrict patient access to the entrance, hand-washing station, or toilet.

***3.1.1.5** Hand-washing stations. These shall be provided to serve each patient room.

(1) A hand-washing station shall be located in the toilet room.

(2) A hand-washing station shall be provided in the patient room in addition to that in the toilet room. This shall be located outside the patient's cubicle curtain and convenient to staff entering and leaving the room.

(3) A hand sanitation station in patient rooms utilizing waterless cleaners may be used in renovation

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A3.1.1.2 (1) In new construction, single patient rooms should be at least 12 feet (3.66 meters) wide by 13 feet (3.96 meters) deep (or approximately 160 square feet, or 14.86 square meters) exclusive of toilet rooms, closets, lockers, wardrobes, alcoves, or vestibules. These spaces should accommodate comfortable furniture for family members (one or two) without blocking access of staff members to patients. Efforts should be made to provide the patient with some control of the room environment.

A3.1.1.3 Windows are important for the psychological well-being of many patients, as well as for meeting fire safety code requirements. They are also essential for continued use of the area in the event of mechanical ventilation system failure.

A3.1.1.5 Where renovation work is undertaken, every effort should be made to meet this standard. Where space does not permit the installation of an additional hand-washing station in the patient room, or where it is technically infeasible, the authority having jurisdiction may grant approval of alternative forms of hand cleansing.

of existing facilities where existing conditions prohibit an additional hand-washing station.

3.1.1.6 Toilet rooms. Toilet rooms shall be provided in accordance with Section 2.1-2.2.1.

3.1.1.7 Patient storage locations. Patient storage shall be provided in accordance with Section 2.1-2.2.2.

*3.1.2 Patient/Family-Centered Care Rooms

3.1.3 Examination/Treatment Room(s)

Omission of such rooms shall be permitted if all patient rooms in the nursing unit are single-bed rooms.

3.1.3.1 Location. Centrally located examination and treatment room(s) shall be permitted to serve more than one nursing unit on the same floor.

3.1.3.2 Space requirements. Such rooms shall have a minimum floor area of 120 square feet (11.15 square meters).

3.1.3.3 Patient privacy. Provision shall be made to preserve patient privacy from observation from outside the exam room through an open door.

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

3.1.4 Support Areas—General

3.1.4.1 The size and location of each support area shall depend on the numbers and types of beds served.

3.1.4.2 Location

(1) Provision for the support areas listed shall be in or readily available to each nursing unit.

(2) Each support area may be arranged and located to serve more than one nursing unit; however, unless otherwise noted, at least one such support area shall be provided on each nursing floor.

3.1.4.3 Identifiable spaces are required for each of the indicated functions. Where the words room or office are used, a separate, enclosed space for the one named function is intended; otherwise, the described area may be a specific space in another room or common area.

3.1.5 Support Areas for Medical/Surgical Nursing Units

***3.1.5.1** Administrative center(s) or nurse station(s). This area shall be provided in accordance with Section 2.1-2.3.1.

3.1.5.2 Documentation area. This area shall be provided on the unit in accordance with Section 2.1-2.3.2.

3.1.5.3 Nurse or supervisor office

***3.1.5.4** Multipurpose room(s). Room(s) shall be provided for patient conferences, reports, education, training sessions, and consultation in accordance with Section 2.1-2.3.3.

3.1.5.5 Hand-washing stations

(1) In nursing locations, hand-washing stations shall be conveniently accessible to the nurse station, medication station, and nourishment area.

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A3.1.2 Patient/Family-Centered Care Rooms

Where a facility contemplates patient/family-centered care rooms, the rooms should be constructed to meet the needs of the functional program.

a. Capacity. Patient/family-centered rooms should be single-bed rooms.

b. Area and dimensions. These rooms should have a minimum of 250 square feet (23.22 square meters) of clear floor area exclusive of family alcoves, toilet rooms, closets, lockers, wardrobes, vestibules, staff charting areas, or staff hand-washing stations, with a minimum clear dimension of 15 feet (4.57 meters).

c. Additional area. Additional areas should be provided at a minimum clear area of 30 square feet (2.79 square meters) per family member (permitted by the facility).

d. Environment of care. Consideration for a homelike atmosphere, furniture arrangements, and orientation to the patient bed and room windows should reflect the needs of the functional program.

A3.1.5.1 The station should permit visual observation of all traffic into the unit.

A3.1.5.4 Multipurpose rooms are used primarily for staff purposes and generally are not available for family or visitors. A waiting room convenient to the unit should be provided.

(2) If it is convenient to each, one hand-washing station shall be permitted to serve several areas.

3.1.5.6 Medication station. Provision shall be made for distribution of medications in accordance with Section 2.1-2.3.4.

3.1.5.7 Nourishment area. This area shall be provided in accordance with Section 2.1-2.3.5.

3.1.5.8 Ice machine. Each nursing unit shall have equipment to provide ice for treatments and nourishment. Ice-making equipment shall be provided in accordance with Section 2.1-2.3.6.

3.1.5.9 Patient bathing facilities

(1) Showers and bathtubs

(a) Where individual bathing facilities are not provided in patient rooms, there shall be at least one shower and/or bathtub for each 12 beds without such facilities.

(b) Each bathtub or shower shall be in an individual room or enclosure that provides privacy for bathing, drying, and dressing.

(2) Toilets. A toilet shall be provided within or directly accessible to each central bathing facility.

(3) Special bathing facilities, including space for attendant, shall be provided for patients on stretchers, carts, and wheelchairs at the ratio of one per 100 beds or a fraction thereof. These facilities may be on a separate floor if convenient for use.

3.1.5.10 Clean workroom or clean supply room. Such rooms shall be provided in accordance with Section 2.1-2.3.7.

3.1.5.11 Soiled workroom or soiled holding room. Such rooms shall be provided in accordance with Section 2.1-2.3.8.

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A3.1.5.13 A storage or bin space should be included for recyclable materials: white paper, mixed paper, cans, bottles, and cardboard.

3.1.5.12 Equipment and supply storage

(1) Clean linen storage. Each nursing unit shall contain a designated area for clean linen storage in accordance with Section 2.1-2.3.9.1.

(2) Equipment storage room or alcove. Appropriate room(s) or alcove(s) shall be provided in accordance with Section 2.1-2.3.9.2.

(3) Storage space for stretchers and wheelchairs. Space shall be provided in accordance with Section 2.1-2.3.9.3.

(4) Emergency equipment storage. Storage shall be provided for emergency equipment in accordance with Section 2.1-2.3.9.4.

***3.1.5.13** Housekeeping room. One housekeeping room shall be provided for each nursing unit or nursing floor in accordance with Section 2.1-2.3.10.

Note: This housekeeping room may not be used for other departments and nursing units that require separate housekeeping rooms.

3.1.6 Support Areas for Staff

3.1.6.1 Staff lounge facilities. Lounge facilities shall be provided in accordance with Section 2.1-2.4.1.

3.1.6.2 Staff toilet room(s). Staff toilet rooms shall be provided in accordance with Section 2.1-2.4.2.

3.1.6.3 Staff storage facilities. Storage facilities for the personal use of staff shall be provided in accordance with Section 2.1-2.4.3.

3.1.7 Support Areas for Patients and Visitors

3.1.7.1 Visitor lounge. Each nursing unit shall have access to a lounge for visitors and family.

(1) This lounge shall be sized appropriately for the number of beds and/or nursing units served per the functional program.

(2) This lounge shall be conveniently located to the nursing unit(s) served.

(3) This lounge shall provide comfortable seating.

(4) This lounge shall be designed to minimize the impact of noise and activity on patient rooms and staff functions.

3.1.7.2 Toilet room(s). A toilet room(s) with hand-washing station shall be located convenient to multi-purpose room(s).

(1) Patient use. If the functional program calls for the toilet rooms(s) to be for patient use, it shall be designed/equipped for patient use.

(2) Public use. If called out in the functional program, the toilet room(s) serving the multipurpose rooms(s) may also be designated for public use.

3.2 Special Patient Care Areas

3.2.1 Applicability

As designated by the functional program, both airborne infection isolation and protective environment rooms may be required. Many facilities care for patients with an extreme susceptibility to infection (e.g., immunosuppressed patients with prolonged granulocytopenia, most notably bone marrow recipients, or solid-organ transplant recipients and patients with hematological malignancies who are receiving chemotherapy and are severely granulocytopenic). These rooms are not intended for use with patients diagnosed with HIV infection or AIDS, unless they are also severely granulocytopenic. Generally, protective environments are not needed in community hospitals, unless these facilities take care of these types of patients.

*3.2.2 Airborne Infection Isolation Room(s)

The airborne infection isolation room requirements contained in these Guidelines for particular areas throughout a facility should be predicated on an infection control risk assessment (ICRA) and based on the needs of specific community and patient populations served by an individual health care provider (see Glossary and Section 1.5–2.3).

3.2.2.1 Number. At least one airborne infection isolation room shall be provided in the hospital. The number of airborne infection isolation rooms for individual patient units shall be increased based upon an ICRA or by a multidisciplinary group designated for that purpose. This process ensures a more accurate determination of environmentally safe and appropriate room types and spatial needs. Special ventilation requirements are found in Table 2.1-2.

3.2.2.2 Location. Airborne infection isolation rooms may be located within individual nursing units and used for normal acute care when not required for patients with airborne infectious diseases, or they may be grouped as a separate isolation unit.

3.2.2.3 Capacity. Each room shall contain only one bed.

3.2.2.4 Facility requirements. Each airborne infection isolation room shall comply with the acute care patient room section (Section 2.1–3.1.1) of this document as well as the following requirements:

(1) Each room shall have an area for hand-washing, gowning, and storage of clean and soiled materials located directly outside or immediately inside the entry door to the room.

(2) Construction requirements

(a) Airborne infection isolation room perimeter walls, ceiling, and floors, including penetrations, shall be sealed tightly so that air does not infiltrate the environment from the outside or from other spaces. (See Glossary.)

(b) Airborne infection isolation room(s) shall have self-closing devices on all room exit doors.

(3) Separate toilet, bathtub (or shower), and hand-washing stations shall be provided for each airborne infection isolation room.

*(4) Rooms shall have a permanently installed visual mechanism to constantly monitor the pressure

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A3.2.2 For additional information, refer to the Centers for Disease Control and Prevention (CDC) "Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health Care Facilities" as they appear in the *Federal Register* dated October 28, 1994, and to the CDC "Guidelines for Environmental Infection Control in Health-Care Facilities," December 2003.

status of the room when occupied by patients with an airborne infectious disease. The mechanism shall continuously monitor the direction of the airflow.

*3.2.3 Protective Environment Room(s)

The differentiating factor between protective environment rooms and other patient rooms is the requirement for positive air pressure relative to adjoining spaces, with all supply air passing through high-efficiency particulate air (HEPA) filters with 99.97 percent efficiency for particles > 0.3 μm in diameter.

3.2.3.1 Applicability. When determined by an ICRA, special design considerations and ventilation to ensure the protection of patients who are highly susceptible to infection shall be required.

3.2.3.2 Functional program. The appropriate clinical staff shall be consulted regarding room type, and spatial needs to meet facility infection control requirements shall be incorporated into the functional program.

3.2.3.3 Number and location. The appropriate numbers and location of protective environment rooms shall be as required by the ICRA.

3.2.3.4 Capacity. Protective environment rooms shall contain only one bed.

3.2.3.5 Facility requirements. Protective environment rooms shall comply with Section 2.1-3.2.2. Special ventilation requirements are found in Table 2.1-2.

(1) Each protective environment room shall have an area for hand-washing, gowning, and storage of clean and soiled materials located directly outside or immediately inside the entry door to the room.

(2) Patient bathing and toilet facilities. Separate toilet, bathtub (or shower), and hand-washing stations shall be directly accessible from each protective environment room.

(3) Monitoring equipment. Rooms shall have a permanently installed visual mechanism to constantly monitor the pressure status of the room when occupied by patients requiring a protective environment. The mechanism shall continuously monitor the direction of the airflow.

(4) Construction requirements

(a) Protective environment room perimeter walls, ceiling, and floors, including penetrations,

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A3.2.2.4 (4) In general, reliance on a substantial pressure differential (> 0.01 "wg/12.5Pa) will maintain the appropriate directional airflow with or without an anteroom. The anteroom concept should remain an option (i.e., not required).

a. Anterooms, in general, should be designed to meet local fire safety code as well as to prevent air from the patient room from escaping to the corridor or other common areas.

b. In addition to the concept of containment of airborne microorganisms, anterooms may appropiately be used for storage of personal protective equipment (PPE) (e.g., respirators, gowns, gloves), clean equipment, and hand hygiene.

c. In ganged anterooms (two patient rooms with a common anteroom), it may be difficult to maintain directional airflow and pressure differential intended to avoid contamination from one room to the other through the anteroom. The design, installation, and monitoring of ventilation systems in such configurations is of utmost importance.

A3.2.3 Immunosuppressed host airborne infection isolation (protective environment/airborne infection isolation)

a. Having a protective environment is not a minimum requirement. Facilities with protective environment rooms should include at least one immunosuppressed host airborne infection isolation room.

b. An anteroom is required for the special case in which an immunosuppressed patient requires airborne infection isolation. See Section 2.1-3.2.1 for more information.

c. There is no prescribed method for anteroom ventilation—the room can be ventilated with either of the following airflow patterns: (1) airflows from the anteroom, to the patient room and the corridor, or (2) airflows from the patient room and the corridor, into the anteroom. The advantage of pattern (1) is the provision for a clean anteroom in which health care workers need not mask before entering the anteroom.

shall be sealed tightly so that air does not infiltrate the environment from the outside or from other spaces.

(b) Protective environment room(s) shall have self-closing devices on all room exit doors.

(5) Renovation. See references to protective environment rooms during renovation and construction in Section 1.5–2.2.

***3.2.3.6** Bone marrow transplant units. Rooms in allogeneic bone marrow transplant units shall be designed to meet specific patient needs.

3.2.4 Seclusion Room(s)

3.2.4.1 Applicability. If indicated by the functional program, the hospital shall provide one or more single-bed rooms for patients needing close supervision for medical and/or psychiatric care.

3.2.4.2 Location. These rooms may be part of the psychiatric unit described in Section 2.1-3.8.

3.2.4.3 Facility requirements. If the single-bed room(s) is part of the acute care nursing unit, the provisions of Section 2.1-3.8.2 shall apply, with the following exceptions:

(1) Each room shall be for single occupancy.

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A3.2.3.6 Bone marrow transplant facilities

General space and staffing requirements are critical for bone marrow transplant facilities. Patients in these units may be acutely aware of the surrounding environment, which is their life support system during the many weeks they are confined in an immunosuppressed condition. Means of controlling unnecessary noise are important. At times, each patient may require individual privacy, although each is required to be under close staff supervision.

a. Location. Bone marrow transplant rooms should be located to have access within the hospital to out-of-unit diagnostic and treatment equipment, particularly radiation therapy equipment.

b. All bone marrow transplant-designated beds should be in exceptionally clean environments, which should consist of protective environment rooms equipped with HEPA filtration, preferably located close to each other.

c. A countertop with scrub sink and space for high-level disinfection procedures should be available outside the entrance to each patient room when located within the nursing unit or at each entrance to a dedicated bone marrow transplant room. A handwashing station should be accessible near the entrance to each patient room within a dedicated bone marrow transplant unit.

d. Toilet and bathing facilities. Each bone marrow transplant patient room should have a private toilet room, which contains a water closet and a bathing facility, for the exclusive use of the patient. The patient should be able to enter the room directly without leaving the patient room or passing through the vestibule. The patient should also have a lavatory for the patient's exclusive use, located in the patient room or the private toilet room.

e. Patients should be housed in single-bed rooms with full-height partitions, sealed airtight to the structure to prevent cross-infections.

f. All surfaces, floors, walls, ceilings, doors, windows, and curtains in the patient room should be scrubbable.

g. Windows should be provided so that each patient may be cognizant of the outdoor environment. Windowsill height should not exceed 3 feet (0.91 meter) above the floor and should be above grade. All windows in the unit should be fixed sash and sealed to eliminate infiltration.

h. Viewing panels should be provided in doors or walls for nursing staff observation. Flame-retardant curtains or other means should be provided to cover windows and viewing panels when a patient requires visual privacy. Glazing should be safety glass, wire glass, or tempered clear plastic to reduce hazards from accidental breakage.

i. Nurse and emergency call systems. Each patient room should be provided with a nurse call system accessible at the bed, sitting area, and patient toilet room. An emergency call system should also be provided at each patient bed and toilet room to summon additional personnel from on-call rooms, consultation rooms, and staff lounges.

j. Facilities for administration of suction, compressed air, and oxygen should be provided at the bed.

k. Staff and visitor support areas. Each geographically distinct unit should provide appropriate space to support nurses' administrative activities, report/conference room activities, doctors' consultation, drug preparation and distribution, emergency equipment storage, and closed accessible waiting for family members.

(2) Each room shall be located to permit staff observation of the entrance, preferably adjacent to the nurse station.

(3) Each room shall be designed to minimize the potential for escape, concealment, injury, or suicide.

(4) If vision panels are used for observation of patients, the arrangement shall ensure patient privacy and prevent casual observation by visitors and other patients.

*3.2.5 Protected Units

3.3 Intermediate Care Units

Intermediate care units, sometimes referred to as step-down units, are routinely utilized in acute care hospitals for patients who require frequent monitoring of vital signs and/or nursing intervention that exceeds the level needed in a regular medical/surgical unit but is less than that provided in a critical care unit.

3.3.1 General

3.3.1.1 Classification. Intermediate care units can be progressive care units or specialty units such as cardiac, surgical (e.g., thoracic, vascular), neurosurgical/neurological monitoring, or chronic ventilator respiratory care units.

3.3.1.2 Applicability. These standards shall apply to adult beds designated to provide intermediate care, but not pediatric or neonatal intermediate care.

3.3.1.3 Location. In hospitals that provide intermediate care, beds shall be designated for this purpose. These beds shall be permitted to constitute a separate unit or be a designated part of another unit.

3.3.1.4 Nurse management space. There shall be a separate physical area devoted to nursing management for the care of the intermediate patient.

3.3.2 Patient Rooms

The following shall apply to all intermediate care units unless otherwise noted.

3.3.2.1 Capacity
Maximum room capacity shall be four patients.

3.3.2.2 Space requirements. Minor encroachments, including columns and hand-washing stations, that do not interfere with functions may be ignored when determining space requirements for patient rooms.

(1) Area. In new construction, patient rooms shall be constructed to meet the needs of the functional program and have a minimum of 120 square feet (11.15 square meters) of clear floor area per bed in multiple-bed rooms and 150 square feet (13.94 square meters) of clear floor area for single-bed rooms, exclusive of toilet rooms, closets, lockers, wardrobes, alcoves, or vestibules.

(2) Clearances. In new construction, the dimensions and arrangement of rooms shall be such that there is a minimum clearance of 4 feet (1.22 meters) between the sides of the beds and other beds, walls, or fixed obstructions. A minimum clearance of 4 feet (1.22 meters) shall be available at the foot of each bed to permit the passage of equipment and beds.

(3) Renovation. Where renovation work is undertaken, every effort shall be made to meet these standards. If it is not possible to meet these minimum standards, the authorities having jurisdiction may grant approval to deviate from this requirement. In such cases, patient rooms shall have no less than 100 square feet (9.29 square meters) of clear floor area per bed in multiple-bed rooms and 120 square feet (11.15 square meters) of clear floor area in single-bed rooms.

3.3.2.3 Windows. Each patient room shall have a window in accordance with Section 2.1-8.2.2.5.

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A3.2.5 Protected Units

The purpose of this section is to lend guidance in the design of units that by their very nature require a protected environment for the treatment and care of their patients. The following units fall within this intended guidance, although this list is not inclusive: transplant units, burn units, nurseries, units for immunosuppressed populations, and neonatal intensive care units. Portions of emergency departments where the initial triage occurs may be incorporated as part of the triage service while an assessment of potential infection and contamination is made prior to processing the suspected patient. Consideration for appropriate pressurization and air exchange rates to control contamination should be addressed.

3.3.2.4 Patient privacy. In multiple-bed rooms, visual privacy shall be provided for each patient. The design for privacy shall not restrict patient access to the room entrance, lavatory, toilet, or room windows.

3.3.2.5 Nurse call systems. Nurse call systems for two-way voice communication shall be provided in accordance with Section 2.1-10.3.8. The call system for the unit shall include provisions for an emergency code resuscitation alarm to summon assistance from outside the intermediate care unit.

3.3.2.6 Hand-washing stations. These shall be provided to serve each patient room.

(1) In new construction and renovation, a hand-washing station shall be provided in the patient room in addition to that in the toilet room.

(2) The hand-washing station in the patient room shall be located outside the patient's cubicle curtain so it is convenient to staff entering and leaving the room.

3.3.2.7 Toilet rooms. Toilet rooms shall be provided in accordance with Section 2.1-2.2.1.

3.3.2.8 Bathing facilities. Patients shall have access to bathing facilities within their rooms or in a central bathing facility.

(1) Each shower or bathtub in a central bathing facility shall be in an individual room or enclosure that provides privacy for bathing, drying, and dressing.

(2) A water closet and lavatory in a separate enclosure shall be directly accessible to each central bathing facility.

3.3.2.9 Patient storage. Storage locations for patient use shall be provided in accordance with Section 2.1-2.2.2.

3.3.3 Airborne Infection Isolation Room

Access to at least one airborne infection isolation room shall be provided unless provided elsewhere in the facility. The number of airborne infection isolation rooms shall be determined on the basis of an infection control risk assessment (ICRA). Each room shall comply with the requirements of Section 2.1-3.2.2. Special ventilation requirements are found in Table 2.1-2.

3.3.4 Support Areas—General

3.3.4.1 Provision for the support areas listed below shall be in or readily available to each intermediate care unit.

3.3.4.2 The size and location of each staff support area shall depend upon the numbers and types of beds served.

3.3.4.3 Identifiable spaces are required for each of the indicated functions. Where the words "room" or "office" are used, a separate, enclosed space for the one named function is intended; otherwise, the described area may be a specific space in another room or common area.

3.3.4.4 Services shared with adjacent units shall be permitted.

3.3.5 Support Areas for Intermediate Care Units

3.3.5.1 Administrative center or nurse station

(1) An administrative center or nurse station shall be provided in accordance with Section 2.1-2.3.1.

(2) There shall be direct or remote visual observation between the administrative center or nurse station, staffed charting stations, and all patient beds in the unit.

3.3.5.2 Documentation area. This area shall be provided within the patient unit in accordance with Section 2.1-2.3.2.

3.3.5.3 Medication station. Provision shall be made for 24-hour distribution of medications in accordance with Section 2.1-2.3.4.

3.3.5.4 Hand-washing stations

(1) In nursing locations, hand-washing stations shall be conveniently accessible to the nurse station, medication station, and nourishment area.

(2) If it is convenient to each, one hand-washing station shall be permitted to serve several areas.

3.3.5.5 Nourishment area. There shall be a nourishment area with a work counter, a hand-washing station, a refrigerator, storage cabinets, and equipment for preparing and serving hot and cold nourishments between scheduled meals.

3.3.5.6 Ice machine. A self-dispensing ice machine shall be provided to supply ice for treatments and nourishment.

3.3.5.7 Clean workroom or clean supply room. This room shall be provided in accordance with Section 2.1-2.3.7.

3.3.5.8 Soiled workroom or soiled holding room. This room shall be provided in accordance with Section 2.1-2.3.8.

3.3.5.9 Equipment and supply storage

(1) Equipment storage room. An equipment storage room shall be provided for storage of equipment necessary for patient care.

   (a) This room shall be permitted to serve more than one unit.

   (b) Each unit shall provide sufficient storage area(s) located on the patient floor to keep its required corridor width free of all equipment and supplies, but not less than 20 square feet (1.86 square meters) per patient bed shall be provided.

(2) Emergency equipment storage. This shall be provided in accordance with Section 2.1-2.3.9.4.

3.3.5.10 Housekeeping room. This room shall be provided in accordance with Section 2.1-2.3.10.

3.3.6 Support Areas for Staff

3.3.6.1 Staff lounge facilities. Staff lounge facilities shall be provided in accordance with Section 2.1-2.4.1.

(1) The location of these facilities shall be convenient to the intermediate care unit.

(2) These facilities may be shared with other nursing unit(s).

3.3.6.2 Staff toilet room(s). These shall be provided in accordance with Section 2.1-2.4.2.

3.3.6.3 Staff storage facilities. Storage facilities for personal use of the staff shall be provided in accordance with Section 2.1-2.4.3.

3.4 Critical Care Units

3.4.1 General Considerations

3.4.1.1 Applicability

(1) The following standards are intended for typical critical care services. Design of critical care units shall comply with these standards and shall be appropriate to the needs of the functional program.

(2) Where specialized services are required, additions and/or modifications shall be made as necessary for efficient, safe, and effective patient care.

3.4.1.2 Environment of care. Critical care units require special space and equipment considerations for safe and effective patient care, staff functions, and family participation. Families and visitors to critical care units often wait for long periods, including overnight, under highly stressful situations. They tend to congregate at unit entries to be readily accessible to staff interaction. Clinical personnel perform in continously stressful circumstances over long hours. Often they cannot leave the critical care unit, necessitating space and services to accommodate their personal and staff group needs in close proximity to the unit. Design shall address such issues as privacy, atmosphere, and aesthetics for all involved in the care and comfort of patients in critical care units.

3.4.1.3 Functional program. Not every hospital will provide all types of critical care. Some hospitals may have a small combined unit; others may have separate, sophisticated units for highly specialized treatments. Critical care units shall comply in size, number, and type with these standards and with the functional program.

3.4.1.4 Unit location. The following shall apply to all types of critical care units unless otherwise noted.

(1) The location shall offer convenient access from the emergency, respiratory therapy, laboratory,

radiology, surgery, and other essential departments and services as defined by the functional program.

(2) The unit shall be located so that medical emergency resuscitation teams can respond promptly to emergency calls with minimum travel time.

(3) Space arrangement shall include provisions for access to emergency equipment from other departments.

(4) The location shall be arranged to eliminate the need for through traffic.

***3.4.1.5** Elevator considerations. In new construction, where elevator transport is required to move critically ill patients, the size of the cab, door width, and mechanisms and controls shall meet the specialized needs.

*3.4.2 Critical Care Units (General)

The following shall apply to all types of critical care units unless otherwise noted.

***3.4.2.1** Patient care areas

(1) Space requirements for new construction

(a) Area. Each patient space (whether separate rooms, cubicles, or multiple-bed space) shall have a minimum of 200 square feet (18.58 square meters) of clear floor area with a minimum headwall width of 13 feet (3.96 meters) per bed, exclusive of anterooms, vestibules, toilet rooms, closets, lockers, wardrobes, and/or alcoves.

(b) Clearances. Bed clearances for all adult and pediatric units shall be a minimum of 5 feet (1.52 meters) at the foot of the bed to the wall, 5 feet (1.52 meters) on the transfer side, 4 feet (1.22 meters) on the non-transfer side, and 8 feet (2.44 meters) between beds.

(2) Space requirements for renovation. In renovation of existing critical care units, every effort shall be made to meet the above minimum standards. If it is not possible to meet the above area standards, authorities having jurisdiction may grant approval to deviate from this requirement. In such cases, the following standards shall be met:

(a) Separate rooms or cubicles for single patient use shall be no less than 150 square feet (13.94 square meters).

(b) Multiple-bed space shall contain at least 150 square feet (13.94 square meters) of clear floor area per bed, exclusive of the spaces noted for new construction in Section 2.1-3.4.2.1 (1)(a).

(3) Windows. Each patient bed shall have visual access, other than skylights, to the outside environment, with not less than one outside window in each patient bed area, in accordance with Section 2.1-8.2.2.5.

(4) Privacy

(a) When private rooms or cubicles are provided, view panels to the corridor shall be required with a means to ensure visual privacy.

(b) Each patient bed area shall have space at each bedside for visitors and shall have provisions for visual privacy from casual observation by other patients and visitors.

*(5) Nurse call system

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A3.4.1.5 Transportation of patients to and from the critical care unit should ideally be separated from public corridors and visitor waiting areas.

A3.4.2 Provision should be made for rapid and easily accessible information exchange and communication within the unit and the hospital.

A3.4.2.1 In critical care units, the size of the patient care space should be determined by the intended functional use. The patient space in critical care units, especially those caring for surgical patients following major trauma or cardiovascular, transplant, or orthopedic procedures and those caring for medical patients simultaneously requiring ventilation, dialysis, and/or treatment with other large equipment (e.g., intra-aortic balloon pump) may be overwhelmed if designed to the absolute minimum clear floor area.

(a) Nurse call systems for two-way voice communication shall be provided in accordance with Section 2.1-10.3.8.

(b) The communication system for the unit shall include provisions for an emergency code resuscitation alarm to summon assistance from outside the critical care unit.

(6) Hand-washing stations

(a) Hand-washing stations shall be convenient to nurse stations and patient bed areas.

(b) There shall be at least one hand-washing station for every three beds in open plan areas and one in each patient room.

(c) The hand-washing station shall be located near the entrance to the patient cubicle or room, sized to minimize splashing water onto the floor, and equipped with hands-free operable controls.

(d) Where towel dispensers are provided, they shall operate so that dispensing requires only the towel to be touched.

(7) Construction requirements

(a) Doors

(i) Where only one door is provided to a bed space, it shall be at least 4 feet (1.22 meters) wide and arranged to minimize interference with movement of beds and large equipment.

(ii) Sliding doors shall not have floor tracks and shall have hardware or a breakaway feature that minimizes jamming possibilities.

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A3.4.2.1 (5). A staff emergency assistance system should be provided on the most accessible side of the bed. The system should annunciate at the nurse station with backup from another staffed area from which assistance can be summoned.

(iii) Where sliding doors are used for access to cubicles within a suite, a 3-foot-wide (91.44 centimeters) swinging door shall be permitted for personnel communication.

(b) Windows in renovation projects

(i) Clerestory windows with windowsills above the heights of adjacent ceilings may be used, provided they afford patients a view of the outside and are equipped with appropriate forms of glare and sun control.

(ii) Distance from the patient bed to the outside window shall not exceed 50 feet (15.24 meters).

(iii) Where partitioned cubicles are used, patients' view to outside windows shall be through no more than two separate clear vision panels.

(8) Design criteria for mechanical, electrical, and plumbing systems. The electrical, medical gas, heating, ventilation, and communication services shall support the needs of the patients and critical care team members under normal and emergency situations.

3.4.2.2 Airborne infection isolation room

(1) At least one airborne infection isolation room shall be provided, unless provided in another critical care unit. The number of airborne infection isolation rooms shall be determined based on an ICRA.

(2) Each room shall comply with the requirements of Section 2.1-3.2.2; however, the requirement for the bathtub (or shower) may be eliminated. Compact, modular toilet/sink combination units may replace the requirement for a "toilet room."

(3) Special ventilation requirements are found in Table 2.1-2.

3.4.2.3 Diagnostic, treatment, and service areas

(1) Special procedures room. This shall be provided if required by the functional program. It may be

located outside the critical care unit if conveniently accessible.

(2) The following shall be available. Provision of these services from the central departments or from satellite facilities shall be permitted as required by the functional program.

(a) Imaging facilities

(b) Respiratory therapy services

(c) Laboratory services

(d) Pharmacy services

3.4.2.4 Support areas for critical care units. The following shall be provided for all types of critical care units unless otherwise noted.

*(1) Administrative center or nurse station

(a) An administrative center or nurse station shall be provided in accordance with Section 2.1-2.3.1.

(b) Visual observation. There shall be direct or remote visual observation between the administrative center, nurse station, or staffed charting stations and all patient beds in the critical care unit.

*(2) Documentation and information review spaces. Space shall be provided within the unit to accommodate the recording of patient information.

*(a) The documentation space shall be located within or adjacent to the patient bed space. It shall include countertop that will provide for a large flow sheet typical of critical care units and a computer monitor and keyboard. There shall be one documentation space with seating for each patient bed.

*(b) There shall be a specifically designated area within the unit for information review located to facilitate concentration.

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A3.4.2.4 (1). Patients should be visually observed at all times. This can be achieved in a variety of ways.

a. If a central station is chosen, it should be located to allow for complete visual control of all patient beds in the critical care unit. It should be designed to maximize efficiency in traffic patterns. Patients should be oriented so that they can see the nurse but cannot see the other patients. There should be an ability to communicate with the clerical staff without having to enter the central station.

b. If a central station is not chosen, the unit should be designed to provide visual contact between patient beds so that there can be constant visual contact between the nurse and patient.

A3.4.2.4 (2). The requirements for documenting patient information by providers have become substantial and continue to grow. A growing number of providers and others review patient records in critical care units. Confidentiality of patient information is important. Computers are increasingly used to meet these expectations.

a. Separate areas need to be designed for the unit secretary and staff charting. Planning should consider the potential volume of staff (both medical and nursing) that could be present at any one time and translate that to adequate charting surfaces.

b. The secretarial area should be accessible to all. However, the charting areas may be somewhat isolated to facilitate concentration.

c. Storage for chart forms and supplies should be readily accessible.

d. Space for computer terminals and printer and conduit for computer hookup should be provided when automated information systems are in use or planned for the future.

e. Patient records should be readily accessible to clerical, nursing, and physician staff.

A3.4.2.4 (2)(a). Documentation space. The countertop area should be a minimum of 8 square feet (0.74 square meters). If a documentation space is to serve two patient beds, it should be a minimum of 10 square feet (0.93 square meter).

A3.4.2.4 (2)(b). Information review space. There should be a minimum of 8 square feet (0.74 square meters) of countertop and seating to accommodate two people for every five patient beds it serves.

*(3) Office space. Adequate office space for critical care medical and nursing management/administrative personnel shall be available immediately adjacent to the critical care unit. The offices shall be linked with the unit by telephone or an intercommunications system.

(4) Multipurpose room(s). Multipurpose room(s) shall be provided for staff, patients, and patients' families for patient conferences, reports, education, training sessions, and consultation. These rooms shall be accessible to each nursing unit.

*(5) Medication station. Provision shall be made for 24-hour distribution of medications in accordance with Section 2.1-2.3.4.

*(6) Patient monitoring equipment. Each unit shall contain equipment for continuous monitoring, with visual displays for each patient at the bedside and at the nurse station. Monitors shall be located to permit easy viewing and access but shall not interfere with access to the patient.

(7) X-ray viewing facility. The unit shall have an x-ray viewing facility, which may be shared by more than one critical care unit provided direct access is available from each.

(8) Nourishment area. This area shall be provided in accordance with Section 2.1-2.3.5. It shall be immediately available within each critical care suite. More than one critical care unit shall be permitted to share this area provided direct access is available from each.

(9) Ice machine. This equipment shall be provided in accordance with Section 2.1-2.3.6.

(10) Clean workroom or clean supply room.

(a) This room shall be provided in accordance with Section 2.1-2.3.7.

(b) This room shall be immediately available in each critical care suite. More than one critical care unit shall be permitted to share a clean workroom or clean supply room provided direct access is available from each.

(11) Soiled workroom or soiled holding room.

(a) This room shall be provided in accordance with Section 2.1-2.3.8.

(b) It shall be immediately available in each critical care suite, but more than one critical care unit shall be permitted to share the room provided direct access is available from each.

(12) Equipment and supply storage

(a) Clean linen storage. This shall be provided in accordance with Section 2.1-2.3.9.1. This area shall be immediately available within each critical care suite. More than one critical care unit shall be permitted to share the room provided direct access is available from each.

*(b) Equipment storage room or alcove

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A3.4.2.4 (3). The offices should be large enough to permit consulting with members of the critical care team and visitors.

A3.4.2.4 (5). To minimize distraction of those preparing medications, the area should be enclosed. A glass wall or walls may be advisable to permit observation of patients and unit activities. A self-contained medicine-dispensing unit may be located at the nurse station, in the clean workroom, in an alcove, or in another area directly under visual control of nursing or pharmacy staff.

A3.4.2.4 (6). The unit should provide the ability to continuously monitor the physiological parameters appropriate for the types of patients the unit is expected to care for.

A3.4.2.4 (12)(b). Equipment storage room or alcove

a. The location of the equipment storage room or alcove should not interfere with the flow of traffic.

b. Work areas and storage of critical care supplies should be readily accessible to nursing and physician staff.

c. Shelving, file cabinets, and drawers should be accessible to all requiring use.

d. Electrical outlets should be provided in sufficient numbers to permit recharging stored battery-operated equipment.

e. Alcoves should be provided for the storage and rapid retrieval of crash carts and portable monitor/defibrillator units.

(i) Appropriate room(s) or alcove(s) shall be provided in accordance with Section 2.1-2.3.9.2.

(ii) Each critical care unit shall have sufficient storage area(s) located on the patient floor to keep the required corridor width free of all equipment and supplies. No less than 20 square feet (1.86 square meters) per patient bed shall be provided for equipment storage.

(c) Wheelchair and stretcher storage. Space to store stretchers and wheelchairs shall be provided in accordance with Section 2.1-2.3.9.3.

(d) Emergency equipment storage. Space shall be provided in accordance with Section 2.1-2.3.9.4.

(13) Housekeeping room. A housekeeping room shall be provided within or immediately adjacent to the critical care unit.

(a) This room shall not be shared with other nursing units or departments.

(b) It shall contain a service sink or floor receptor and provisions for storage of supplies and housekeeping equipment.

3.4.2.5 Support areas for staff. The following shall be provided for all types of critical care units unless otherwise noted.

(1) Staff lounge(s) and toilet(s). The following may be located outside the unit if conveniently accessible.

(a) These shall be located so that staff may be recalled quickly to the patient area in emergencies.

(b) The lounge shall have telephone or intercom and emergency code alarm connections to the critical care unit it serves.

(c) If not provided elsewhere, provision for the storage of coats, etc., shall be made in this area.

(d) Adequate furnishings, equipment, and space for comfortable seating and the preparation and consumption of snacks and beverages shall be provided unless provisions have been made elsewhere.

(e) One lounge shall be permitted to serve adjacent critical care areas.

(2) Staff storage facilities. Facilities for personal use of staff shall be provided in accordance with Section 2.1-2.4.3.

(3) Staff accommodations. Sleeping and personal care accommodations shall be provided for staff on 24-hour, on-call work schedules.

3.4.2.6 Support areas for visitors
The following shall be provided and may be located outside the unit if conveniently accessible.

(1) Visitor waiting room

(a) This room shall be designed to accommodate the long stays and stressful conditions common to such spaces, including provisions for privacy, means to facilitate communications, and access to toilets.

(b) The locations and size shall be appropriate for the number of patients and units served, with a seating capacity of not less than one family member per patient bed.

3.4.3 Coronary Care Unit

Coronary patients have special needs. They are often fully aware of their surroundings but still need immediate and critical emergency care. In addition to the standards in Section 2.1-3.4.2, the following standards apply to the coronary critical care unit:

3.4.3.1 Each coronary patient shall have a separate room for acoustical and visual privacy.

3.4.3.2 Each coronary patient shall have access to a toilet in the room. Portable commodes shall be permitted in lieu of individual toilets, but provisions must be made for their storage, servicing, and odor control.

3.4.4 Combined Medical/Surgical Critical Care and Coronary Care

If medical/surgical and coronary critical care services are combined in one critical care unit, at least 50 percent of the beds shall be located in private rooms or cubicles.

3.4.5 Pediatric Critical Care

Critically ill pediatric patients have unique physical and psychological needs.

3.4.5.1 General

(1) Applicability. The standards previously set forth for a general critical care unit (Section 2.1-3.4.2) shall apply to a pediatric critical care unit.

(2) Functional program. If a facility has a specific pediatric critical care unit, the functional program shall include consideration for staffing, isolation, transportation, life support, and environmental systems.

3.4.5.2 Patient care areas. A pediatric critical care unit shall provide the following:

(1) Space requirements

(a) Space at each bedside for families and visitors in addition to the space provided for staff. The space provided for parental accommodations as defined by the functional program shall not limit or encroach upon the minimum clearance requirements for staff and medical equipment around the patient's bed station.

*(b) Sleeping space for parents who may be required to spend long hours with the patient. If the sleeping area is separate from the patient area, it shall be in communication with the critical care unit.

(2) Consultation/demonstration room within, or convenient to, the pediatric critical care unit for private discussions

(3) Storage facilities

*(a) Provisions for formula storage

(b) Separate storage cabinets or closets for toys and games

*(c) Equipment storage space. Space for equipment storage shall be provided in accordance with Section 2.1-2.3.9.2.

***3.4.5.3** Examination and treatment room(s)

3.4.6 Newborn Intensive Care Units

The following standards apply to the newborn intensive care unit (NICU):

3.4.6.1 Patient care areas

(1) Safety and security

*(a) All entries to the NICU shall be controlled. The family entrance and reception area shall be clearly identified. The reception area shall permit visual observation and contact with all traffic entering the unit.

(b) The NICU shall be designed as part of an overall safety program to protect the physical security of infants, parents, and staff and to minimize the risk of infant abduction.

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A3.4.5.2 (1)(b) Parent sleeping accommodations should be provided at the patient's bedside.

A3.4.5.2 (3)(a) Formula storage may be outside the unit but should be available for use at all times. The functional program should determine the location and size of formula storage.

A3.4.5.2 (3)(c) Space allowances for pediatric beds and cribs are greater than those for adult beds because of the variation in bed/crib sizes and the potential for change. The functional program may determine that general storage be provided in the pediatric critical care unit above the minimum required under Section 2.1-3.4.2.4 (12)(b).

A3.4.5.3 The number and location of examination/treatment rooms should be based on the functional program.

A3.4.6.1 (1)(a) There should be efficient access to the unit from the labor and delivery area and emergency department or other referral entry points.

(2) Space requirements

(a) Each patient care space shall contain a minimum of 120 square feet (11.15 square meters) of clear floor area per bassinet excluding sinks and aisles.

(b) There shall be an aisle adjacent to each infant care space with a minimum width of 4 feet (1.22 meters) in multiple-bed rooms. When single-patient rooms or fixed cubicle partitions are utilized in the design, there shall be an adjacent aisle of not less than 8 feet (2.44 meters) in clear and unobstructed width to permit the passage of equipment and personnel.

(c) In multiple-bed rooms, there shall be a minimum of 8 feet (2.44 meters) between infant care beds.

(3) Viewing windows. When viewing windows are provided, provision shall be made to control casual viewing of infants.

(4) Privacy. Each patient care space shall be designed to allow privacy for the infant and family.

(5) Control station. A central area shall serve as a control station.

(a) This area shall have space for counters and storage.

(b) This area shall have convenient access to hand-washing stations.

(c) It shall be permitted to be combined with or to include centers for reception and communication and patient monitoring.

(6) Hand-washing stations

(a) In a multiple-bed room, every bed position shall be within 20 feet (6.10 meters) of a hands-free hand-washing station. Where an individual room concept is used, a hands-free hand-washing station shall be provided within each infant care room.

(b) All hand-washing stations shall be large enough to contain splashing.

(7) Construction requirements

(a) Noise control

(i) Infant bed areas and the spaces opening onto them shall be designed to produce minimal background noise and to contain and absorb much of the transient noise that arises within the NICU.

(ii) The combination of continuous background sound and transient sound in any patient care area shall not exceed an hourly Leq of 50 dB and an hourly L10 of 55 dB, both A-weighted slow response. The Lmax (transient sounds) shall not exceed 70 dB, A-weighted slow response.

(b) Doors. At least one door to each patient room in the unit must be large enough in both width and height to accommodate portable x-ray and ultrasound equipment.

(c) Ceilings

(i) Ceilings shall be easily cleanable and nonfriable.

(ii) Ceilings shall have a noise reduction coefficient (NRC) of at least 0.90.

(iii) Ceiling construction shall limit passage of particles from above the ceiling plane into the clinical environment.

(8) Lighting

(a) Provisions shall be made for indirect lighting and high-intensity lighting in the NICU.

(b) Controls shall be provided to enable lighting to be adjusted over individual patient care spaces.

(c) Darkening sufficient for transillumination shall be available when necessary.

(d) No direct ambient lighting shall be permitted in the infant care space, and any direct ambient lighting used outside the infant care area shall be located or framed to avoid a direct line of sight from any infant to the fixture. This does not exclude the use of direct procedure lighting.

(e) Lighting fixtures shall be easy to clean.

(f) At least one source of daylight shall be visible from newborn care areas.

(i) External windows in infant care rooms shall be glazed with insulating glass to minimize heat gain or loss.

(ii) External windows in infant care rooms shall be situated at least 2 feet (60.96 centimeters) away from any part of a baby's bed to minimize radiant heat loss from the baby.

(iii) All external windows shall be equipped with easily cleaned shading devices that are neutral color or opaque to minimize color distortion from transmitted light.

3.4.6.2 Airborne infection isolation room. An airborne infection isolation room shall be required in at least one level of nursery care.

(1) The room shall be enclosed and separated from the nursery unit with provisions for observation of the infant from adjacent nurseries or control area(s).

(2) All airborne infection isolation rooms shall comply with the requirements of Section 2.1-3.2.2, except the requirements for separate toilet, bathtub, or shower.

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A3.4.6.4 (6) Whenever possible, supplies should flow through special supply entrances from external corridors so that penetration of the semi-sterile zone by non-nursery personnel is unnecessary.

A3.4.6.4 (7) Soiled materials should be sealed and stored in a soiled holding area until removed. This holding area should be located where there will be no need to pass back through the semi-sterile zone to remove the soiled materials.

3.4.6.3 Diagnostic, treatment, and service areas. Support space shall be accessible for respiratory therapy, blood gas lab, developmental therapy, social work, laboratory, pharmacy, radiology, and other ancillary services when these activities are routinely performed on the unit.

3.4.6.4 Support areas for newborn intensive care units

(1) Documentation area. Charting facilities shall have adequate linear surface space to ensure that staff and physicians may chart and have simultaneous access to information and communication systems.

(2) Nurse/supervisor office or station. This shall be provided in accordance with Section 2.1-3.4.2.4 (3).

(3) Multipurpose room(s) for staff, patients, and patients' families for patient conferences, reports, education, training sessions, and consultation.

(a) These rooms must be accessible to each nursing unit. They may be on other floors if convenient for regular use.

(b) One such room may serve several nursing units and/or departments.

(4) Medication station. A medication station shall be provided in accordance with Section 2.1-2.3.4.

(5) Lactation support space. Space shall be provided for lactation support and consultation in or immediately adjacent to the NICU. Provision shall be made, either within the room or conveniently located nearby, for hand-washing station, counter, refrigeration and freezing, storage for pump and attachments, and educational materials.

*(6) Clean workroom or clean supply room. This room shall be provided in accordance with Section 2.1-3.4.2.4 (10).

*(7) Soiled workroom or soiled holding room. This room shall be provided in accordance with Section 2.1-3.4.2.4 (11).

(8) Emergency equipment storage. Space for storage of emergency equipment shall be provided in accordance with Section 2.1-2.3.9.4.

(9) Housekeeping room. A housekeeping room shall be provided for the unit.

(a) This room shall be directly accessible from the unit and dedicated for the exclusive use of the NICU.

(b) This room shall contain a service sink or floor receptor and provisions for storage of supplies and housekeeping equipment.

3.4.6.5 Support areas for staff

(1) Staff lounge, storage facilities, and toilet. A lounge, locker room, and staff toilet shall be provided within or adjacent to the unit for staff use.

(2) Staff accommodations. Physician sleeping facilities with access to a toilet and shower. If not contained within the unit itself, the area shall have a telephone or intercom connection to the patient care area.

3.4.6.6 Support areas for patients and visitors

(1) Visitor waiting room. See Section 2.1-3.4.2.6.

(2) Parent/infant room(s). A room(s) shall be provided within the NICU that allow(s) parents and infants extended private time together.

(a) The room(s) shall have direct, private access to sink and toilet facilities, communication linkage with the NICU staff, electrical and medical gas outlets as specified for other NICU beds, sleeping facilities for at least one parent, and sufficient space for the infant's bed and equipment.

(b) The room(s) may be used for other purposes when they are not required for family use.

3.5 Postpartum Units

See Section 2.1-4.2.

3.6 Nurseries

3.6.1 General

Infants shall be housed in nurseries that comply with the standards in this section.

3.6.1.1 Location. All nurseries other than pediatric nurseries shall be convenient to the postpartum nursing unit and obstetrical facilities.

3.6.1.2 Layout

(1) The nurseries shall be located and arranged to preclude the need for unrelated pedestrian traffic.

(2) No nursery shall open directly onto another nursery.

3.6.2 Patient Care Areas (General)

The following standards shall apply to nurseries:

3.6.2.1 Space requirements. Enough space shall be provided for parents to stay 24 hours.

3.6.2.2 Viewing windows. Glazed observation windows to permit the viewing of infants from public areas, workrooms, and adjacent nurseries shall be provided.

3.6.2.3 Hand-washing station(s). At least one lavatory, equipped with a hands-free hand-washing facility, shall be provided for each eight or fewer infant stations.

3.6.2.4 Storage for infant supplies. Convenient, accessible storage for linens and infant supplies shall be provided at each nursery room.

3.6.3 Airborne Infection Isolation Room

An airborne infection isolation room shall be provided in or near at least one level of nursery care.

3.6.3.1 The room shall be enclosed and separated from the nursery unit with provisions for observation of the infant from adjacent nurseries or control area(s).

3.6.3.2 All airborne infection isolation rooms shall comply with the requirements of Section 2.1-3.2.2, except for separate toilet, bathtub, or shower.

3.6.4 Neonate Examination and Treatment Areas

Such areas, when required by the functional program, shall contain a work counter, storage facilities, and a hands-free hand-washing station.

3.6.5 Support Areas for Nurseries

The following standards shall apply to nurseries:

3.6.5.1 Documentation area. Charting facilities shall have linear surface space to ensure that staff and physicians may chart and have simultaneous access to information and communication systems.

***3.6.5.2** Workroom(s). Each nursery room shall be served by a connecting workroom.

(1) The workroom shall contain scrubbing and gowning facilities at the entrance for staff and housekeeping personnel, work counter, refrigerator, storage for supplies, and a hands-free hand-washing station.

(2) One workroom may serve more than one nursery room provided that required services are convenient to each.

(3) The workroom serving the full-term and continuing care nurseries may be omitted if equivalent work and storage areas and facilities, including those for scrubbing and gowning, are provided within that nursery. Space required for work areas located within the nursery is in addition to the area required for infant care.

(4) Provision shall be made for storage of emergency cart(s) and equipment out of traffic.

(5) Provision shall be made for the sanitary storage and disposal of soiled waste.

(6) Visual control shall be provided via borrowed lights and/or view panels between the staff work area and each nursery.

3.6.5.3 Lactation support room. A consultation/demonstration/breastfeeding or pump room shall be provided convenient to the nursery.

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A3.6.5.2 When the functional program includes a mother-baby couplet approach to nursing care, the workroom functions described above may be incorporated into the nurse station that serves the postpartum patient rooms.

(1) Provision shall be made, either within the room or conveniently located nearby, for hand-washing station, counter, refrigeration and freezing, storage for pump and attachments, and educational materials.

(2) If conveniently located, this ancillary area shall be permitted to be shared for other purposes.

3.6.5.4 Neonate formula facilities

(1) Location. Where infant formula is prepared on-site, direct access from the formula preparation room to any nursery room is prohibited. The room may be located near the nursery or at other appropriate locations in the hospital.

(2) The formula preparation room shall include the following:

(a) Cleanup area for washing and sterilizing supplies. This area shall include a hand-washing station, facilities for bottle washing, a work counter, and sterilization equipment.

(b) Separate room for preparing infant formula. This room shall contain warming facilities, refrigerator, work counter, formula sterilizer, storage facilities, and a hand-washing station.

(c) Refrigerated storage and warming facilities for infant formula accessible for use by nursery personnel at all times.

(3) If a commercial infant formula is used, the separate cleanup and preparation rooms may be omitted. The storage and handling may be done in the nursery workroom or in another appropriate room that is conveniently accessible at all hours. The preparation area shall have a work counter, a hand-washing station, and storage facilities.

3.6.5.5 Soiled workroom or soiled holding room shall be provided in accordance with Section 2.1-2.3.8.

3.6.5.6 Housekeeping room

(1) A housekeeping/environmental services room shall be provided for the exclusive use of the

nursery unit. It shall be directly accessible from the unit.

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

3.6.6 Newborn Nursery

***3.6.6.1** Capacity. Each newborn nursery room shall contain no more than 16 infant stations. When a rooming-in program is used, the total number of bassinets in these units shall be permitted to be reduced, but the newborn nursery shall not be omitted in its entirety from any facility that includes delivery services.

3.6.6.2 Area. The minimum floor space shall be 24 square feet (2.23 square meters) per bassinet, exclusive of auxiliary work areas.

3.6.6.3 Baby-holding nursery. In postpartum and labor-delivery-recovery-postpartum (LDRP) units, a baby-holding nursery shall be permitted instead of a traditional nursery.

(1) The minimum floor area per bassinet, ventilation, electrical, and medical vacuum and gases shall be the same as that required for a full-term nursery.

(2) These holding nurseries shall be next to the nurse station on these units.

(3) The holding nursery shall be sized to accommodate the percentage of newborns who do not remain with their mothers during the postpartum stay.

3.6.7 Continuing Care Nursery

3.6.7.1 For hospitals that provide continuing care for infants requiring close observation (for example, low birth-weight babies who are not ill but require more hours of nursing than normal neonates), the minimum floor space shall be 50 square feet (4.65 square meters) per bassinet, exclusive of auxiliary work areas, with provisions for at least 4 feet (1.22 meters) between and at all sides of each bassinet.

3.6.7.2 The continuing care bassinets are permitted to be within the hospital's NICU in a defined location for these infants.

3.6.8 Pediatric Nursery

3.6.8.1 Capacity. To minimize the possibility of cross-infection, each nursery room serving pediatric patients shall contain no more than eight bassinets.

Note: Limitation on number of patients in a nursery room does not apply to the pediatric critical care unit.

3.6.8.2 Space requirements. Each bassinet shall have a minimum clear floor area of 40 square feet (3.72 square meters).

3.6.8.3 Facility requirements. Each room shall contain a hands-free hand-washing station, a nurse emergency call system, and a glazed viewing window for observing infants from public areas and workrooms.

*3.7 Pediatric and Adolescent Unit

The unit shall meet the following standards:

3.7.1 Patient Rooms

3.7.1.1 Capacity. Maximum room capacity shall be four patients.

3.7.1.2 Space requirements. The space requirements for pediatric patient beds shall be the same as for adult beds due to the size variation and the need to change from cribs to beds and vice-versa. See Section 2.1-3.1.1.2 for requirements.

***3.7.1.3** Family support requirements. Additional provisions for hygiene, toilets, sleeping, and personal belongings shall be made where the program indicates that parents will be allowed to remain with young children. (See Section 2.1-3.4.5 for pediatric critical care units and Section 2.1-3.6.6 for newborn nurseries.)

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A3.6.6.1 For facilities that use a rooming-in program in which all infants are returned to the nursery at night, a reduction in nursery size may not be practical.

A3.7 In view of their unique physical and developmental needs, pediatric and adolescent patients, to the extent their condition permits, should be grouped together in distinct units or distinct areas of general units separate from adults.

A3.7.1.3 Family support spaces, including family sleep rooms, pantry, toilets, showers, washers and dryers, and access to computers, phones, and copy machines, should be provided.

3.7.1.4 Window. Each patient room shall have a window in accordance with Section 2.1-8.2.2.5.

3.7.2 Airborne Infection Isolation Room(s)

3.7.2.1 At least one such room shall be provided in each pediatric unit. The total number of infection isolation rooms shall be determined by an ICRA.

3.7.2.2 Airborne infection isolation room(s) shall comply with the requirements of Section 2.1-3.2.2.

3.7.3 Examination/Treatment Rooms

An examination/treatment room shall be provided for pediatric and adolescent patients. A separate area for infant examination and treatment shall be permitted within the pediatric nursery workroom.

3.7.3.1 Space requirements. Examination/treatment rooms shall have a minimum floor area of 120 square feet (11.15 square meters).

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

3.7.4 Support Areas for Pediatric/Adolescent Units

The staff support areas in the pediatric and adolescent nursing units shall conform to Sections 2.1-3.1.4 through 2.1-3.1.6 and shall also meet the following standards:

3.7.4.1 Multipurpose or individual room(s)

(1) These shall be provided within or adjacent to areas serving pediatric and adolescent patrons for dining, education, and developmentally appropriate play and recreation, with access and equipment for patients with physical restrictions.

(2) If the functional program requires, an individual room shall be provided to allow for confidential parent/family comfort, consultation, and teaching.

(3) Insulation, isolation, and structural provisions shall minimize the transmission of impact noise through the floor, walls, or ceiling of the multipurpose room(s).

3.7.4.2 Formula facilities. Space for preparation and storage of infant formula shall be provided within the unit or other convenient location. Provisions shall be made for continuation of special formula that may have been prescribed for the infant prior to admission or readmission.

3.7.4.3 Clean and soiled workrooms. Separate clean and soiled workrooms or holding rooms shall be provided as described in Sections 2.1-2.3.7 and 2.1-2.3.8.

3.7.4.4 Equipment and supply storage

(1) Storage closets or cabinets shall be provided for toys, educational, and recreational equipment.

(2) Storage space shall be provided to permit exchange of cribs and adult beds.

(3) Provisions shall also be made for storage of equipment and supplies (including cots or recliners, extra linen, etc.) for parents who stay with the patient overnight.

3.7.5 Support Areas for Patients

3.7.5.1 Patient toilet room(s). Toilet room(s) with hand-washing station(s) in each room, in addition to those serving bed areas, shall be convenient to multipurpose room(s) and to each central bathing facility.

3.8 Psychiatric Nursing Unit

3.8.1 General

3.8.1.1 Psychiatric care in a medical unit. See Section 2.1-3.2.4 for psychiatric care in a medical unit.

3.8.1.2 Functional program. Provisions shall be made in the design for adapting the area for various types of medical and psychiatric therapies as described in the functional program.

***3.8.1.3** Environment of care. The facility shall provide a therapeutic environment appropriate for the planned treatment programs.

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A3.8.1.3 The facility should provide a therapeutic environment appropriate for the planned treatment programs. The environment should be characterized by a feeling of openness with emphasis on natural light. In every aspect of building design and maintenance it is essential to make determinations based on the potential risk to the specific patient population served.

***3.8.1.4** Security. Security appropriate for the planned treatment programs shall be provided.

3.8.1.5 Shared facilities. In no case shall adult and pediatric clients be mixed. This does not exclude sharing of nursing stations or support areas, as long as the separation and safety of the units can be maintained.

*3.8.2 Patient Rooms

See Section 2.3-2.1.1.

3.8.3 Seclusion Treatment Rooms

See Section 2.3-2.2.1.

3.8.4 Support Areas for Staff and Visitors

See Section 2.3-2.6.

3.9 In-Hospital Skilled Nursing Units

Many facilities have incorporated extended stay units for the medical/surgical department; these are often referred to as in-hospital skilled nursing units or facilities. These units should not be confused with long-term skilled nursing units found in Chapter 4.1 of these Guidelines. These extended stay unit beds are licensed hospital beds for patients requiring skilled nursing care as part of their recovery process. Many of these facilities are intended for elderly patients undergoing various levels of rehabilitation and recuperating stroke victims or brain trauma victims requiring rehabilitation.

3.9.1 General

3.9.1.1 Location

(1) The location of the unit shall provide convenient access to the Physical and Rehabilitation Medicine departments.

(2) Wherever possible, the unit shall be located to provide access to outdoor spaces that can be utilized for therapeutic purposes.

3.9.1.2 Layout. The unit shall be located to exclude unrelated traffic going through the unit to access other areas of the hospital.

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A3.8.1.4 A safe environment is critical; however, no environment can be entirely safe and free of risk. The majority of persons who attempt suicide suffer from a treatable mental disorder or a substance abuse disorder or both. Patients of inpatient psychiatric treatment facilities are considered at high risk for suicide; the environment should avoid physical hazards while maintaining a therapeutic environment. The built environment, no matter how well designed and constructed, cannot be relied upon as an absolute preventive measure. Staff awareness of their environment, latent risks of that environment, and the behavior risks and needs of the patients served in the environment are absolute necessities. Different organizations and different patient populations will require greater or lesser tolerance for risk.

a. Consideration should be given to visual control (including electronic surveillance) on nursing units of corridors, dining areas, and social areas such as dayrooms and activity areas. Hidden alcoves or blind corners or areas should be avoided.

b. The openness of the nurse station will be determined by the planned treatment program. Consideration should be given to patient privacy and also to staff safety.

A3.8.2 Patient Rooms. The guidelines noted in Sections 2.3-1 through 2.3-2.3.3 and Section 2.3-2.6 should apply, with the following exceptions:

a. The patient room size should meet the requirements in Section 2.1-3.1.1.2.

b. Adequate storage should meet the requirements in Section 2.1-2.2.2.

c. A desk or writing surface for patient use may be provided in each room, but this is not required.

d. A quiet room is not required on units of 12 beds or fewer unless required by the functional program.

e. The functional needs of the program should determine the need for a nurse call system. If a nurse call system is provided, it should meet the requirements of Section 2.1-10.3.8. However, provisions should be made for easy removal or covering of the call system.

f. Visual privacy in multi-bed rooms (e.g., cubicle curtains) is not required.

g. The functional needs of the program will determine the need for medical gas and/or vacuum systems. If a medical gas/vacuum system is provided, it should meet the requirements of Sections 2.1-10.1.4.1 and 2.1-10.1.2.1 (2). However, provisions should be made for easy removal and/or covering of the medical gas/vacuum system.

3.9.2 Patient Rooms

The basic requirements contained in Section 2.1-3.1.1 apply.

3.9.3 Treatment Areas

3.9.3.1 Physical rehabilitation room. When required by the functional program, a physical rehabilitation room shall be provided for the use of the skilled nursing unit if the unit is not located conveniently to the facility's physical and rehabilitation therapy departments. The room size and the equipment provided shall be adequate to provide the therapeutic milieu required by the facility's functional program.

3.9.4 Support Areas for In-Hospital Skilled Nursing Units

In addition to the support areas required under Sections 2.1-3.1.4 through 2.1-3.1.6, the following rooms and support elements shall be provided:

3.9.4.1 Storage for wheelchairs and walking aids. Additional storage spaces to accommodate the increase in wheelchair and walking aids used by this patient population shall be included in the design of the unit, with an additional square footage of 7 square feet (0.65 square meters) per bed.

3.9.5 Support Areas for Patients

3.9.5.1 Dining and recreation spaces

(1) Factors for determining space requirements. The space needed for dining and recreation shall be determined by considering the following:

   (a) The needs of patients who use adaptive equipment and mobility aids and receive assistance from support and service staff

   (b) The extent to which support programs shall be centralized or decentralized

   (c) The number of patients to be seated for dining at one time, as required by the functional program

(2) Space requirements. Nothing in these Guidelines is intended to restrict a facility from providing additional square footage per resident beyond what is required herein for dining rooms, activity areas, and similar spaces.

   (a) In new construction, the total area set aside for dining, patient lounges, and recreation shall be at least 25 square feet (2.32 square meters) per bed with a minimum total area of at least 225 square feet (20.90 square meters). At least 20 square feet (1.86 square meters) per bed shall be available for dining. Additional space may be required for outpatient day care programs.

   (b) For renovations, at least 14 square feet (1.30 square meters) per bed shall be available for dining. Additional space may be required for outpatient day care programs.

3.9.5.2 Private space. When required by the functional program, the unit shall contain private space for the use of individual patients, family, and caregivers to discuss the specific patient's needs or private family matters.

(1) This space shall have a minimum clear area of 250 square feet (23.23 square meters).

(2) This space is permitted to be considered part of the square footage per bed outlined in Section 2.1-3.9.5.2.

3.9.5.3 Patient grooming room. When required by the functional program, a room for patient grooming shall be provided.

(1) The minimum area shall not be part of the aggregate area under Section 2.1-3.9.5.2 and shall be as determined by the functional program.

(2) This room shall provide spaces for hair-washing station(s), hair clipping and hair styling, and other grooming needs.

(3) A hand-washing station, mirror, work counter(s), storage shelving, and sitting area(s) for patients shall be provided as part of the room.

3.9.6 Construction Requirements

3.9.6.1 Handrails

(1) Handrails located in accordance with ADA and all local, state, and federal requirements shall be installed on both sides of the patient use corridor. Where corridors are defined by walls, handrails shall be provided on both sides of all corridors normally used by patients.

(2) A minimum clearance of 1-1/2 inches (3.81 centimeters) shall be provided between the handrail and the wall.

(3) Rail ends shall be returned to the wall or floor.

4 Obstetrical Facilities

*4.1 General

4.1.1 Location and Layout

The obstetrical unit shall be located and designed to prohibit nonrelated traffic through the unit. When delivery and operating rooms are in the same suite, access and service arrangements shall be such that neither staff nor patients need to travel through one area to reach the other.

4.1.2 Newborn Nursery

A newborn nursery shall be provided. See Section 2.1-3.6.6.

4.1.3 Renovation

Except as permitted otherwise herein, existing facilities being renovated shall, as far as practicable, provide all the required support services.

4.2 Postpartum Unit

4.2.1 Postpartum Bedrooms

See Section 2.1-3.1.1.

4.2.2 Airborne Infection Isolation Room(s)

An airborne infection isolation room is not required for the obstetrical unit. Provisions for the care of the perinatal patient with an airborne infection shall be determined by an ICRA.

4.2.3 Examination/Treatment Room and/or Multipurpose Diagnostic Testing Room

4.2.3.1 Space requirements. This room shall have a minimum clear floor area of 120 square feet (11.15 square meters). When used as a multi-patient diagnostic testing room, a minimum clear floor area of 80 square feet (7.43 square meters) per patient shall be provided.

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A4.1 Obstetrical program models vary widely in their delivery methodologies. The models are essentially of three types. The following narrative describes the organizational framework of each model.

a. Traditional Model

Under the traditional model, labor, delivery, recovery, and postpartum occur in separate areas. The birthing woman is treated as the moving part. She is moved through these functional areas depending on the status of the birth process.

The functional areas are separate rooms consisting of the labor room, delivery room, recovery room, postpartum bedroom, and infant nurseries (levels determined by acuity).

b. Labor-Delivery-Recovery Model

All labor-delivery-recovery rooms (LDRs) are designed to accommodate the birthing process from labor through delivery and recovery of mother and baby. They are equipped to handle most complications, with the exception of cesarean sections.

The birthing woman moves only as a postpartum patient to her bedroom or to a cesarean section delivery room (surgical operative room) if delivery complications occur.

After the mother and baby are recovered in the LDR, they are transferred to a mother-baby care unit for postpartum stay.

c. Labor-Delivery-Recovery-Postpartum Model

Single-room maternity care in labor-delivery-recovery-postpartum rooms (LDRPs) adds a "P" to the LDR model. Room design and capability to handle most emergencies remain the same as the LDRs. However, the LDRP model eliminates a move to postpartum after delivery. LDRP uses one private room for labor, delivery, recovery, and postpartum stay.

Equipment is moved into the room as needed, rather than moving the patient to the equipped room. Certain deliveries are handled in a cesarean section delivery room (surgical operative room) should delivery complications occur.

4.2.3.2 Toilet room. An adjoining toilet room shall be provided for patient use.

4.2.4 Support Areas for the Postpartum Unit

The following support areas shall be provided for this unit.

4.2.4.1 A nurse station

4.2.4.2 Documentation area

4.2.4.3 A nurse office

4.2.4.4 Consultation/conference room(s)

4.2.4.5 Medication station. Provision shall be made for storage and distribution of drugs and routine medications. This may be done from a medicine preparation room or unit, from a self-contained medicine-dispensing unit, or by another system.

(1) Medicine preparation room or unit

(a) If used, a medicine preparation room or unit shall be under visual control of nursing staff.

(b) This room or unit shall contain a work counter, sink, refrigerator, and double-locked storage for controlled substances.

(c) Convenient access to hand-washing stations shall be provided. (Standard cup-sinks provided in many self-contained units are not adequate for hand-washing.)

4.2.4.6 Nourishment area. A nourishment station shall be provided in accordance with Section 2.1-2.3.5.

4.2.4.7 Clean workroom or clean supply room. A clean workroom or clean supply room shall be provided in accordance with Section 2.1-2.3.7. A clean workroom is required if clean materials are assembled within the obstetrical suite prior to use.

4.2.4.8 Soiled workroom or soiled holding room. A soiled workroom or soiled holding room shall be provided for the exclusive use of the obstetrical suite in accordance with Section 2.1-2.3.8.

4.2.4.9 Equipment and supply storage

(1) Clean linen storage. This shall be provided in accordance with Section 2.1-2.3.9.1.

(2) Equipment storage room. Each unit shall provide sufficient storage area(s) on the patient floor to keep its required corridor width free of equipment and supplies.

(a) This storage area shall be not less than 10 square feet (0.93 square meter) per postpartum room and 20 square feet (1.86 square meters) per each labor-delivery-recovery (LDR) or LDRP room.

(b) This storage area shall be in addition to any storage in patient rooms.

(3) Storage space for stretchers and wheelchairs. Storage space shall be provided in accordance with Section 2.1-2.3.9.3.

(4) Emergency equipment storage. Storage shall be close to the nurse station.

4.2.4.10 Housekeeping room. A housekeeping room shall be provided for the exclusive use of the obstetrical suite in accordance with Section 2.1-2.3.10.

4.2.5 Support Areas for Staff

The following support areas shall be provided for this unit.

4.2.5.1 Staff lounge

4.2.5.2 Staff storage facilities. Lockable closets or cabinets for personal articles of staff shall be provided.

4.2.5.3 Staff toilet room

4.2.6 Support Areas for Patients and Visitors

The following support areas shall be provided for this unit.

4.2.6.1 Patient lounge. The patient lounge may be omitted if all rooms are single-bed rooms.

4.2.6.2 Patient bathing facilities

(1) Where bathing facilities are not provided in

patient rooms, there shall be at least one shower and/or bathtub for each six beds or fraction thereof.

(2) A toilet and hand-washing station shall be provided within or directly accessible to each bathing facility.

4.3 Cesarean/Delivery Suite

4.3.1 Labor Rooms

4.3.1.1 General

(1) Number. In facilities that have only one cesarean/delivery room, two labor rooms shall be provided.

(2) Access. Labor rooms shall have controlled access with doors that are arranged for observation from a nursing station.

4.3.1.2 Capacity. Where LDRs or LDRPs are not provided, a minimum of two labor beds shall be provided for each cesarean/delivery room.

4.3.1.3 Space requirements

(1) Each room shall be designed for either one or two beds, with a minimum clear area of 120 square feet (11.15 square meters) per bed.

(2) In renovation projects, labor room(s) (LDR or LDRP rooms may be substituted) shall have a minimum clear area of 100 square feet (9.29 square meters) per bed.

4.3.1.4 Windows. Windows in labor rooms, if provided, shall be located, draped, or otherwise arranged to preserve patient privacy from casual observation from outside the labor room.

4.3.1.5 Hand-washing station. Each labor room shall contain a hand-washing station.

4.3.1.6 Toilet room

(1) Each labor room shall have access to a toilet room.

(2) One toilet room may serve two labor rooms.

4.3.1.7 Bathing facilities. At least one shower (which may be separate from the labor room if under staff control) for use of patients in labor shall be provided.

4.3.2 Delivery Room(s)

4.3.2.1 Space requirements. These shall have a minimum clear area of 300 square feet (27.87 square meters) exclusive of fixed cabinets and built-in shelves.

4.3.2.2 Emergency communication system. An emergency communication system shall be connected with the obstetrical suite control station.

4.3.3 Cesarean/Delivery Room(s)

4.3.3.1 Number. There shall be a minimum of one such room in every obstetrical unit.

4.3.3.2 Space requirements. These shall have a minimum clear floor area of 360 square feet (33.45 square meters) with a minimum dimension of 16 feet (4.88 meters) exclusive of built-in shelves or cabinets.

4.3.4 Infant Resuscitation Space

4.3.4.1 Location. Infant resuscitation shall be provided within cesarean/delivery room(s) and delivery rooms or in a separate but immediately accessible room.

4.3.4.2 Space requirements

(1) Space in delivery rooms. A minimum clear floor area of 40 square feet (3.72 square meters) shall be provided for the infant resuscitation space in addition to the required area of each delivery or cesarean/delivery room.

(2) Space in a separate room. Infant resuscitation space provided in a separate but immediately accessible room shall have a minimum clear floor area of 150 square feet (13.94 square meters).

4.3.4.3 Electrical outlets. Six single or three duplex electrical outlets shall be provided for the infant in addition to the facilities required for the mother.

4.3.5 Recovery Room(s)

LDR or LDRP rooms, when located within or adjacent to the cesarean/delivery suite, may be substituted.

4.3.5.1 Capacity. Recovery rooms shall contain at least two beds.

4.3.5.2 Support areas for recovery rooms

(1) Nurse station and documentation area. Recovery room shall have a nurse station with charting facilities located to permit visual control of all beds.

(2) Hand-washing station. Each room shall include a hand-washing station.

(3) Medication dispensing facilities. Each room shall include facilities for dispensing medicine.

(4) Clinical sink. A clinical sink with bedpan flushing device shall be available.

(5) Equipment and supply storage. Storage for supplies and equipment shall be available.

4.3.5.3 Support areas for families

(1) When required by the functional program, there shall be enough space for baby and crib and a chair for the support person. There shall be the ability to maintain visual privacy for the new family.

4.3.6 Support Areas for the Cesarean/Delivery Suite

4.3.6.1 General. Individual rooms shall be provided as indicated in the following standards; otherwise, alcoves or other open spaces that do not interfere with traffic may be used.

4.3.6.2 Areas solely for the cesarean/delivery suite. The following support areas shall be provided:

(1) A control/nurse station. This shall be located to restrict unauthorized traffic into the suite.

(2) Soiled workroom or soiled holding room. This room shall be provided in accordance with Section 2.1-2.3.8.

(3) Fluid waste disposal

4.3.6.3 Areas permitted to be shared. The following support areas shall be permitted to be shared with the surgical facilities in accordance with the functional program. Where shared, areas shall be arranged to avoid direct traffic between the delivery and operating rooms.

(1) A supervisor's office or station

(2) Medication station. A drug distribution station with hand-washing stations and provisions for controlled storage, preparation, and distribution of medication shall be provided. A self-contained medication dispensing unit in accordance with Section 2.1-2.3.4 may be utilized instead.

(3) Scrub facilities for cesarean/delivery rooms

(a) Two scrub positions shall be provided adjacent to the entrance to each cesarean/delivery room.

(b) Scrub facilities shall be arranged to minimize any splatter on nearby personnel or supply carts.

(c) In new construction, view windows shall be provided at scrub stations to permit the observation of room interiors.

(4) Anesthesia workroom. An anesthesia workroom for cleaning, testing, and storing anesthesia equipment shall be provided. It shall contain a work counter, sink, and provisions for separation of clean and soiled items.

*(5) Sterilization facilities. Sterilization facilities with high-speed sterilizers shall be located convenient to all cesarean/delivery rooms. Sterilization facilities shall be separate from the delivery area and adjacent to clean assembly.

(6) Clean workroom or clean supply room

(a) Clean workroom. A clean workroom shall be provided if clean materials are assembled within the obstetrical suite prior to use. It shall contain a work counter, hand-washing station, and space for storage of supplies.

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A4.3.6.3 (5) High-speed autoclaves should only be used in an emergency situation (e.g., a dropped instrument and no sterile replacement readily available).

(b) Clean supply room. Provision of a clean supply room shall be permitted when the functional program defines a system for the storage and distribution of clean and sterile supplies. See (7)(a) just below for sterile storage.

(7) Equipment and supply storage. Storage room(s) shall be provided for equipment and supplies used in the obstetrical suite. These shall include the following:

(a) A clean sterile storage area readily available to the delivery room. The size shall be based on level of usage, functions provided, and supplies from the hospital central distribution area.

(b) Medical gas storage facilities. See Section 2.1-5.3.5.14 (3).

(c) An area for storing stretchers out of the path of normal traffic

(8) Housekeeping room. Housekeeping room with a floor receptacle or service sink and storage space for housekeeping supplies and equipment.

4.3.7 Support Areas for Staff

The following support areas shall be permitted to be shared with the surgical facilities in accordance with the functional program. Where shared, areas shall be arranged to avoid direct traffic between the delivery and operating rooms.

4.3.7.1 Lounge and toilet facilities. Lounge and toilet facilities for obstetrical staff convenient to delivery, labor, and recovery areas. The toilet room shall contain hand-washing stations.

4.3.7.2 Staff change areas

(1) The clothing change area(s) shall be laid out to encourage one-way traffic and eliminate cross-traffic between clean and contaminated personnel.

(2) The area(s) shall contain lockers, showers, toilets, hand-washing stations, and space for donning and disposing scrub suits and booties.

4.3.7.3 Support person change areas. Change areas, designed as described above, shall be provided for male and female support persons.

4.3.7.4 Staff accommodations. An on-call room(s) shall be provided for physician and/or staff. It may be located elsewhere in the facility.

4.3.8 Support Areas for Visitors

The following support areas shall be permitted to be shared with the surgical facilities in accordance with the functional program.

4.3.8.1 Waiting room. A waiting room, with toilets, telephones, and provisions for drinking water shall be conveniently located. The toilet room shall contain hand-washing stations.

4.4 LDR and LDRP Rooms

When required by the functional program, delivery procedures in accordance with birthing concepts may be performed in the LDR or LDRP rooms.

4.4.1 Location

LDR room(s) may be located in a separate LDR suite or as part of the cesarean/delivery suite. The postpartum unit may contain LDRP rooms.

4.4.2 Capacity

Each LDR or LDRP room shall be for single occupancy.

4.4.3 Space Requirements

***4.4.3.1** New construction. These rooms shall have a minimum clear floor area of 300 square feet (27.87 square meters) with a minimum dimension of 13 feet (3.96 meters), exclusive of toilet room, closet, alcove, or vestibules.

(1) Where required by the functional program, there shall be enough space for a crib and reclining chair for a support person.

(2) An area within the room but distinct from the

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A4.4.3.1 A minimum dimension of 15 feet (4.57 meters) is preferable to accommodate the equipment and staff needed for complex deliveries.

mother's area shall be provided for infant stabilization and resuscitation.

4.4.3.2 Renovation. When renovation work is undertaken, every effort shall be made to meet the above minimum standards. If it is not possible to meet the above square-foot standards, existing LDR or LDRP rooms shall be permitted to have a minimum clear area of 200 square feet (18.58 square meters).

4.4.4 Patient Privacy

Windows or doors within a normal sightline that would permit observation into the room shall be arranged or draped as necessary for patient privacy.

4.4.5 Hand-Washing Stations

Each room shall be equipped with hand-washing stations. (Hand-washing stations with hands-free operation are acceptable for scrubbing.)

4.4.6 Patient Bathroom

Each LDR or LDRP room shall have direct access to a private toilet with shower or tub.

4.4.7 Medical Gas Outlets

4.4.7.1 See Table 2.1-5 for medical gas outlet requirements.

4.4.7.2 These outlets shall be located in the room so they are accessible to the mother's delivery area and infant resuscitation area.

4.4.8 Finishes

Finishes shall be selected to facilitate cleaning and to resist strong detergents.

4.4.9 Lighting

Portable examination lights shall be permitted, but must be immediately accessible.

5 Diagnostic and Treatment Locations

*5.1 Emergency Service

5.1.1 General

***5.1.1.1** Definition

Levels of emergency care range from initial emergency management to definitive emergency care.

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A5.1 Surge Capacity

In preparation for the emergence of highly infectious patients, hospitals should have the capacity to handle a surge of up to ten or a fourfold increase above the current emergency department capacity for such patients.

a. This preparation should include the provision of adjacent space for triage and management of infectious patients.

b. Utility upgrades for these areas (oxygen, water, electrical) should be considered.

c. The area should provide for depressurization to help control aerosolized infectious particles with 100 percent exhaust capability. If 100 percent exhaust cannot be achieved, appropriate proven technology should be utilized to reduce airborne particles by > 95 percent. If patient care areas are to be utilized in the hospital to house these patients, the route to the patient care unit should minimize the potential for cross-contamination. Existing smoke control areas could be utilized to meet the ventilation requirements. Air-handling systems should be designed to provide required pressure differentials. Written protocols must be developed to ensure proper performance of the means to accomplish the intended goals. DHHS, the Office of Emergency Preparedness, will have more up-to-date information.

A5.1.1.1 Classification of emergency departments/services/trauma centers

Basic aspects of previous Level I-IV emergency department/services classifications are still recognizable in current criteria statements but have evolved substantially to address changes in practice, needs, and technologies. The following publications are especially useful references for understanding and listing current refined and expanded requirements:

American College of Surgeons. "Trauma Center Descriptions and Their Roles in a Trauma System," chapter 2 in *Resources for Optimal Care of the Injured Patient* (ACS, 1999). This reference provides detailed descriptions of Level I–Level IV trauma centers. (www.facs.org)

Riggs, Leonard M., Jr., ed. *Emergency Department Design* (American College of Emergency Physicians, 1993). The author discusses planning for various levels of treatment acuity. (www.acep.org)

(1) Initial emergency management is care provided to stabilize a victim's condition and to minimize potential for further injury during transport to an appropriate service. Patients may be brought to the "nearest hospital," which may or may not have all required services for definitive emergency management. In those cases, it is important that the hospital be able to assess and stabilize emergent illnesses and injuries and arrange for appropriate transfer.

(2) Emergency care may range from the suturing of lacerations to full-scale emergency medical procedures. Facilities that include personnel and equipment for definitive emergency care provide for 24-hour service and complete emergency care leading to discharge to the patient's home or direct admission to the appropriate hospital.

5.1.1.2 Applicability. The extent and type of emergency service to be provided depends on community needs and the availability of other services in the area.

(1) While initial emergency management shall be available at every hospital, full-scale definitive emergency services may be impractical and/or an unnecessary duplication.

(2) All services need adequate equipment and 24-hour staffing to ensure no delay in essential treatment.

5.1.1.3 Requirements

(1) The following standards are intended only as minimums. Additional facilities, as needed, shall be as required to satisfy the functional program.

(2) Provisions for facilities to provide non-emergency treatment of outpatients are covered in Chapter 3.2.

5.1.2 Initial Emergency Management

5.1.2.1 General

(1) At a minimum, each hospital shall have provisions for emergency treatment for staff, employees, and visitors, as well as for persons who may be unaware of or unable to immediately reach services in other facilities. This is not only for patients with minor illnesses or injuries that may require minimal care but also for persons with severe illness and injuries who must receive immediate emergency care and assistance prior to transport to other facilities.

(2) Provisions for initial emergency management shall include the following:

5.1.2.2 Entrance. A well-marked, illuminated, and covered entrance shall be provided at grade level. The emergency vehicle entry cover shall provide shelter for both the patient and the emergency medical crew during transfer from an emergency vehicle into the building.

5.1.2.3 Reception, triage, and control station. This shall be located to permit staff observation and control of access to treatment area, pedestrian and ambulance entrances, and public waiting area.

5.1.2.4 Communication system. Communication hookups to the Poison Control Center and regional emergency medical service (EMS) system.

5.1.2.5 A treatment room

(1) Space requirements

(a) This shall have not less than 120 square feet (11.15 square meters) of clear area, exclusive of toilets, waiting area, and storage.

(b) The treatment room may have additional space and provisions for several patients with cubicle curtains for privacy. Multiple-bed treatment rooms shall provide a minimum of 80 square feet (7.43 square meters) per patient cubicle.

(2) Facility requirements. Each treatment room shall contain an examination light, work counter, handwashing stations, medical equipment, cabinets, medication storage, adequate electrical outlets above floor level, and counter space for writing.

5.1.2.6 Airborne infection control. At least one airborne infection isolation room shall be provided as described in Table 2.1-2 and Sections 2.1-3.2.2.2, 2.1-3.2.2.4 (2)(a) and (b), and 3.2.2.4 (4). The need for additional airborne infection isolation rooms or

for protective environment rooms as described in Section 2.1-3.2.3 shall be determined by an ICRA.

5.1.2.7 Equipment and supply storage. Storage for general medical/surgical emergency supplies, medications, and equipment such as ventilator, defibrillator, splints, etc. This shall be located out of traffic and under staff control.

5.1.2.8 Waiting room. Provisions for reception, control, and public waiting. These shall include a public toilet with hand-washing station(s) and a telephone.

5.1.2.9 Patient toilet. A patient toilet room with hand-washing station(s). This shall be convenient to the treatment room(s).

*5.1.3 Definitive Emergency Care

5.1.3.1 General. Where 24-hour emergency service is to be provided, the type, size, and number of the services shall be as defined in the functional program. As a minimum, the following shall be provided:

5.1.3.2 Emergency access. Paved emergency access to permit discharge of patients from automobiles and ambulances and temporary parking convenient to the entrance shall be provided.

5.1.3.3 Entrance. A well-marked, illuminated, and covered entrance shall be provided at grade level.

(1) This shall provide direct access from public roads for ambulance and vehicle traffic.

(2) Entrance and driveway shall be clearly marked.

(3) If a raised platform is used for ambulance discharge, a ramp shall be provided for pedestrian and wheelchair access.

***5.1.3.4** Reception, triage, and control station

(1) Reception, triage, and control station shall be located to permit staff observation and control of access to treatment area, pedestrian and ambulance entrances, and public waiting area. (See Table 2.1-5.)

(2) The triage area requires special consideration. As the point of entry and assessment for patients with undiagnosed and untreated airborne infections, the triage area shall be designed and ventilated to reduce exposure of staff, patients, and families to airborne infectious diseases. (See Table 2.1-2.)

5.1.3.5 Communications center. The communications center shall be convenient to the nursing station and have radio, telephone, and intercommunication systems. (See Section 2.1-8.1.3.)

5.1.3.6 Public waiting area

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A5.1.3 Fast-Track Area

A separate fast-track area when annual emergency department visits exceed 20,000–30,000 visits should be considered. This area should include space for registration, discharge, triage, and waiting, as well as a physician/nurse work station. Storage areas for supplies and medication should be included. A separate treatment/procedure room of 120 square feet (11.15 square meters) of clear floor space should be provided. Examination/treatment areas should be 100 square feet (9.29 square meters) of clear floor space, with hand-washing stations, vacuum, oxygen, and air outlets, and examination lights. At least one treatment/examination room should be designated for pelvic examinations.

A5.1.3.4 The design of the emergency department is critical, particularly at the main public access point, to ensure that emergency medical staff and hospital security personnel maintain control of access at all times. In the event of a disaster, terrorist event, or infectious disease outbreak, the emergency service must remain under the control of the hospital and limit contamination to ensure its continued availability as a resource.

a. Efforts will be made to separate patients waiting for triage in a secure area with appropriate ventilation that is clearly visible from the triage station. This area will be separate from the post-triage waiting area to limit the spread of contamination and/or contagion.

b. Although the triage station must have unobstructed visibility of the waiting area to permit observation of patients waiting for treatment, a reception and control or security function must be provided to monitor the main entrance to the department and all public areas. Public access points to the treatment area shall be minimal in number, and under direct observation by the reception and control or security function.

(1) This shall have toilet facilities, drinking fountains, and telephones.

(2) If so determined by the hospital ICRA, the emergency department waiting area shall require special measures to reduce the risk of airborne infection transmission. These measures may include enhanced general ventilation and air disinfection similar to inpatient requirements for airborne infection isolation rooms. See the CDC "Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health Care Facilities."

5.1.3.7 Diagnostic, treatment, and service areas

(1) Examination and treatment room(s)

(a) Space requirements. Each examination room shall have a minimum clear floor area of 120 square feet (11.15 square meters), exclusive of fixed casework.

(b) Facility requirements. Each examination room shall contain work counter(s); cabinets; hand-washing stations; supply storage facilities; examination lights; a desk, counter, or shelf space for writing; and a vision panel adjacent to and/or in the door.

(c) Renovation. Where renovation work is undertaken, every effort shall be made to meet these minimum standards. In such cases, each room shall have a minimum clear area of 100 square feet (9.29 square meters), exclusive of fixed or wall-mounted cabinets and built-in shelves.

(d) Treatment cubicles

(i) Where treatment cubicles are in open multiple-bed areas, each cubicle shall have a minimum of 80 square feet (7.43 square meters) of clear floor space and shall be separated from adjoining cubicles by curtains.

(ii) Hand-washing stations shall be provided for each four treatment cubicles or major fraction thereof in multiple-bed areas.

(e) For oxygen and vacuum, see Table 2.1-5.

(f) Treatment/examination rooms used for pelvic exams shall allow for the foot of the examination table to face away from the door.

*(2) Trauma/cardiac rooms for emergency procedures, including emergency surgery

(a) Space requirements

(i) Each room shall have at least 250 square feet (23.23 square meters) of clear floor space.

(ii) Additional space with cubicle curtains for privacy may be provided to accommodate more than one patient at a time in the trauma room.

(b) Facility requirements. The room shall contain cabinets and emergency supply shelves, x-ray film illuminators, examination lights, and counter space for writing.

(c) Patient monitoring. Provisions shall be made for monitoring the patients.

(d) Supply storage. Storage shall be provided for immediate access to attire used for universal precautions.

(e) Door width. Doorways leading from the ambulance entrance to the cardiac trauma room shall be a minimum of 5 feet (1.52 meters) wide to simultaneously accommodate stretchers, equipment, and personnel.

(f) Renovation. In renovation projects, every effort shall be made to have existing cardiac/trauma rooms meet the above minimum standards. If it is not possible to meet the above square-foot standards, the authorities having jurisdiction may grant approval to deviate from this requirement. In such cases, these rooms shall

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A5.1.3.7 (2) Access should be convenient to the ambulance entrance.

be no less than a clear area of 240 square feet (22.30 square meters), and doorways leading from the ambulance entrance to the room may be 4 feet (1.22 meters) wide.

(3) Provisions for orthopedic and cast work. These may be in separate room(s) or in the trauma room.

(a) Space requirements. The clear floor space for this area shall be dependent on the functional

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A5.1.3.7 (4) When advanced imaging technologies such as CT are available, the emergency department should have convenient access.

A5.1.3.7 (5) Decontamination area on the exterior perimeter

a. Ideally 150 feet (45.72 meters) from the ambulance entrance (if required by the constraints of the structures involved, this may be no less than 30 feet (9.14 meters) from the ambulance entrance).

b. At a location where no windows or doors abut the defined area or where all doors are securable from the outside and all windows are capable of being shuttered.

c. Boundaries shall be defined on the paved ground surface with a yellow paint line and the word "DECON" painted within these boundaries.

d. At least two shower heads, temperature-controlled and separated by at least 6 feet (1.83 meters); a separate spigot for attachment of a hose.

e. Semipermanent or portable/collapsible structures (curtains, tents, etc.) that will provide shelter from the environment, privacy, and some containment of the contaminant/infectious agent.

f. Secured access to the hospital telephone system and a duplex electrical outlet for each two shower heads and no closer than 4 feet (1.22 meters) to any shower.

g. Exterior lighting to maximize visibility; appropriate for wet/shower facilities.

h. Negative airflow and ventilation system on the hospital perimeter wall but drawing air within the confines of the decontamination structure; exhausted directly to the outdoors, no less than 50 feet (15.24 meters) away from the decontamination site with no recirculation of air. This system shall be defunctionalized when the decontamination structure is not in use.

i. Water runoff shall be contained and disposed of safely to ensure that it does not enter community drainage systems. This shall be accomplished either by graded floor structures leading to a drain with a collection system separate from that of the hospital or by the use of plastic pools or specialized decontamination stretchers.

Decontamination room within the facility

a. Separate, independent, secured external entrance adjacent to the ambulance entrance, but no less than 30 feet (9.14 meters) distant; lighted and protected from the environment in the same way as the ambulance entrance; a yellow painted boundary line 3 feet (0.91 meter) from each side of the door and extending 6 feet (1.83 meters) from the hospital wall; the word "DECON" painted within these boundaries.

b. Internal entrance to a corridor within the emergency area.

c. It shall have spatial requirements and the medical support services of a standard emergency area airborne infection isolation room, with air externally exhausted separate from the hospital system. It shall contain a work counter, hand-washing station with hands-free controls, an area for personnel gowning, and a storage area for supplies, as well as equipment for the decontamination process.

d. Ceiling, wall, and floor finishes shall be smooth, nonporous, scrubbable, nonadsorptive, nonperforated, capable of withstanding cleaning with and exposure to harsh chemicals, nonslip, and without crevices or seams. Floors shall be self-coving to a height of 6 inches (15.24 centimeters). The surface of the floor shall be self-finished and require no protective coating for maintenance.

e. Two hospital telephones; two duplex electrical outlets, secured appropriately for a wet environment.

f. At least two hand-held shower heads, temperature-controlled; curtains or other devices to allow patient privacy, to the extent possible.

g. Appropriately heated and air-cooled for a room with an external door and very high relative humidity.

h. Water drainage must be contained and disposed of safely to ensure that it does not enter the hospital or community drainage systems. There should be a "saddle" at the floor of the door buck to prevent efflux.

i. A certified physicist or other qualified expert representing the owner or the state agency shall specify the type, location, and amount of radiation protection to be installed in accordance with final approved department layout and the functional program. These specifications shall be incorporated into the plans.

j. The decontamination area may function as an isolation room or a patient hygiene room under routine departmental function.

program and the procedures and equipment accommodated here.

(b) Plaster trap. If a sink is used for the disposal of plaster of paris, a plaster trap shall be provided.

(c) Equipment and supply storage. They shall include storage for splints and other orthopedic supplies, traction hooks, x-ray film illuminators, and examination lights.

*(4) Diagnostic service areas. Convenient access to radiology and laboratory services shall be provided.

*(5) Decontamination area

(a) Location. In new construction, a decontamination room shall be provided with an outside entry door as far as practical from the closest other entrance. The internal door of this room shall open into a corridor of the emergency department, swing into the room, and be lockable against ingress from the corridor.

(b) Space requirements. The room shall provide a minimum of 80 square feet (7.43 square meters) clear floor area.

(c) Facility requirements

(i) The room shall be equipped with two hand-held shower heads with temperature controls and dedicated holding tank with floor drain.

(ii) Portable or hard-piped oxygen shall be provided. Portable suction shall also be available.

(d) Construction requirements. The room shall have all smooth, nonporous, scrubbable, nonadsorptive, nonperforated surfaces. Fixtures shall be acid resistant. The floor of the decontamination room shall be self-coving to a height of 6 inches (15.24 centimeters).

(e) This section does not preclude decontamination capability at other locations or entrances immediately adjacent to the emergency department.

*(6) Pediatric care

5.1.3.8 Special patient care areas

(1) Airborne infection isolation room. At least one airborne infection isolation room shall be provided as described in Table 2.1-2 and Sections 2.1-3.2.2.2, 3.2.2.4 (2)(a) and (b), and 3.2.2.4 (4). The need for additional airborne infection isolation rooms or for protective environment rooms as described in Section 2.1-3.2.3 shall be determined by an ICRA.

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A5.1.3.7 (6) Pediatric treatment rooms. Provisions for the treatment of pediatric cases in dedicated pediatric room(s) within the unit should be provided. The quantity of dedicated rooms should depend on the census of the particular institution.

a. This area should include space for registration, discharge, triage, waiting, and a playroom. Pediatric designated rooms should be adjacent to a family waiting area and toilet. An area for the nurse station and physician station, storage for supplies and medication, and one to two isolation rooms should also be included.

b. Each examination/treatment room should have 100 square feet (9.29 square meters) of clear floor space, with a separate procedure/trauma room of 120 square feet (11.15 square meters) of clear floor space. Each of these rooms should have hand-washing stations; vacuum, oxygen, and air outlets; examination lights; and wall/column-mounted ophthalmoscopes/otoscopes.

Where possible, rooms should be sized larger than 120 square feet (11.15 square meters) of clear area (exclusive of casework) to accommodate the additional equipment and escorts that accompany pediatric cases.

c. Particular attention should be paid to the soundproofing of these treatment rooms.

d. At least one room for pelvic examinations should be included.

e. X-ray illuminators should be available.

*(2) Observation units

(a) Each patient bed area shall have space at each bedside for visitors, and provision for visual privacy from casual observation by other patients and visitors.

(b) Hand-washing stations. Hand-washing stations shall be provided for each four treatment cubicles or major fraction thereof. Hand-washing stations shall be convenient to nurse stations and patient bed areas.

(c) Toilet room. One toilet room shall be provided for each eight treatment cubicles or major fraction thereof.

(d) Shower room. One shower room shall be provided for each sixteen treatment cubicles or major fraction thereof; the shower room and toilet room may be combined into the same room.

(e) Nourishment area. A nourishment station that may be shared shall be provided. It shall include a sink, work counter, refrigerator, storage cabinets, and equipment for hot and cold nourishment between scheduled meals.

(3) Secure holding room. When required by the functional program, there shall be a secure holding room. This room shall be designed to prevent injury to patients.

(a) All finishes, light fixtures, vents and diffusers, and sprinklers shall be tamper resistant.

(b) There shall not be any electrical outlets, medical gas outlets, or similar devices.

(c) There shall be no sharp corners, edges, or protrusions, and the walls shall be free of objects or accessories of any kind.

(d) Patient room doors shall swing out and shall have hardware on the exterior side only. Doors shall have an electric strike that is tied into the fire alarm.

5.1.3.9 Support areas for definitive emergency management facilities

(1) Administrative center or nurse station for staff work and charting.

(a) These areas shall have space for counters, cabinets, and medication storage, and shall have convenient access to hand-washing stations.

(b) They are permitted to be combined with or

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A5.1.3.8 (2) Observation/holding units for patients requiring observation up to 23 hours or admission to an inpatient unit should be located separately but near the main emergency department. The size will depend upon the function (observation and/or holding), patient acuity mix, and projected utilization.

a. As defined by the functional plan, this area should consist of a centralized nurse station; 100 square feet (9.29 square meters) of clear floor space for each cubicle, with vacuum, oxygen, and air outlets, monitoring space, and nurse call buttons.

b. A patient bathroom should be provided.

c. Storage space for medical and dietary supplies should be included.

d. X-ray illuminators should be available.

A5.1.3.9 (2) A security station and/or system should be located to maximize visibility of the treatment areas, waiting areas, and key entrance sites.

a. The system should include visual monitoring devices installed both internally in the emergency department as well as externally at entrance sites and parking lots.

b. Special requirements for a security station should include accommodation for hospital security staff, local police officers, and monitoring equipment.

c. Design consideration should include installation of silent alarms, panic buttons, and intercom systems, and physical barriers such as doors to patient entry areas.

d. The security monitoring system should be included on the hospital's emergency power backup system.

include centers for reception and communication or poison control.

(c) Nursing stations decentralized near clusters of treatment rooms are permitted.

(d) Where feasible, visual observation of all traffic into the unit and of all patients shall be provided from the nursing station.

*(2) Security station. Where dictated by local needs, a security system shall be located near the emergency entrances and triage/reception area.

(3) Poison control center and EMS communications center. If provided, they shall be permitted to be part of the staff work and charting area.

(4) Scrub stations. Scrub stations located in or adjacent and convenient to each trauma and/or orthopedic room.

(5) Provisions for disposal of solid and liquid waste. This may be a clinical sink with bedpan flushing device within the soiled workroom.

(6) Clean workroom or clean supply room. A clean workroom or clean supply room shall be provided in accordance with Section 2.1-2.3.7. If the area serves children, additional storage shall be provided to accommodate supplies and equipment in the range of sizes required for pediatrics.

*(7) Soiled workroom or soiled holding room. A soiled workroom or soiled holding room shall be provided in accordance with Section 2.1-2.3.8 for the exclusive use of the emergency service.

(8) Equipment and supply storage

(a) Wheelchair and stretcher storage. Storage for wheelchairs and stretchers for arriving patients shall be located out of traffic with convenient access from emergency entrances.

(b) Emergency equipment storage. Sufficient space shall be provided for emergency equipment (e.g., a CPR cart, pumps, ventilators, patient monitoring equipment, and portable x-ray unit) in accordance with Section 2.1-2.3.9.4.

(9) Housekeeping room. A housekeeping room shall be directly accessible from the unit and shall contain a service sink or floor receptor and provisions for storage of supplies and housekeeping equipment.

5.1.3.10 Support areas for staff

(1) Staff lounge. Convenient and private access to staff toilets, lounge, and lockers shall be provided.

(2) Staff storage facilities. Securable closets or cabinet compartments shall be provided for the personal effects of emergency service personnel in accordance with Section 2.1-2.4.3.

***5.1.3.11** Support areas for patients

*(1) Bereavement room

(2) Patient toilet room. A minimum of one patient toilet room per eight treatment rooms or fraction thereof shall be provided, with hand-washing station(s) in each toilet room.

5.2 Freestanding Emergency Service

5.2.1 Definition

Freestanding emergency service shall mean an extension of an existing hospital emergency department that is physically separate from the main hospital emergency department and that is intended to provide comprehensive emergency service. A service that does not provide 24-hour-a-day, seven-day-a-week operation

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A5.1.3.9 (7) Disposal space for regulated medical waste (e.g., gauzes/linens soaked with body fluids) should be separate from routine disposal space.

A5.1.3.11 Other space considerations. Provision of a patient hygiene room with shower and toilet facilities should be considered.

A5.1.3.11 (1) At least one bereavement room should be provided. This room should be accessible from both the emergency treatment corridor and the emergency waiting area. This room should be comfortable enough to provide respite to the bereaved family and should be equipped with a sound transmission coefficient equivalent to 65 for the walls and 45 for the floors and ceiling.

or that is not capable of providing basic services as defined for hospital emergency departments shall not be classified as a freestanding emergency service and shall be described under other portions of this document.

5.2.1.1 Physically separate from the main hospital means not located on the same campus.

5.2.2 Facility Requirements

Except as noted in the following sections, the requirements for freestanding emergency service shall be the same as for hospital emergency service as described in Section 2.1-5.1.

5.2.2.1 General. See Section 2.1-5.1.1.

5.2.2.2 Initial emergency management. See Section 2.1-5.1.2.

5.2.2.3 Definitive emergency care. See Section 2.1-5.1.3.

5.2.2.4 Support areas. See Sections 2.1-5.1.3.9 through 2.1-5.1.3.11.

APPENDIX

A5.3 Surgery

a. The size and location of the surgical procedure rooms shall be determined by the level of care to be provided. The levels of care as defined by the American College of Surgeons are as follows:

Class A: Provides for minor surgical procedures performed under topical, local, or regional anesthesia without pre-operative sedation. Excluded are intravenous, spinal, and epidural routes; these methods are appropriate for Class B and Class C facilities.

Class B: Provides for minor or major surgical procedures performed in conjunction with oral, parenteral, or intravenous sedation or under analgesic or dissociative drugs.

Class C: Provides for major surgical procedures that require general or regional block anesthesia and support of vital bodily functions.

b. When invasive procedures are performed on patients known or suspected to have pulmonary tuberculosis, these procedures should not be performed in the operating suite. They should be performed in a room meeting airborne infection isolation room ventilation requirements or in a space using local exhaust ventilation. If the procedure must be performed in the operating suite, see the "CDC Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health Care Facilities."

5.2.3 Additional Requirements

The freestanding emergency service shall have the following capabilities and/or functions within the facility:

5.2.3.1 Diagnostic and treatment areas

(1) Diagnostic imaging. This shall include radiography and fluoroscopy.

(2) Observation beds. At least one of these shall have full cardiac monitoring.

(3) Laboratory. These facilities shall accommodate those functions described in Section 2.1-5.11.

5.2.3.2 Service areas

(1) Pharmacy

(2) Provision for serving patient and staff meals shall be provided. A kitchen or a satellite serving facility shall be permitted.

(3) Support services and functions shall include housekeeping, laundry, general stores, maintenance and plant operations, and security.

*5.3 Surgery

5.3.1 Surgical Suites

Note: Additions to, and adaptations of, the following elements shall be made for the special procedure operating rooms found in larger facilities.

5.3.1.1 Size. The number of operating rooms and recovery beds and the sizes of the support areas shall be based on the expected surgical workload.

5.3.1.2 Layout

(1) The surgical suite shall be located and arranged to prevent nonrelated traffic through the suite.

(2) The clinical practice setting shall be designed to facilitate movement of patients and personnel into, through, and out of defined areas within the surgical suite. Signs shall clearly indicate the surgical attire required.

(3) An operating room suite design with a sterile core shall provide for no cross-traffic of staff and supplies from the soiled/decontaminated areas to the sterile/clean areas. The use of facilities outside the operating room for soiled/decontaminated processing and clean assembly and sterile processing shall be designed to move the flow of goods and personnel from dirty to clean/sterile without compromising universal precautions or aseptic techniques in both departments.

(4) The surgical suite shall be divided into three designated areas—unrestricted, semirestricted, and restricted—defined by the physical activities performed in each area.

(a) Unrestricted area

(i) The unrestricted area includes a central control point established to monitor the entrance of patients, personnel, and materials.

(ii) Street clothes are permitted in this area and traffic is not limited.

(b) Semirestricted area

(i) The semirestricted area includes the peripheral support areas of the surgical suite. It has storage areas for clean and sterile supplies, work areas for storage and processing of instruments, and corridors leading to the restricted areas of the surgical suite.

(ii) Traffic in this area is limited to authorized personnel and patients. Personnel are required to wear surgical attire and cover all head and facial hair.

(c) Restricted area

(i) The restricted area includes operating and procedure rooms, the clean core, and scrub sink areas.

(ii) Surgical attire and hair coverings are required. Masks are required where open sterile supplies or scrubbed persons may be located.

5.3.1.3 Provision of outpatient surgery. In the functional program, the size, location, and configuration of the surgical suite and support areas shall reflect the projected volume of outpatients. This may be achieved by designing either an outpatient surgery facility or a combined inpatient/outpatient surgical suite.

(1) Hospital surgical suite. Where outpatient surgery is provided in the surgical suite of the hospital facility, it shall comply with the requirements for outpatient surgery in Chapter 3.7, Outpatient Surgical Facility.

(2) Separate hospital unit or outpatient surgical facility. Where outpatient surgery and post-anesthetic care is provided in a separate unit of the hospital facility or in a separate outpatient surgical facility, it shall comply with the requirements for outpatient surgery in Chapter 3.7.

5.3.2 Operating and Procedure Rooms

5.3.2.1 General operating room(s)

(1) New construction

(a) Space requirements. Each room shall have a minimum clear area of 400 square feet (37.16 square meters) exclusive of fixed or wall-mounted cabinets and built-in shelves, with a minimum of 20 feet (6.10 meters) clear dimension between fixed cabinets and built-in shelves.

(b) Communication system. Each room shall have a system for emergency communication with the surgical suite control station.

(c) X-ray viewers. X-ray film viewers for handling at least four films simultaneously or digital image viewers shall be provided.

(d) Construction requirements. Operating room perimeter walls, ceiling, and floors, including penetrations, shall be sealed. (See Glossary.)

*(2) Renovation. Where renovation work is undertaken, every effort shall be made to meet the above minimum standards. If it is not possible to meet the above square-footage standards, each room shall have a minimum clear area of 360 square feet (33.45 square meters), exclusive of fixed or wall-mounted cabinets and built-in shelves, with a minimum of 18 feet (5.49 meters) clear dimension between fixed cabinets and built-in shelves.

5.3.2.2 Room(s) for cardiovascular, orthopedic, neurological, and other special procedures that require additional personnel and/or large equipment

(1) Space requirements. When included, these room(s) shall have, in addition to the above requirements for general operating rooms, a minimum clear area of 600 square feet (55.74 square meters), with a minimum of 20 feet (6.10 meters) clear dimension exclusive of fixed or wall-mounted cabinets and built-in shelves.

(2) Pump room. Where open-heart surgery is performed, an additional room in the restricted area of the surgical suite, preferably adjoining this operating room, shall be designated as a pump room where extra corporeal pump(s), supplies, and accessories are stored and serviced.

(3) Equipment storage rooms. Where complex orthopedic and neurosurgical surgery is performed, additional rooms shall be in the restricted area of the surgical suite, preferably adjoining the specialty operating rooms, which shall be designated as equipment storage rooms for the large equipment used to support these procedures.

(4) Plumbing and electrical connections. Appropriate plumbing and electrical connections shall be provided in the cardiovascular, orthopedic, neurosurgical, pump, and storage rooms.

(5) Renovation. Where renovation work is undertaken, every effort shall be made to meet the above minimum standards. If it is not possible to meet the above square-footage standards, the following standards shall be met:

(a) Orthopedic surgical rooms shall have a minimum clear area of 360 square feet (33.45 square meters), with a minimum dimension of 18 feet (5.49 meters).

(b) Rooms for cardiovascular, neurological, and other special procedures shall have a minimum clear area of 400 square feet (37.16 square meters).

5.3.2.3 Additional requirements for orthopedic surgery

(1) Equipment storage. Where included, this room shall, in addition to the above requirements, have enclosed storage space for splints and traction equipment. Storage may be outside the operating room but must be conveniently located.

(2) Plaster trap. If a sink is used for the disposal of plaster of paris, a plaster trap shall be provided.

5.3.2.4 Room(s) for surgical cystoscopic and other endourologic procedures

(1) Space requirements

(a) This room shall have a minimum clear area of 350 square feet (32.52 square meters) exclusive of fixed or wall-mounted cabinets and built-in shelves, with a minimum of 15 feet (4.57 meters) clear dimension between fixed cabinets and built-in shelves.

(b) In renovation projects, rooms for surgical cystoscopy shall be permitted to have a minimum clear area of 250 square feet (23.23 square meters).

(2) X-ray viewer. X-ray viewing capability to accommodate at least four films simultaneously shall be provided.

APPENDIX

A5.3.2.1 (2) The functional program may require additional clear space, plumbing, and mechanical facilities to accommodate special functions in one or more of these rooms. When existing functioning operating rooms are modified, and it is impractical to increase the square footage because of walls or structural members, the operating room may continue in use when requested by the hospital.

5.3.2.5 Endoscopy suite. See Chapter 3.9, Gastrointestinal Endoscopy Facilities.

5.3.3 Pre- and Postoperative Holding Areas

5.3.3.1 Preoperative patient holding area(s). In facilities with two or more operating rooms, areas shall be provided to accommodate stretcher patients as well as sitting space for ambulatory patients.

(1) Location. These areas shall be under the direct visual control of the nursing staff and may be part of the recovery suite to achieve maximum flexibility in managing surgical caseloads.

(2) Space requirements. Each stretcher station shall be a minimum of 80 square feet (7.43 square meters) exclusive of general circulation space through the ward and shall have a minimum clearance of 4 feet (1.22 meters) on the sides of the stretchers and the foot of the stretchers.

(3) Patient privacy. Provisions such as cubicle curtains shall be made for patient privacy.

(4) Provisions shall be made for the isolation of infectious patients.

(5) An airborne infection isolation room is not required in a preoperative holding area. Provisions for the recovery of a potentially infectious patient with an airborne infection shall be determined by an ICRA.

***5.3.3.2** Post-anesthetic care units (PACUs)

(1) Space requirements. The design shall provide a minimum of 80 square feet (7.43 square meters) for each patient bed, exclusive of general circulation space within the PACU, with a space for additional equipment described in the functional program and for clearance of at least 5 feet (1.52 meters) between patient beds and 4 feet (1.22 meters) between patient bedsides and adjacent walls.

(2) Layout. In new construction, at least one door to the recovery room shall provide access directly from the surgical suite without crossing public hospital corridors.

(3) Patient privacy. Provisions for patient privacy such as cubicle curtains shall be made.

(4) Facility requirements. Each PACU shall contain a medication station; hand-washing stations; nurse station with charting facilities; clinical sink; provisions for bedpan cleaning; and storage space for stretchers, supplies, and equipment.

(a) Hand-washing station(s). At least one hand-washing station with hands-free or wrist blade-operable controls shall be available for every four beds, uniformly distributed to provide equal access from each bed.

(b) Staff toilet. A staff toilet shall be located within the working area to maintain staff availability to patients.

(5) Provisions shall be made for the isolation of infectious patients.

(6) An airborne infection isolation room (AIIR) is not required in a PACU. Provisions for the recovery of a potentially infectious patient with an airborne infection shall be determined by an ICRA.

5.3.3.3 Phase II recovery. Where outpatient surgeries are to be part of the surgical suite, and where outpatients receive Class B or Class C sedation, a separate Phase II or step-down recovery room shall be provided.

(1) Layout. In new construction, at least one door shall access the PACU without crossing unrestricted corridors of the hospital.

(2) Space requirements

(a) The design shall provide a minimum of 50 square feet (4.65 square meters) for each patient in a lounge chair, with space for additional equipment described in the functional

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A5.3.3.2 Separate and additional recovery space may be necessary to accommodate patients. If children receive care, recovery space should be provided for pediatric patients and the layout of the surgical suite should facilitate the presence of parents in the PACU.

program and for clearance of 4 feet (1.22 meters) on the sides of the lounge chairs and the foot of the lounge chairs.

(b) A minimum clear floor area of 100 square feet (9.29 square meters) shall be provided in single-bed rooms.

(3) Patient privacy. Provisions for patient privacy such as cubicle curtains shall be made.

(4) Facility requirements. The room shall contain hand-washing stations, a nurse station with charting facilities, clinical sink, provision for bedpan cleaning, and storage space for supplies and equipment.

(a) Hand-washing stations

(i) A hand-washing station shall be provided in each room.

(ii) At least one hand-washing station with hands-free operable controls shall be provided for every four lounge chairs, uniformly distributed to provide equal access from each lounge chair.

(b) Toilet rooms

(i) Staff toilet. A staff toilet shall be provided with direct access to the working area to maintain staff availability to patients.

(ii) Patient toilet. A patient toilet shall be provided with direct access to the Phase II recovery unit for the exclusive use of patients.

(5) Provisions shall be made for the isolation of infectious patients.

(6) An airborne infection isolation room is not required in a Phase II recovery area. Provisions for the recovery of a potentially infectious patient with an airborne infection shall be determined by an ICRA.

5.3.4 Diagnostic and Treatment Locations

5.3.4.1 Examination provisions. Provisions shall be made for patient examination, interviews, preparation, testing, and obtaining vital signs of patients for outpatient surgery.

5.3.4.2 Area for preparation and examination of frozen sections. This area may be part of the general laboratory if immediate results are obtainable without unnecessary delay in the completion of surgery.

5.3.5 Support Areas for the Surgical Suite

Support areas, except for the enclosed soiled workroom mentioned in Section 2.1-5.3.5.10 and the housekeeping room in Section 2.1-5.3.5.14, may be shared with the obstetrical facilities in accordance with the functional program. Support areas, where shared with delivery rooms, shall be designed to avoid the passing of patients or staff between the operating room and the delivery room areas. The following shall be provided:

5.3.5.1 A control station. This shall be located to permit visual observation of all traffic into the suite.

5.3.5.2 A supervisor office or station. The number of offices, stations, and teaching areas in the surgical suite shall depend upon the functional program.

5.3.5.3 Documentation area. The dictation and report preparation area may be accessible from the lounge area.

5.3.5.4 Scrub facilities. Two scrub positions shall be provided near the entrance to each operating room.

(1) Two scrub positions may serve two operating rooms if both positions are adjacent to the entrance of each operating room.

(2) Scrub facilities shall be arranged to minimize incidental splatter on nearby personnel, medical equipment, or supply carts.

(3) In new construction, view windows at scrub stations permitting observation of room interiors shall be provided.

(4) The scrub sinks shall be recessed into an alcove out of the main traffic areas. The alcove shall be

located off the semirestricted or restricted areas of the surgical suite.

5.3.5.5 Medication station. Provision shall be made for storage and distribution of drugs and routine medications in accordance with Section 2.1-2.3.4.

5.3.5.6 Ice machine. An ice machine shall be provided in accordance with Section 2.1-2.3.6.

5.3.5.7 Patient holding area. In facilities with two or more operating rooms, an area shall be provided to accommodate stretcher patients waiting for surgery. This holding area shall be under the visual control of the nursing staff.

5.3.5.8 A substerile service areas(s). This area acts as a service area between two or more operating or procedure rooms. Other facilities for processing and sterilizing reusable instruments, etc., are typically located in another hospital department, such as central services.

(1) It shall be equipped with a flash sterilizer, warming cabinet, sterile supply storage area, and hand-washing station with hands-free controls.

(2) A sterilizing facility(ies) with high-speed sterilizer(s) or other sterilizing equipment for immediate or emergency use shall be grouped to service several operating rooms for convenient, efficient use.

(3) A work space and hand-washing station shall be provided if required by the functional program.

5.3.5.9 Clean workroom or clean supply room. Soiled and clean workrooms or holding rooms shall be separated. The clean workroom or supply room shall not be used for food preparation.

(1) Storage space for sterile and clean supplies shall be sized to meet the functional program. The space shall be moisture and temperature controlled and free from cross-traffic.

(2) Clean workroom. A clean workroom shall be provided when clean materials are assembled within the surgical suite prior to use or following the decontamination cycle.

(a) It shall contain a work counter, a hand-washing station, storage facilities for clean supplies, and a space to package reusable items.

(b) The storage for sterile supplies must be separated from this space.

(3) Clean supply room. If the room is used only for storage and holding as part of a system for distribution of clean and sterile supply materials, the work counter and hand-washing station may be omitted.

5.3.5.10 Soiled workroom or holding room. Soiled and clean workrooms or holding rooms shall be separated.

(1) An enclosed soiled workroom (or soiled holding room that is part of a system for the collection and disposal of soiled material) shall be provided for the exclusive use of the surgical suite.

(2) The room shall be located in the restricted area.

(3) The soiled workroom shall contain a flushing-rim clinical sink or equivalent flushing-rim fixture, a hand-washing station, a work counter, and space for waste receptacles and soiled linen receptacles. Rooms used only for temporary holding of soiled material may omit the flushing-rim clinical sink and work counters. However, if the flushing-rim clinical sink is omitted, other provisions for disposal of liquid waste shall be provided.

(4) The room shall not have direct connection with operating rooms or other sterile activity rooms.

5.3.5.11 Anesthesia workroom. An anesthesia workroom for cleaning, testing, and storing anesthesia equipment.

(1) This room shall contain work counter(s) and sink(s) and racks for cylinders.

(2) Provisions shall be made for separate storage of clean and soiled items.

(3) In new construction, depending on the functional and space programs, the anesthesia workroom shall provide space for anesthesia case carts and other anesthesia equipment.

5.3.5.12 Storage for blood, organs, and pathological specimens

(1) Provisions for refrigerated blood bank storage that meets the standards of the American Blood Banking Association shall be provided.

(2) Storage for harvested organs. Where applicable, refrigeration facilities for harvested organs shall be provided.

5.3.5.13 Storage for pathological specimens. Provisions for storage of pathological specimens prior to transfer to pathology section shall be provided.

5.3.5.14 Equipment and supply storage

*(1) Storage room(s) shall be provided for equipment and supplies used in the surgical suite. Each surgical suite shall provide sufficient storage area to keep its required corridor width free of equipment and supplies, but not less than 150 square feet (13.94 square meters) or 50 square feet (4.65 square meters) per operating room, whichever is greater.

(2) Storage areas shall be provided for portable x-ray equipment, stretchers, fracture tables, warming devices, auxiliary lamps, etc. These areas shall be out of corridors and traffic.

(3) Medical gas storage. Main storage of medical gases may be outside or inside the facility in accordance with NFPA 99. Provision shall be made for additional separate storage of reserve gas cylinders necessary to complete at least one day's procedures.

5.3.5.15 Housekeeping facilities. Housekeeping facilities shall be provided for the exclusive use of the surgical suite. They shall be directly accessible from the suite and shall contain a service sink or floor receptor and provisions for storage of supplies and housekeeping equipment.

5.3.6 Support Areas for Staff

5.3.6.1 Staff lounge and toilet facilities

(1) Separate or combined lounges shall be provided for male and female staff.

(2) Lounge(s) shall be designed to minimize the need to leave the suite and to provide convenient access to the recovery room.

5.3.6.2 Staff clothing change areas. Appropriate areas shall be provided for male and female personnel (orderlies, technicians, nurses, and doctors) working within the surgical suite.

(1) The areas shall contain lockers, showers, toilets, hand-washing stations, and space for donning surgical attire.

(2) These areas shall be arranged to encourage a one-way traffic pattern so that personnel entering from outside the surgical suite can change and move directly into the surgical suite.

5.3.7 Support Areas for Patients

5.3.7.1 Patient clothing change areas. If the functional program defines outpatient surgery as part of the surgical suite, a separate area shall be provided where outpatients and same-day admission patients may change from street clothing into hospital gowns and be prepared for surgery.

(1) It shall include a waiting room, locker(s), toilet(s), and clothing change or gowning area.

(2) Where private holding room(s) or cubicle(s) are provided, a separate change area is not required.

5.4 Interventional Imaging Facilities

5.4.1 Cardiac Catheterization Lab (Cardiology)

5.4.1.1 Location. The cardiac catheterization lab is normally a separate suite, but location in the imaging suite shall be permitted provided the appropriate sterile environment is provided. See Section 2.1-5.5.7.

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5.3.5.14 (1) Equipment storage room(s) for equipment and supplies used in the surgical suite should be strategically located and sized for convenient access and utilization. In larger surgical suites, storage spaces should be located for ready access to specialty rooms.

5.4.1.2 Space requirements

(1) Procedure rooms

(a) The number of procedure rooms shall be based on expected utilization.

(b) The procedure room shall be a minimum of 400 square feet (37.16 square meters) exclusive of fixed cabinets and shelves.

(2) Prep, holding, and recovery rooms. The size of the prep, holding, and recovery areas shall be based on expected utilization.

5.4.1.3 Electrophysiology labs. If electrophysiology labs are also provided in accordance with the approved functional program, these labs may be located within and integral to the catheterization suite or located in a separate functional area proximate to the cardiac care unit.

5.4.1.4 Support areas for the cardiac catheterization lab

(1) Scrub facilities. Scrub facilities with hands-free operable controls shall be provided adjacent to the entrance of procedure rooms, and shall be arranged to minimize incidental splatter on nearby personnel, medical equipment, or supplies.

(2) Patient prep, holding, and recovery area or room. A patient preparation, holding, and recovery area or room shall be provided and arranged to provide visual observation before and after the procedure.

(3) Control room or area. A control room or area shall be provided and shall be large enough to contain and provide for the efficient functioning of the x-ray and image recording equipment. A view window permitting full view of the patient from the control console shall be provided.

(4) Electrical equipment room. An equipment room or enclosure large enough to contain x-ray transformers, power modules, and associated electronics and electrical gear shall be provided.

(5) Viewing room. A viewing room shall be available for use by the cardiac catheterization suite.

(6) Clean workroom or clean supply room. A clean workroom or clean supply room shall be provided in accordance with Section 2.1-2.3.7.

(7) Soiled workroom or soiled holding room. A soiled workroom shall be provided in accordance with Section 2.1-2.3.8.

(8) Film file room. Film file room shall be available for use by the cardiac catheterization suite.

(9) Housekeeping closet. A housekeeping closet shall be provided in accordance with Section 2.1-2.3.10.

5.4.1.5 Support areas for staff

(1) Staff clothing change area(s). Staff change area(s) shall be provided and arranged to ensure a traffic pattern so that personnel can enter from outside the suite, change their clothing, and move directly into the cardiac catheterization suite.

5.5 Imaging Suite

5.5.1 General

***5.5.1.1** Functional program. Equipment and space shall be as necessary to accommodate the functional program. The imaging department provides diagnostic procedures. An imaging department commonly includes fluoroscopy, radiography, mammography, tomography, computerized tomography scanning, ultrasound, magnetic resonance, angiography, and similar techniques.

***5.5.1.2** Layout. Beds and stretchers shall have ready

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A5.5.1.1 Space layouts should be developed in compliance with manufacturer's recommendations because area requirements may vary from machine to machine. Since technology changes frequently and from manufacturer to manufacturer, rooms can be sized larger to allow upgrading of equipment over time.

A5.5.1.2 Particular attention should be paid to the management of outpatients for preparation, holding, and observation. The emergency, surgery, cystoscopy, and outpatient clinics should be accessible to the imaging suite. Imaging should be located on the ground floor, if practical, because of equipment ceiling height requirements, close proximity to electrical services, and expansion considerations.

access to and from other departments of the institution.

5.5.1.3 Radiation protection. Most imaging requires radiation protection. A certified physicist or other qualified expert representing the owner or appropriate state agency shall specify the type, location, and amount of radiation protection to be installed in accordance with the final approved department layout and equipment selections.

(1) Where protected alcoves with view windows are required, a minimum of 1 foot 6 inches (45.72 centimeters) shall be provided between the view window and the outside partition edge.

(2) Radiation protection requirements shall be incorporated into the specifications and the building plans.

5.5.1.4 Construction requirements

(1) Floor. Floor shall be adequate to meet load requirements.

(2) Ceiling. A lay-in type ceiling shall be permitted to be considered for ease of installation, service, and remodeling.

5.5.2 Angiography

5.5.2.1 General

*(1) Space requirements. Space shall be provided as necessary to accommodate the functional program.

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A5.5.2.1 (1) The procedure room should be a minimum of 400 square feet (37.16 square meters).

A5.5.2.3 Viewing areas should be a minimum of 10 feet (3.05 meters) in length.

A5.5.2.6 A patient holding area should be provided to accommodate two stretchers with additional spaces for additional procedure rooms.

A5.5.4.1 Radiography rooms should be a minimum of 180 square feet (16.72 square meters). (Dedicated chest X-ray may be smaller.)

A5.5.4.2 Tomography and radiography/fluoroscopy (R&F) rooms should be a minimum of 250 square feet (23.23 square meters).

(2) Provision shall be made within the facility for extended post-procedure observation of outpatients.

5.5.2.2 Control room. A control room shall be provided as necessary to accommodate the functional program. A view window shall be provided to permit full view of the patient.

***5.5.2.3** Viewing area. A viewing area shall be provided.

5.5.2.4 Scrub facilities. A scrub sink located outside the staff entry to the procedure room shall be provided for use by staff.

5.5.2.5 Equipment storage. Storage for portable equipment and catheters shall be provided.

***5.5.2.6** Patient holding area. A patient holding area shall be provided.

5.5.3 Computerized Tomography (CT) Scanning

5.5.3.1 Space requirements. CT scan rooms shall be as required to accommodate the equipment.

5.5.3.2 Control room. A control room shall be provided that is designed to accommodate the computer and other controls for the equipment.

(1) A view window shall be provided to permit full view of the patient.

(2) The angle between the control and equipment centroid shall permit the control operator to see the patient's head.

(3) The control room shall be located to allow convenient film processing.

5.5.3.4 Patient toilet. A patient toilet shall be provided. It shall be convenient to the procedure room and, if directly accessible to the scan room, arranged so a patient can leave the toilet without having to reenter the scan room.

5.5.4 Diagnostic X-Ray

***5.5.4.1** Space requirements. Radiography rooms shall be of a size to accommodate the functional program.

***5.5.4.2** Tomography, radiography/fluoroscopy rooms

(1) Separate toilets with hand-washing stations shall be provided with direct access from each fluoroscopic room so that a patient can leave the toilet without having to reenter the fluoroscopic room.

(2) Rooms used only occasionally for fluoroscopic procedures shall be permitted to use nearby patient toilets if they are located for immediate access.

***5.5.4.3** Mammography rooms

5.5.4.4 Shielded control alcoves

(1) Each x-ray room shall include a shielded control alcove. This area shall be provided with a view window designed to provide full view of the examination table and the patient at all times, including full view of the patient when the table is in the tilt position or the chest x-ray is in use.

(2) For mammography machines with built-in shielding for the operator, the alcove shall be permitted to be omitted when approved by the certified physicist or state radiation protection agency.

5.5.5 Magnetic Resonance Imaging (MRI)

5.5.5.1 Space requirements

(1) Space shall be provided as necessary to accommodate the functional program.

(2) The MRI room shall be permitted to range from 325 square feet (30.19 square meters) to 620 square feet (57.60 square meters), depending on the vendor and magnet strength.

5.5.5.2 Layout. When spectroscopy is provided, caution shall be exercised in locating it in relation to the magnetic fringe fields.

***5.5.5.3** Control room. A control room shall be provided with full view of the MRI.

***5.5.5.4** Patient holding area. A patient holding area shall be provided.

***5.5.5.5** Computer room. A computer room shall be provided.

***5.5.5.6** Darkroom. A darkroom shall be provided.

***5.5.5.7** Cryogen storage. Cryogen storage shall be provided.

5.5.5.8 Equipment installation requirements

*(1) Power conditioning shall be provided.

*(2) Magnetic shielding shall be provided.

(3) For super-conducting MRI, cryogen venting and emergency exhaust must be provided in accordance with the original equipment manufacturer's specifications.

5.5.6 Ultrasound

5.5.6.1 Space requirements. Space shall be provided as necessary to accommodate the functional program.

5.5.6.2 Patient toilet. A patient toilet, accessible from the procedure room, shall be provided.

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A5.5.4.3 Mammography rooms should be a minimum of 100 square feet (9.29 square meters).

A5.5.5.3 Control rooms should be a minimum of 100 square feet (9.29 square meters), but may be larger depending on the vendor and magnet size.

A5.5.5.4 When patient holding areas are provided, they should be located near the MRI unit and should be large enough to accommodate stretcher(s).

A5.5.5.5 A computer room may range from 150 square feet (13.94 square meters) to 380 square feet (35.30 square meters) depending on the vendor and magnet strength. Self-contained air conditioning supplement is normally required.

A5.5.5.6 A darkroom may be required for loading cassettes and shall be located near the control room. This darkroom shall be outside the 10-gauss field.

A5.5.5.7 Cryogen storage may be required in areas where service to replenish supplies is not readily available. When provided, space should be a minimum of 50 square feet (4.65 square meters) to accommodate two large dewars of cryogen.

A5.5.5.8 (1) Power conditioning and voltage regulation equipment as well as direct current (DC) may be required.

5.5.7 Cardiac Catheterization Lab (Cardiology)

The cardiac catheterization lab is normally a separate suite (see Section 2.1-5.4.1) but location within the imaging suite shall be permitted provided the appropriate sterile environment is provided. Combination with angiography shall be permitted in low usage situations.

5.5.8 Support Areas for the Imaging Suite

The following spaces are common to the imaging department and are minimum requirements unless stated otherwise:

5.5.8.1 Control desk and reception area

5.5.8.2 Offices for radiologist(s) and assistant(s). Offices shall include provisions for viewing, individual consultation, and charting of film.

5.5.8.3 Hand-washing stations

(1) Hand-washing stations shall be provided within each procedure room unless the room is used only for routine screening such as chest x-rays where the patient is not physically handled by the staff.

(2) Hand-washing stations shall be provided convenient to the MRI room, but need not be within the room.

5.5.8.4 Consultation area. An appropriate area for individual consultation with referring clinicians shall be provided.

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A5.5.5.8 (2) Magnetic shielding may be required to restrict the magnetic field plot. Radio frequency shielding may be required to attenuate stray radio frequencies. The area around, above and below the MRI suite shall be reviewed and evaluated for the following:

- Possible occupancy by person(s) who could have pacemakers or other metal implants.
- Equipment that can be disrupted by a magnetic field. Examples include but are not limited to personal computers, monitors, CT scanners, and nuclear cameras.

After reviewing and evaluating the surrounding space, appropriate magnetic shielding should be provided based upon the type of MRI scanner to be installed.

5.5.8.5 Patient holding area. A convenient holding area under staff control shall be provided to accommodate inpatients on stretchers or beds.

5.5.8.6 Clerical offices/spaces. Office space shall be provided as necessary for the functional program.

5.5.8.7 Film processing room

(1) If film systems are used, a darkroom shall be provided for processing film unless the processing equipment normally used does not require a darkroom for loading and transfer. When daylight processing is used, the darkroom shall be permitted to be minimal for emergency and special uses.

(2) Film processing shall be located convenient to the procedure rooms and to the quality control area.

5.5.8.8 Quality control area. An area or room shall be provided near the processor for viewing film immediately after it is processed. All view boxes shall be illuminated to provide light of the same color value and intensity for appropriate comparison of several adjacent films.

5.5.8.9 Contrast media preparation

(1) If contrast media are used, this area shall include a sink, counter, and storage to allow for mixing of contrast media.

(2) One preparation room, if conveniently located, shall be permitted to serve any number of rooms.

(3) Where pre-prepared media are used, this area shall be permitted to be omitted, but storage shall be provided for the media.

5.5.8.10 Cleanup facilities. Provisions for cleanup shall be located within the suite for convenient access and use.

(1) The facilities shall include service sink or floor receptacle as well as storage space for equipment and supplies.

(2) If automatic film processors are used, a receptacle of adequate size with hot and cold water for cleaning the processor racks shall be provided.

5.5.8.11 Clean storage. Provision shall be made for the storage of clean supplies and linens. If conveniently located, storage shall be permitted to be shared with another department.

5.5.8.12 Soiled holding. Provision shall be made for soiled holding. Separate provisions for contaminated handling and holding shall be made. Hand-washing stations shall be provided.

5.5.8.13 Film storage

(1) Film storage (active). A room with cabinet or shelves for filing patient film for immediate retrieval shall be provided.

(2) Film storage (inactive). A room or area for inactive film storage shall be provided. It shall be permitted to be outside the imaging suite, but must be under imaging's administrative control and properly secured to protect films against loss or damage.

(3) Storage for unexposed film. If film systems are used, storage facilities for unexposed film shall include protection of film against exposure or damage and shall not be warmer than the air of adjacent occupied spaces.

5.5.8.14 Medication storage. Provision shall be made for locked storage of medications and drugs.

5.5.9 Support Areas for Staff

The following spaces are common to the imaging department and are minimum requirements unless stated otherwise:

5.5.9.1 Staff lounge. Staff lounge with lockers shall be permitted to be outside the suite but shall be convenient for staff use.

5.5.9.2 Staff toilets. Toilets shall be permitted to be outside the suite but shall be convenient for staff use. In suites of three or more procedure rooms, toilets internal to the suite shall be provided.

5.5.10 Support Areas for Patients

The following spaces are common to the imaging department and are minimum requirements unless stated otherwise:

5.5.10.1 Patient waiting area

(1) The area shall be out of traffic, under staff control, and shall have seating capacity in accordance with the functional program.

(2) If the suite is routinely used for outpatients and inpatients at the same time, separate waiting areas shall be provided with screening for visual privacy between them.

(3) If so determined by an ICRA, the diagnostic imaging waiting area shall require special measures to reduce the risk of airborne infection transmission. These measures shall include enhanced general ventilation and air disinfection techniques similar to inpatient requirements for airborne infection isolation rooms (see Table 2.1-2). See the "CDC Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health Care Facilities."

5.5.10.2 Patient toilet rooms. Toilet rooms with hand-washing stations convenient to the waiting rooms and equipped with an emergency call system shall be provided.

5.5.10.3 Patient dressing rooms. Dressing rooms shall be provided convenient to the waiting areas and x-ray rooms. Each room shall include a seat or bench, mirror, and provisions for hanging patients' clothing and securing valuables.

5.6 Nuclear Medicine

5.6.1 General

***5.6.1.1** Space requirements. Space shall be provided as necessary to accommodate the functional program. Where the functional program calls for it, nuclear medicine procedure room(s) shall accommodate the equipment specified in the functional program, a stretcher, exercise equipment (treadmill and/or bicycle), and staff work space.

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A5.6.1.1 Nuclear medicine may include positron emission tomography, which is not common to most facilities. It requires specialized planning for equipment.

5.6.1.2 Radiation protection requirements. A certified physicist or other qualified expert representing the owner or state agency shall specify the type, location, and amount of radiation protection to be installed in accordance with final approved department layout and equipment selection. These specifications shall be incorporated into the plans.

5.6.1.3 Construction requirements. Provision for wiring raceways, ducts, or conduits shall be made in floors, walls, and ceilings. Ceiling-mounted equipment shall have properly designed rigid support structures located above the finished ceiling.

5.6.2 Radiopharmacy

If radiopharmaceutical preparation is performed on-site, an area adequate to house a radiopharmacy shall be provided with appropriate shielding.

5.6.2.1 Space requirements

(1) This area shall include adequate space for storage of radionuclides, chemicals for preparation, dose calibrators, and record-keeping.

(2) If pre-prepared materials are used, storage and calculation area may be considerably smaller than that for on-site preparation.

(3) Space shall provide adequately for dose calibration, quality assurance, and record-keeping.

5.6.2.2 Radiation protection requirements. The area may still require shielding from other portions of the facilities.

5.6.2.3 Construction requirements

(1) Floors and walls shall be constructed of easily decontaminated materials.

(2) Vents and traps for radioactive gases shall be provided if such are used.

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A5.6.3 Positron Emission Tomography (PET) Facilities

Space requirements

a. Space should be provided as necessary to accommodate the functional program. PET scanning is generally used in experimental settings and requires space for a scanner and for a cyclotron.

b. Scanner room. The scanner room should be a minimum of 300 square feet (27.87 square meters).

c. Cyclotron room. Where a cyclotron room is required, it should be a minimum of 225 square feet (20.90 square meters) with a 16-square-foot (1.47 square meters) space safe for storage of parts that may need to cool down for a year or more.

Laboratory facilities

a. Both a hot (radioactive) lab and a cold (nonradioactive) lab may be required, each a minimum of 250 square feet (23.23 square meters).

b. A blood lab of a minimum of 80 square feet (7.43 square meters) should be provided.

Facility requirements

a. Patient holding area. A patient holding area to accommodate two stretchers should be provided.

b. Gas storage area. A gas storage area large enough to accommodate bottles of gas should be provided. Each gas will be piped individually and may go to the cyclotron or to the lab.

Construction requirements

Radiation protection. Significant radiation protection may be required, since the cyclotron may generate high radiation.

Ventilation requirements

a. Ventilation adequate for the occupancy is required. Compressed air may be required to pressurize a water circulation system.

b. Special ventilation systems together with monitors, sensors, and alarm systems may be required to vent gases and chemicals.

c. The heating, ventilating, and air conditioning system will require particular attention; highest pressures should be in coldest (radiation) areas and exhaust should be in hottest (radiation) areas. Redundancy may be important.

Plumbing requirements

The cyclotron is water cooled with de-ionized water. A heat exchanger and connection to a compressor or connection to chilled water may be required. A redundant plumbing system connected to a holding tank may be required to prevent accidental leakage of contaminated water into the regular plumbing system.

(3) Hoods for pharmaceutical preparation shall meet applicable standards.

*5.6.3 Positron Emission Tomography (PET)

5.6.4 Nuclear Medicine Area

The nuclear medicine area, when operated separately from the imaging department, shall include the following:

5.6.4.1 Space requirements. Space shall be adequate to permit entry of stretchers and beds and able to accommodate imaging equipment, electronic consoles, and if present, computer terminals.

5.6.4.2 A control desk and reception area

5.6.4.3 Hand-washing stations. These shall be provided within each procedure room.

***5.6.4.4** Dose administration area. A dose administration area as specified by the functional program shall be provided, located near the preparation area. Since as much as several hours may elapse for a dose to take effect, the area shall provide for visual privacy from other areas.

5.6.4.5 Support areas for the nuclear medicine area

(1) Consultation area. A consultation area with view boxes illuminated to provide light of the same color value and intensity for appropriate comparison of several adjacent films shall be provided. Space shall be provided for computer access and display terminals if such are included in the program.

(2) Patient holding area

(a) A holding area for patients on stretchers or beds shall be provided out of traffic and under control of staff.

(b) Combination of this area with the dose administration area shall be permitted provided there is visual privacy between the areas.

(3) Offices

(a) Medical staff offices. Offices for physicians and assistants shall be provided and equipped for individual consultation, viewing, and charting of film.

(b) Other staff offices. Clerical offices and spaces shall be provided as necessary for the program to function.

*(4) Darkroom. If film processing is used, an on-site darkroom shall be provided for film processing.

(5) Computer room. When the functional program requires a centralized computer area, it shall be a separate room with access terminals available within the imaging rooms.

(6) A soiled workroom or holding room

(a) Soiled workroom. It shall contain a hand-washing station and a clinical sink (or equivalent flushing-rim fixtures).

(b) Soiled holding room. If the room is used for temporary holding of soiled materials, omission of the clinical sink shall be permitted.

(7) Equipment and supply storage

(a) Film storage. Inactive film storage under departmental administrative control and properly secured to protect film against loss or damage shall be provided and can be off site.

(b) Clean linen storage. A storage area for clean linen with a hand-washing station.

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A5.6.4.4 Because patients in this area may be held for long periods of time, the design of the area should incorporate such features as comfortable seating, varied lighting, an entertainment center, music headphones, and availability of reading materials.

A5.6.4.5 (4) The darkroom should contain protective storage facilities for unexposed film that guard the film against exposure or damage.

(8) Housekeeping rooms. Provisions for cleanup shall be located within the suite for convenient access and use. Cleanup facilities shall include service sink or floor receptacle as well as storage space for housekeeping equipment and supplies.

5.6.4.6 Support areas for staff

(1) Staff toilet(s). These shall be provided convenient to the nuclear medicine laboratory.

5.6.4.7 Support areas for patients

(1) Patient waiting areas. Waiting areas shall be provided out of traffic, under staff control, and with seating capacity in accordance with the functional program. If the department is routinely used for outpatients and inpatients at the same time, separate waiting areas shall be provided with screening or visual privacy between the waiting areas.

(2) Patient dressing rooms

(a) These shall be convenient to the waiting area and procedure rooms.

(b) Each dressing room shall include a seat or bench, a mirror, and provisions for hanging patients' clothing and securing valuables.

(3) Patient toilet rooms. Toilet rooms reserved for nuclear medicine patients shall be provided convenient to waiting and procedure rooms.

5.6.5 Radiotherapy Suite

***5.6.5.1** Space requirements

(1) Rooms and spaces shall be provided as necessary to accommodate the functional program.

*(2) Simulator, accelerator, and cobalt rooms shall be sized to accommodate the equipment and patient access on a stretcher, medical staff access to the equipment and patient, and service access.

5.6.5.2 Radiation protection requirements. Cobalt, linear accelerators, and simulation rooms require radiation protection.

(1) Layouts shall be designed to prevent the escape of radioactive particles.

(2) Openings into the room, including doors, ductwork, vents, and electrical raceways and conduits, shall be baffled to prevent direct exposure to other areas of the facility.

(3) A certified physicist representing the owner or appropriate state agency shall specify the type, location, and amount of protection to be installed in accordance with final approved department layout and equipment selection. The architect shall incorporate these specifications into the hospital building plans.

5.6.5.3 Construction requirements

(1) Flooring shall be adequate to meet load requirements for equipment, patients, and personnel.

(2) Provision for wiring raceways, ducts, or conduit shall be made in floors and ceilings.

(3) Ceiling-mounted equipment shall have properly designed rigid support structures located above the finished ceiling.

5.6.5.4 Support areas for the radiotherapy suite. The following areas shall be provided. Sharing of these areas

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A5.6.5.1 Equipment manufacturers' recommendations should be sought and followed, since space requirements may vary from one machine to another and one manufacturer to another.

a. The radiotherapy suite may contain electron beam therapy or radiation therapy or both.

b. Although not recommended, a simulation room may be omitted in small linear accelerator facilities where other positioning geometry is provided.

A5.6.5.1 (2) Minimum size should be 260 square feet (24.15 square meters) for the simulator room; 680 square feet (63.17 square meters), including the maze, for accelerator rooms; and 450 square feet (41.81 square meters) for cobalt rooms.

between the radiotherapy suite and other areas shall be permitted if required by the functional program:

(1) Exam rooms for each treatment room. These shall be as specified by the functional program.

(a) Each exam room shall be a minimum of 100 square feet (9.29 square meters).

(b) Each exam room shall be equipped with a hand-washing station.

(2) A stretcher hold area

(a) This shall be located adjacent to the treatment rooms, screened for privacy, and combined with a seating area for outpatients.

(b) The size of the area will be dependent on the program for outpatients and inpatients.

(3) Patient gowning area

(a) Safe storage for valuables and clothing shall be provided.

(b) At least one space should be large enough for staff-assisted dressing.

(4) Business office and/or reception/control area

(5) Darkroom. This shall be convenient to the treatment room(s) and the quality control area.

(a) Where daylight processing is used, the darkroom may be minimal for emergency use.

(b) If automatic film processors are used, a receptacle of adequate size with hot and cold water for cleaning the processor racks shall be provided either in the darkroom or nearby.

(6) Film file area

(7) Film storage area for unprocessed film.

(8) Housekeeping room. This shall be equipped with service sink or floor receptor and large enough for equipment or supplies storage.

5.6.5.5 Optional support areas for the radiotherapy suite. The following areas may be required by the functional program:

(1) Offices

(a) Oncologist's office (may be combined with consultation room)

(b) Physicist's office (may be combined with treatment planning)

(2) Treatment planning and record room

(3) Consultation room

(4) Quality control area. This shall have view boxes illuminated to provide light of consistent color value and intensity.

(5) Computer control area. This is normally located just outside the entry to the treatment room(s).

(6) Dosimetry equipment area

(7) Hypothermia room (may be combined with an exam room)

(8) Workstation/nutrition station

5.6.5.6 Additional support areas for linear accelerator

(1) Mold room with exhaust hood and hand-washing station

(2) Block room with storage. The block room may be combined with the mold room.

5.6.5.7 Additional support areas for cobalt room

(1) Hot lab

5.7 Rehabilitation Therapy Department

5.7.1 General

Rehabilitation therapy is primarily for restoration of body functions and may contain one or several categories of services.

5.7.1.1 If a formal rehabilitation therapy service is included in a project, the facilities and equipment shall be as necessary to accommodate the functional program.

5.7.1.2 Where two or more rehabilitation services are included, facilities and equipment may be shared as appropriate.

5.7.2 Physical Therapy

If physical therapy is part of the service, at least the following shall be provided:

5.7.2.1 Individual treatment area(s) with privacy screens or curtains. Each such space shall have not less than 70 square feet (6.51 square meters) of clear floor area.

5.7.2.2 Exercise area and facilities

5.7.2.3 Provision for additional therapies. If required by the functional program, provisions for thermotherapy, diathermy, ultrasonics, and hydrotherapy shall be made.

5.7.2.4 Hand-washing stations

(1) Hand-washing stations for staff shall be located either within or at each treatment space.

(2) Each treatment room shall have at least one hand-washing station.

5.7.2.5 Support areas for physical therapy

(1) Soiled material storage. Separate storage for soiled linen, towels, and supplies shall be provided.

(2) Equipment and supply storage

(a) Clean linen and towel storage

(b) Storage for equipment and supplies

5.7.2.6 Support areas for patients. If required by the functional program, patient dressing areas, showers, and lockers shall be provided. They shall be accessible and usable by the disabled.

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A5.7.3.2 The facilities should be similar to a residential environment.

5.7.3 Occupational Therapy

If occupational therapy is part of the service, at least the following shall be provided:

5.7.3.1 Work areas and counters. These shall be suitable for wheelchair access.

***5.7.3.2** Teaching area. An area for teaching daily living activities shall be provided. It shall contain an area for a bed, kitchen counter with appliances and sink, a bathroom, and a table and chair.

5.7.3.3 Hand-washing stations

5.7.3.4 Equipment and supply storage

5.7.4 Prosthetics and Orthotics

If prosthetics and orthotics are part of the service, at least the following shall be provided:

5.7.4.1 Workspace for technicians

5.7.4.2 Space for evaluation and fitting. This shall have provision for privacy.

5.7.4.3 Space for equipment, supplies, and storage

5.7.5 Speech and Hearing Services

If speech and hearing services are offered, at least the following shall be provided:

5.7.5.1 Space for evaluation and treatment

5.7.5.2 Space for equipment and storage

5.7.6 Support Areas for the Rehabilitation Therapy Department

Each rehabilitation therapy department shall include the following, which may be shared or provided as separate units for each service:

5.7.6.1 Reception and control station(s). This shall permit visual control of waiting and activities areas and may be combined with office and clerical space.

5.7.6.2 Office and clerical space. Provision shall be made for filing and retrieval of patient records.

5.7.6.3 Multipurpose room. Access to a demonstration/conference room shall be provided.

5.7.6.4 Wheelchair and stretcher storage. Space(s) shall be provided for storing wheelchairs and stretchers out of traffic while patients are using the services. These spaces may be separate from the service area but must be conveniently located.

5.7.6.5 Housekeeping room. A conveniently accessible housekeeping room and service sink for housekeeping use shall be provided.

5.7.7 Support Areas for Staff

Each rehabilitation therapy department shall include the following, which may be shared or provided as separate units for each service:

5.7.7.1 Convenient access to toilets

5.7.7.2 Locking closets or cabinets shall be provided within the vicinity of each work area for securing staff personal effects.

5.7.8 Support Areas for Patients

Each rehabilitation therapy department shall include the following, which may be shared or provided as separate units for each service:

5.7.8.1 Patient waiting area(s). These shall be located out of traffic with provision for wheelchairs.

5.7.8.2 Patient toilets with hand-washing stations accessible to wheelchair patients.

5.8 Respiratory Therapy Service

The type and extent of respiratory therapy service in different institutions vary greatly. In some, therapy is delivered in large sophisticated units, centralized in a specific area; in others, basic services are provided only at patients' bedsides. If respiratory service is provided, the following elements shall be provided as a minimum, in addition to those elements stipulated in Sections 2.1-5.7.6.1 and 5.7.6.2 and 2.1-5.7.7.1 and 5.7.7.2:

5.8.1 Locations for Cough-Inducing and Aerosol-Generating Procedures

5.8.1.1 All cough-inducing procedures performed on patients who may have infectious Mycobacterium tuberculosis shall be performed in rooms using local exhaust ventilation devices (e.g., booths or special enclosures that have discharge HEPA filters and exhaust directly to the outside).

5.8.1.2 If a ventilated booth is used, the air exchange rate within the booth shall be at least 12 air changes per hour, with a minimum exhaust flow rate of 50 cfm and differential pressure of 0.0l" w.c. (2.5 Pa).

5.8.1.3 These procedures may also be performed in a room that meets the ventilation requirements for airborne infection control. See Table 2.1-2 for airborne infection isolation room ventilation requirements.

5.8.2 Outpatient Testing and Demonstration

If respiratory services such as testing and demonstration for outpatients are part of the program, additional facilities and equipment shall be provided as necessary for the appropriate function of the service, including but not limited to the following:

5.8.2.1 A reception and control station

5.8.2.2 Room(s) for patient education and demonstration

5.8.2.3 Patient waiting area with provision for wheelchairs

5.8.2.4 Patient toilets and hand-washing stations

5.8.3 Space and Utilities for Cleaning and Disinfecting Equipment

5.8.3.1 The space for receiving and cleaning soiled materials shall be physically separated from the space for storage of clean equipment and supplies.

5.8.3.2 Appropriate local exhaust ventilation shall be provided if glutaraldehyde or other noxious disinfectants are used in the cleaning process.

5.8.4 Storage for Equipment and Supplies

5.9 Renal Dialysis Unit (Acute and Chronic)

5.9.1 General

5.9.1.1 Functional program. Equipment and space shall be provided as necessary to meet the functional program, which may include treatment for acute (inpatient) and chronic cases, home treatment, and kidney dialyzer reuse facilities.

5.9.1.2 Location

(1) The location shall offer convenient access for outpatients. Accessibility to the unit from parking and public transportation shall be a consideration.

(2) Inpatient services are permitted in critical care units and designated areas in the hospital with appropriate utilities.

5.9.2 Treatment Area

5.9.2.1 Layout. The treatment area shall be permitted to be an open area and shall be separate from administrative and waiting areas.

5.9.2.2 Space requirements

(1) Area. Individual patient treatment areas shall contain at least 80 square feet (7.43 square meters), exclusive of general circulation space within the ward.

(2) Clearance. There shall be at least a 4-foot (1.22 meters) space between beds and/or lounge chairs.

5.9.2.3 Privacy. The open unit shall be designed to provide privacy for each patient.

5.9.2.4 Nurse station(s). These shall be located within the dialysis treatment area and designed to provide visual observation of all patient stations.

5.9.2.5 Hand-washing stations

(1) Hand-washing stations shall be convenient to the nurse station and patient treatment areas.

(2) There shall be at least one hand-washing station serving no more than four stations.

(3) The hand-washing stations shall be uniformly distributed to provide equal access from each patient station.

5.9.2.6 Patient toilet. A patient toilet with hand-washing stations shall be provided.

5.9.2.7 Stat laboratory

(1) If a stat laboratory for blood and urinalysis is provided, the stat laboratory shall contain a hand-washing station, work counters, storage spaces, an undercounter refrigerator for specimens, and a cup sink.

(2) An area for the phlebotomists' use shall be provided adjacent to the laboratory.

(3) A pass-through for specimens shall be provided between the patient toilet room and the laboratory.

5.9.2.8 Private treatment area. If home training is provided in the unit, a private treatment area shall be provided.

(1) A private treatment area of at least 120 square feet (11.15 square meters) shall be provided for patients who are being trained to use dialysis equipment at home.

(2) This room shall contain a counter, hand-washing stations, and a separate drain for fluid disposal.

5.9.2.9 Airborne infection isolation room(s). The number of and need for required airborne infection isolation rooms shall be determined by an ICRA. When required, the airborne infection isolation room(s) shall comply with the requirements of Section 2.1-3.2.2.

5.9.3 Examination Room

An examination room with hand-washing stations and writing surface shall be provided with at least 100 square feet (9.29 square meters).

5.9.4 Support Areas for the Renal Dialysis Unit

5.9.4.1 Administrative space. Office and clinical workspace shall be available for administrative services.

5.9.4.2 Medication dispensing station. If required by the functional program, there shall be a medication dispensing station for the dialysis center.

(1) A work counter and hand-washing stations shall be included in this area.

(2) Provisions shall be made for the controlled storage, preparation, distribution, and refrigeration of medications.

5.9.4.3 Nourishment station. If a nourishment station for the dialysis service is provided, it shall contain a hand-washing station, a work counter, a refrigerator, storage cabinets, a water-dispensing unit separate from the hand-washing station, and equipment for serving nourishments as required. The nourishment station shall be located away from the treatment area to prevent the risk of cross-contamination.

5.9.4.4 Dialyzer reprocessing room. If dialyzers are reused, a reprocessing room sized to perform the functions required shall be provided.

(1) This room shall include a one-way flow of materials from soiled to clean.

(2) This room shall include provisions for refrigeration for temporary storage of dialyzers, decontamination/cleaning areas, sinks, processors, computer processors and label printers, a packaging area, and dialyzer storage cabinets.

5.9.4.5 Mixing room and delivery system. Each facility using a central batch delivery system shall provide, either on the premises or through written arrangements, individual delivery systems for the treatment of any patient requiring special dialysis solutions. The mixing room shall include a sink, storage space, and holding tanks.

5.9.4.6 Water treatment equipment room. The water treatment equipment shall be located in an enclosed room.

5.9.4.7 Equipment repair room. If required by the functional program, an equipment repair and breakdown room shall be equipped with a hand-washing station, deep service sink, work counter, and storage cabinet.

5.9.4.8 Clean workroom or supply room. A clean workroom shall be provided. Soiled and clean workrooms or holding rooms shall be separated and have no direct connection.

(1) Clean workroom. If the room is used for preparing patient care items, it shall contain a work counter, a hand-washing station, and storage facilities for clean and sterile supplies.

(2) Clean supply room. If the room is used only for storage and holding as part of a system for distribution of clean and sterile materials, the work counter and hand-washing station may be omitted.

5.9.4.9 Soiled workroom. A soiled workroom shall be provided and contain a flushing-rim sink, hand-washing station, work counter, storage cabinets, waste receptacles, and a soiled linen receptacle.

5.9.4.10 Equipment and supply storage

(1) Clean linen storage. A clean linen storage area shall be provided. It may be within the clean workroom, a separate closet, or an approved distribution system. If a closed cart system is used, storage may be in an alcove. It must be out of the path of normal traffic and under staff control.

(2) Supply areas/carts. Supply areas or supply carts shall be provided.

(3) Stretcher/wheelchair storage. If stretchers are provided, storage space shall be available for wheelchairs and stretchers, out of direct line of traffic.

5.9.4.11 Environmental services closet. An environmental services closet shall be provided adjacent to and for the exclusive use of the unit.

(1) The closet shall contain a floor receptor or service sink and storage space for housekeeping supplies and equipment.

(2) Water supply and drain connection for testing machines shall be provided.

5.9.5 Support Areas for Staff

Appropriate staff clothing change areas and lounge shall be available for male and female personnel. The areas shall contain lockers, shower, toilet, and hand-washing stations.

5.9.6 Support Areas for Patients

5.9.6.1 Patient support provisions. A waiting room, toilet room with hand-washing stations, source of drinking water, public telephone, and seating accommodations for waiting periods shall be available or accessible to the dialysis unit.

5.9.6.2 Patient storage. Storage for patients' belongings shall be provided.

5.9.7 Diagnostic Areas

5.9.7.1 Laboratory space. If required by the functional program, a laboratory space, including counters, sinks, cabinets, label machines, computers, and hand-washing sinks, shall be provided to accommodate processing of blood draws and urine samples.

5.9.8 Construction Requirements

***5.9.8.1** Piping. Design consideration shall be given to the disposal of liquid waste from the dialyzing process to prevent odor and backflow.

***5.9.8.2** Temperature/humidity control

*5.10 Hyperbaric Suite

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A5.9.8.1 All installed reverse osmosis water and dialysis solution piping should be accessible.

A5.9.8.2 Due to the nature of the dialyzing process and the nature of the patient's illness, the temperature should be maintained at 72° to 78°F (22° to 26°C) with a relative humidity level of 30 to 60 percent.

A5.10 Hyperbaric Suite

Applicability

These guidelines should apply to hyperbaric facilities designated for clinical hyperbaric oxygen therapy, including hospital-affiliated and freestanding facilities.

General Facility Requirements

Hyperbaric chambers should be constructed in conformance with applicable construction codes (ASME PVHO-1, Safety Standard for Pressure Vessels for Human Occupancy) and carry a "U" stamp.

The facility should be constructed to comply with applicable local, state, and national construction codes governing the type of occupancy (health care, commercial, other) housing the hyperbaric chamber(s).

When a hyperbaric suite/clinic is provided, it should meet the requirements of Chapter 20, NFPA 99, and Chapter 12, NFPA 101.

Multiplace (NFPA Class "A" Chamber) Facilities

Emergency exit requirements

a. The facility housing a Class A chamber should be designed to allow rapid or emergency removal of patients and staff.

b. In the case of multiple Class A chambers installed in a single setting or a Class A chamber that contains multiple compartments, the rapid or emergency removal of a patient or personnel from one chamber/compartment should not restrict in any way the rapid and simultaneous removal of patients or personnel from all other chambers or compartments.

c. A minimum of two exits should be provided for the chamber room unless a single exit opens directly to a primary evacuation hallway.

Space requirements

The space required to house Class A chambers and supporting equipment should be defined by NFPA 99, Chapter 20 and the equipment manufacturer, but in any case should not be less than the following:

a. Minimum clearances around a (Class A) hyperbaric chamber should be as follows:

b. Chamber entry should be designed for gurney/stretcher access: 10 feet (3.04 meters).

c. Entries designed for wheeled gurneys should be provided with access ramps that are flush with the chamber entry doorway.

d. Chambers that utilize fixed internal stretcher frames and transfer gurneys should be designed to allow immediate removal of the patient upon chamber depressurization.

e. Chamber man lock entries or compartments utilizing circular entry hatchways: 4 feet (1.21 meters).

f. The chamber should have a minimum of 4 feet (1.21 meters) of clearance all the way around the chamber, except as specified with regard to entry areas.

g. If the chamber control console is immediately adjacent to the chamber, a minimum passageway of 4 feet (1.21 meters) should be provided between the control console and any obstruction.

Monoplace (Class B) Facilities

Emergency exit requirements

a. In the case of multiple Class B chambers installed in a single setting, the rapid or emergency removal of a patient from one chamber should not restrict in any way the rapid and simultaneous removal of patients from all other chambers.

b. A minimum of two exits should be provided for the chamber room unless a single exit opens directly to a primary evacuation hallway.

c. Exit doorways should have a minimum opening of 46 inches. (1.16 meters)

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Space requirements

The space required to house Class B chambers and supporting equipment should be defined by the equipment manufacturer, but in any case should not be less than the following:

The space housing Class B chambers should conform to NFPA 99, Chapter 20 requirements.

Minimum clearances between individual (Class B) hyperbaric chambers should be as follows:

a. Chamber and side wall, 18 inches (45.72 centimeters). Exception: If any chamber controls, ventilation valves, or other operator-adjustable devices are located on or under the chamber adjacent to the side wall, minimum clearance should be 36 inches (91.44 centimeters).

b. Between control side of two chambers, 48 inches (1.21 meters).

c. Between back side of two chambers, 24 inches (60.96 centimeters)

d. A minimum passage of 14 inches (35.56 centimeters) should be provided at the foot end of each chamber. An oxygen shut-off valve should be provided for each chamber and should be unobstructed by the chamber and located as to be immediately accessible to the chamber operator.

e. A minimum space of 102 inches (2.59 meters) should be available at the head end of the chamber to allow for the safe insertion and removal of the patient from the chamber.

f. Any electrical service outlets located within 10 feet of the Class B chamber entrance should be sited no less than 3 feet (0.91 meter) above floor level.

Support Areas

The following support areas should be provided for the hyperbaric facility. If the hyperbaric facility is included as an integral portion of another service such as a wound care department, support areas may be shared:

Support areas for the hyperbaric suite

a. Reception/control desk

b. Patient waiting area. The waiting area should be large enough to accommodate the clinical program and chamber mix if also used as a holding area. The area should be out of traffic, under staff control, and should have seating capacity in accordance with the functional program. When the hyperbaric suite is routinely used for outpatients and inpatients at the same time, separate waiting areas should be provided with screening for visual privacy between the waiting areas. Patient waiting areas may be omitted for two or fewer Class B hyperbaric chamber units.

c. Holding area. The area should be out of traffic flow from the chamber and should not obstruct access to the exits. A holding area under staff control should accommodate inpatients on stretchers or beds. Stretcher patients should be out of the direct line of normal traffic. The patient holding area may be omitted for two or less individual hyperbaric chamber units.

d. Consultation/treatment rooms. Appropriate room for individual consultation and treatment with referring clinicians should be provided.

e. Patient record storage area. An area should be provided that is out of traffic flow and under staff control. This can be in the clinical area or located at the reception/control desk.

f. Hand-washing stations. A lavatory equipped for hand-washing with hands-free operable controls should be located in the room where the hyperbaric chambers are located.

g. Compressor room. This area should be large enough to house the chamber compressors, accumulator tanks, fire suppression system and their ability to meet the requirements of NFPA 99, Chapter 20. The reserve breathing gases could also be housed here if it is in close proximity to the chamber room.

h. Soiled holding area. A soiled holding room should be provided with waste receptacles and soiled linen receptacles.

i. Equipment and supply storage

Clean supply and linen storage. A clean storage space should be provided for clean supplies and linens. Hand-washing fixtures should be provided with hands-free operable controls. When a separate storage room is provided, it may be shared with another department.

Gas cylinder room. This room should be large enough to accommodate the storage of enough (H) cylinders and manifolds for the reserve breathing gases required for chamber operations. The minimum room size should be able to house eight (H) cylinders and two gas manifolds, consisting of at least two (H) cylinders on each manifold.

j. Housekeeping room. The housekeeping room should contain a floor receptor or service sink and storage space for housekeeping supplies and equipment, and should be located nearby.

Support areas for staff

Toilets with hand-washing fixtures with hands-free operable controls may be outside the suite but should be convenient for staff use.

Support areas for patients

a. Patient dressing rooms. Dressing rooms for outpatients should be provided and should include a seat or bench, mirror, and provisions for hanging patients' clothing and for securing valuables. At least one dressing room should be provided to accommodate wheelchair patients.

b. Patient toilet rooms. Toilet rooms should be provided with hand-washing fixtures with hands-free operable controls with direct access from the hyperbaric suite.

5.11 Laboratory Suite

5.11.1 General

5.11.1.1 Type. Laboratory facilities shall be provided for the performance of tests in hematology, clinical chemistry, urinalysis, microbiology, anatomic pathology, cytology, and blood banking to meet the workload described in the functional program.

5.11.1.2 Location. Certain procedures may be performed on-site or provided through a contractual arrangement with a laboratory service acceptable to the authority having local jurisdiction.

(1) Provisions shall be made for the following procedures to be performed on-site: blood counts, urinalysis, blood glucose, electrolytes, blood urea and nitrogen (BUN), coagulation, transfusions (type and cross-match capability), and stat gram stains.

(2) Provisions shall be included for specimen collection and processing.

5.11.1.3 Equipment requirements. The functional program shall describe the type and location of all special equipment that is to be wired, plumbed, or plugged in, and the utilities required to operate each.

Note: Refer to NFPA code requirements applicable to hospital laboratories, including standards clarifying that hospital units do not necessarily have the same fire safety requirements as commercial chemical laboratories.

5.11.2 Facility Requirements

The following physical facilities shall be provided within the hospital:

5.11.2.1 Work areas

(1) Laboratory work counter(s) with space for microscopes, appropriate chemical analyzer(s), incubator(s), centrifuge(s), biosafety hoods, etc. shall be provided.

(2) Work areas shall include sinks with water and access to vacuum, gases, and air, and electrical services as needed.

5.11.2.2 Hand-washing stations. These shall be located within 25 feet (7.62 meters) of each workstation and within each room with a workstation.

5.11.2.3 Design considerations

(1) Chemical safety provisions. These shall include emergency shower, eye-flushing devices, and appropriate storage for flammable liquids, etc.

(2) Terminal sterilization provisions. Facilities and equipment shall be provided for terminal sterilization of contaminated specimens before transport (autoclave or electric oven). (Terminal sterilization is not required for specimens that are incinerated on-site.)

(3) Radioactive material-handling provisions. If radioactive materials are employed, facilities for long-term storage and disposal of these materials shall be provided. No special provisions shall normally be required for body waste products from most patients receiving low-level isotope diagnostic material. Requirements of authorities having jurisdiction shall be verified.

5.11.2.4 Support areas for the laboratory suite

(1) Administrative areas. These shall include offices as well as space for clerical work, filing, and record maintenance.

(2) Refrigerated blood storage facilities. A refrigerator to store blood for transfusions shall be equipped with temperature-monitoring and alarm signals.

*(3) Storage facilities for reagents, standards, supplies, and stained specimen microscope slides, etc. These shall include refrigeration. Such facilities shall conform to applicable NFPA standards.

(4) A specimen collection facility. This facility may be located outside the laboratory suite.

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A5.11.2.4 (3). For example, separate facilities should be provided for such incompatible materials as acids and bases, and vented storage should be provided for volatile solvents.

(a) The blood collection area shall have a work counter, space for patient seating, and hand-washing stations.

(b) The urine and feces collection facility shall be equipped with a water closet and hand-washing station.

5.11.2.5 Support areas for staff. Lounge, locker, and toilet facilities shall be conveniently located for male and female laboratory staff. Location of these areas outside the laboratory area and sharing of these areas with other departments shall be permitted.

5.12 Morgue

5.12.1 Location

These facilities shall be accessible through an exterior entrance and shall be located to avoid the need for transporting bodies through public areas.

*5.12.2 Autopsy Facilities

If autopsies are performed in the hospital, the following elements shall be provided:

5.12.2.1 Refrigerated facilities for body holding. Body-holding refrigerators shall be equipped with temperature-monitoring and alarm signals.

5.12.2.2 An autopsy room. This shall contain the following:

(1) A work counter with a hand-washing station

(2) A storage space for supplies, equipment, and specimens

(3) An autopsy table

(4) A deep sink for washing specimens

5.12.2.3 Housekeeping facilities. A housekeeping service sink or receptor shall be provided for cleanup and housekeeping.

5.12.3 Body-Holding Room

If autopsies are performed outside the facility, a well-ventilated, temperature-controlled body-holding room shall be provided.

6 Service Areas

6.1 Pharmacy

6.1.1 General

6.1.1.1 Functional program. The size and type of services to be provided in the pharmacy will depend upon the type of drug distribution system used, number of patients to be served, and extent of shared or purchased services. These factors shall be described in the functional program.

6.1.1.2 Location. The pharmacy room or suite shall be located for convenient access, staff control, and security.

6.1.1.3 Facility requirements

(1) Facilities and equipment shall be as necessary to accommodate the functional program. (Satellite facilities, if provided, shall include those items required by the program.)

(2) As a minimum, the following elements shall be provided:

6.1.2 Dispensing Facilities

6.1.2.1 A room or area for receiving, breakout, and inventory control of materials used in the pharmacy

6.1.2.2 Work counters and space for automated and manual dispensing activities

***6.1.2.3** An extemporaneous compounding area. This shall include a sink and sufficient counter space for drug preparation.

6.1.2.4 An area for reviewing and recording

6.1.2.5 An area for temporary storage, exchange, and restocking of carts

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A5.12.2 Autopsy rooms should be equipped with downdraft local exhaust ventilation.

A6.1.2.3 Floor drainage may also be required, depending on the extent of compounding conducted.

6.1.2.6 Security provisions for drugs and personnel in the dispensing counter area, if one is provided

6.1.3 Manufacturing Facilities

6.1.3.1 A bulk compounding area

6.1.3.2 Provisions for packaging and labeling

6.1.3.3 A quality-control area

6.1.4 Storage

Cabinets, shelves, and/or separate rooms or closets shall be provided.

6.1.4.1 Bulk storage

6.1.4.2 Active storage

6.1.4.3 Refrigerated storage

6.1.4.4 Storage for volatile fluids and alcohol. This shall be constructed according to applicable fire safety codes for the substances involved.

6.1.4.5 Storage for narcotics and controlled drugs. Secure storage shall be provided for narcotics and controlled drugs

6.1.4.6 Equipment and supply storage. Storage shall be provided for general supplies and equipment not in use.

6.1.5 Support Areas for the Pharmacy

6.1.5.1 Patient information. Provision shall be made for cross-checking medication and drug profiles of individual patients.

6.1.5.2 Pharmacological information. Poison control, reaction data, and drug information centers

6.1.5.3 Office. A separate room or area shall be provided for office functions. This room shall include space to accommodate a desk, filing capabilities, communication equipment, and reference materials.

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A6.2.1.1 Consideration may also be required for meals to VIP suites and for cafeterias for staff, ambulatory patients, and visitors, as well as providing for nourishments and snacks between scheduled meal service.

6.1.5.4 Provisions for patient counseling and instruction. A room separate from the pharmacy shall be permitted to meet this requirement.

6.1.5.5 A room for education and training. A multipurpose room shared with other departments shall be permitted to serve this purpose.

6.1.5.6 Outpatient consultation/education area. If the functional program requires dispensing of medication to outpatients, an area for consultation and patient education shall be provided.

6.1.5.7 Hand-washing stations. Hand-washing stations shall be provided within each separate room where open medication is prepared for administration.

6.1.5.8 Sterile work area. If intravenous (IV) solutions are prepared in the pharmacy, a sterile work area with a laminar-flow workstation designed for product protection shall be provided. The laminar-flow workstation shall include a nonhydroscopic filter rated at 99.97 percent (HEPA), as tested by dioctyl-phtalate (DOP) tests, and have a visible pressure gauge for detection of filter leaks or defects.

6.1.5.9 Additional equipment and supply storage. If unit dose procedure is used, additional space and equipment for supplies, packaging, labeling, and storage, as well as for the carts.

6.1.6 Support Areas for Staff

6.1.6.1 Staff toilet. Convenient access to toilet shall be provided.

6.1.6.2 Staff storage. Convenient access to locker shall be provided.

6.2 Dietary Facilities

6.2.1 General

*__6.2.1.1__ Applicability. Food service facilities shall provide food service for staff, visitors, inpatients, and outpatients in accordance with the functional program.

6.2.1.2 Location. Patient food preparation areas shall be located adjacent to delivery, interior transportation, and storage facilities.

6.2.1.3 Standards. Food service facilities and equipment shall conform to these standards and to the standards of the National Sanitation Foundation and other applicable codes.

6.2.1.4 Construction requirements. Finishes in the dietary facility shall be selected to ensure cleanability and the maintenance of sanitary conditions.

6.2.2 Functional Elements

If on-site conventional food service preparation is used, the following shall be provided, in size and number appropriate for the functional program:

6.2.2.1 Receiving/control stations. An area for receiving and control of incoming dietary supplies shall be provided.

(1) This area shall be separated from the general receiving area

(2) It shall contain a control station and a breakout area for loading, uncrating, and weighing supplies.

6.2.2.2 Hand-washing stations. Hands-free operable hand-washing stations shall be conveniently accessible at locations throughout the unit.

6.2.2.3 Food preparation work spaces

(1) Work spaces shall be provided for food preparation, cooking, and baking. These areas shall be as close as possible to the user (i.e., tray assembly and dining).

(2) Additional spaces shall be provided for thawing and portioning.

6.2.2.4 Assembly and distribution. A patient tray assembly area shall be close to the food preparation and distribution areas.

6.2.2.5 Food service carts

(1) A cart distribution system shall be provided, with spaces for storage, loading, distribution, receiving, and sanitizing of the food service carts.

(2) The cart traffic shall be designed to eliminate any danger of cross-circulation between outgoing food carts and incoming, soiled carts, and the cleaning and sanitizing process. Cart circulation shall not be through food processing areas.

6.2.2.6 Dining area. Dining space(s) shall be provided for ambulatory patients, staff, and visitors. These spaces shall be separate from the food preparation and distribution areas.

6.2.2.7 Area for receiving, scraping, and sorting soiled tableware. This shall be adjacent to ware-washing and separate from food preparation areas.

6.2.2.8 Ware-washing facilities

(1) These shall be designed to prevent contamination of clean wares with soiled wares through cross-traffic.

(2) The clean wares shall be transferred for storage or use in the dining area without having to pass through food preparation areas.

6.2.2.9 Pot-washing facilities

(1) These shall include multi-compartmented sinks of adequate size for the intended use, convenient to the using service.

(2) Supplemental heat for hot water to clean pots and pans shall be by booster heater, steam jet, or other appropriate means.

(3) Mobile carts or other provisions shall be made for drying and storing pots and pans.

6.2.2.10 Facilities for commissary or contract services from other areas

(1) Provision shall be made to protect food delivered to ensure freshness, retain hot and cold, and avoid contamination. If delivery is from outside sources, protection against weather shall be provided.

(2) Provision shall be made for thorough cleaning and sanitizing of equipment to avoid mixing soiled and clean equipment.

6.2.2.11 Vending services. If vending devices are used for unscheduled meals, a separate room shall be provided that can be accessed without having to enter the main dining area.

(1) The vending room shall contain coin-operated machines, bill changers, a hand-washing station, and a sitting area.

(2) Facilities for servicing and sanitizing the machines shall be provided as part of the facility's food service program.

6.2.3 Support Areas for Dietary Facilities

6.2.3.1 Office spaces. Offices for the use of the food service manager shall be provided. In smaller facilities, this space may be located in an area that is part of the food preparation area.

6.2.3.2 Equipment

(1) Mechanical devices shall be heavy-duty, suitable for use intended, and easily cleaned.

(2) Where equipment is movable, heavy-duty locking casters shall be provided. If equipment is to have fixed utility connections, the equipment shall not be equipped with casters.

(3) Walk-in coolers, refrigerators, and freezers shall be insulated at floor as well as at walls and top.

(4) Coolers, refrigerators, and freezers shall be thermostatically controlled to maintain desired temperature settings in increments of 2 degrees or less.

(a) Coolers and refrigerators shall be capable of maintaining a temperature down to freezing.

(b) Freezers shall be capable of maintaining a temperature of 20 degrees below 0° F.

(c) Interior temperatures shall be indicated digitally so as to be visible from the exterior. Controls shall include audible and visible high and low temperature alarm.Time of alarm shall be automatically recorded.

(5) Walk-in units

(a) These may be lockable from outside but must have release mechanism for exit from inside at all times.

(b) Interior shall be lighted.

(c) All shelving shall be corrosion resistant, easily cleaned, and constructed and anchored to support a loading of at least 100 pounds per linear foot.

(6) Cooking equipment. All cooking equipment shall be equipped with automatic shutoff devices to prevent excessive heat buildup.

(7) Ice-making equipment

(a) This equipment shall be convenient for service and easily cleaned.

(b) It shall be provided for both drinks and food products (self-dispensing equipment) and for general use (storage-bin type equipment).

(8) Construction requirements. Under-counter conduits, piping, and drains shall be arranged to not interfere with cleaning of the equipment or of the floor below.

6.2.3.3 Equipment and supply storage

(1) General. Storage spaces shall be convenient to the receiving area and accessible without traveling through the food preparation area.

(2) Food storage

(a) Storage spaces for bulk, refrigerated, and frozen foods shall be provided. Provision shall be made for storage of a minimum of four days' supplies.

(b) Food storage components shall be grouped for convenient access to the receiving and food preparation areas.

(c) All food shall be stored clear of the floor. Lowest shelf shall be not less than 12 inches (30.48 centimeters) above the floor or shall

be closed in and sealed tight for ease of cleaning.

(3) Additional storage rooms. These shall be provided as necessary for the storage of cooking wares, extra trays, flatware, plastic and paper products, and portable equipment.

(4) Cleaning supplies storage. A separate storage room shall be provided for the storage of nonfood items such as cleaning supplies that might contaminate edibles.

6.2.3.4 Housekeeping rooms

(1) These shall be provided for the exclusive use of the dietary department and shall contain a floor sink and space for mops, pails, and supplies.

(2) Where hot water or steam is used for general cleaning, additional space within the room shall be provided for the storage of hoses and nozzles.

6.2.4 Support Areas for Staff

6.2.4.1 Toilets, lockers, and lounges. Toilets, lockers and lounge facilities shall be convenient to the dietary department. These facilities shall be permitted to be shared with adjacent services provided they are adequately sized.

6.3 Central Services

The following shall be provided:

6.3.1 Soiled and Clean Work Areas

The soiled and clean work areas shall be physically separated.

6.3.1.1 Soiled workroom

(1) This room shall be physically separated from all other areas of the department.

(2) Work space shall be provided to handle the cleaning and initial sterilization/disinfection of all medical/surgical instruments and equipment. Work tables, sinks, flush-type devices, and washer/sterilizer decontaminators shall be provided.

(3) Pass-through doors and washer/sterilizer decontaminators shall deliver into clean processing area/workrooms.

***6.3.1.2** Clean assembly/workroom. This workroom shall contain hand-washing stations, work space, and equipment for terminal sterilizing of medical and surgical equipment and supplies.

6.3.2 Equipment and Supply Storage Areas

6.3.2.1 Clean/sterile medical/surgical supplies

(1) A room for breakdown shall be provided for manufacturers' clean/sterile supplies. The clean processing area shall not be in this area but in an adjacent space.

(2) Storage for packs, etc., shall include provisions for ventilation, humidity, and temperature control.

6.3.2.2 Storage room for patient care and distribution carts. This area shall be adjacent and easily available to clean and sterile storage and close to the main distribution point to keep traffic to a minimum and ease work flow.

6.3.3 Support Areas for Staff

6.3.3.1 Administrative/changing room. If required by the functional program, this room shall be separate from all other areas and provide for staff to change from street clothes into work attire.

6.3.3.2 Staff accommodations. Lockers, hand-washing

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A6.3.1.2 Sterilization room. This room is used exclusively for the inspection, assembly, and packaging of medical/surgical supplies and equipment for sterilization.

a. Access to the sterilization room should be restricted.

b. This room should contain Hi-Vacuum or gravity steam sterilizers and sterilization equipment to accommodate heat-sensitive equipment (ETO sterilizer) and ETO aerators.

c. It should contain worktables, counters, a hand-washing station, ultrasonic storage facilities for backup supplies and instrumentation, and a drying cabinet or equipment.

d. The area should be spacious enough to hold sterilizer carts for loading of prepared supplies for sterilization.

station, and showers shall be made available within the immediate vicinity of the department.

6.4 Linen Services

6.4.1 General

Each facility shall have provisions for storing and processing of clean and soiled linen for appropriate patient care. Processing may be done within the facility, in a separate building on- or off-site, or in a commercial or shared laundry.

6.4.2 Internal Linen Processing

Facilities and equipment shall be as required for cost-effective operation as described in the functional program. At a minimum, the following elements shall be provided:

6.4.2.1 Soiled linen holding room. A separate room shall be provided for receiving and holding soiled linen until ready for pickup or processing.

6.4.2.2 Clean linen storage. A central clean linen storage and issuing room(s) shall be provided in addition to the linen storage required at individual patient units.

6.4.2.3 Cart storage area(s). These shall be provided for separate parking of clean- and soiled-linen carts out of traffic.

6.4.2.4 A clean linen inspection and mending room or area. If not provided elsewhere, a clean linen inspection, delinting, folding, assembly, and packaging area shall be provided as part of the linen services.

(1) Mending shall be provided for in the linen services department.

(2) A space for tables, shelving, and storage shall be provided.

6.4.2.5 Hand-washing stations. These shall be provided in each area where unbagged, soiled linen is handled.

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A6.4.4.3 This may require a capacity for processing a seven-day supply in a 40-hour week.

6.4.3 Additional Areas for Outside Laundry Services

If linen is processed outside the building, provisions shall also be made for:

6.4.3.1 Service entrance. A service entrance, protected from inclement weather, shall be provided for loading and unloading of linen.

6.4.3.2 Control station. A control station shall be provided for pickup and receiving.

6.4.4 On-Site Laundry Facility

If linen is processed in a laundry facility that is part of the project (within or as a separate building), the following shall be provided in addition to the requirements for internal processing facilities in Section 2.1-6.4.2.

6.4.4.1 Layout. Equipment shall be arranged to permit an orderly work flow and minimize cross-traffic that might mix clean and soiled operations.

6.4.4.2 Control and distribution room. A receiving, holding, and sorting room shall be provided for control and distribution of soiled linen. Discharge from soiled linen chutes shall be received in a separate room adjacent to it.

***6.4.4.3** Laundry processing room. This shall have commercial or industrial-type equipment that can process at least a seven-day supply within the regular scheduled work week.

6.4.4.4 Hand-washing stations. Employee hand-washing stations shall be provided in each room where clean or soiled linen is processed and handled.

6.4.4.5 Storage for laundry supplies

6.4.4.6 Staff support locations. Conveniently accessible staff lockers, showers, and lounge shall be provided.

6.4.5 Linen Chutes

If provided, these shall meet or exceed the following standards:

6.4.5.1 Standards

(1) Service openings to chutes shall comply with NFPA 101.

(2) Chutes shall meet the provisions described in NFPA 82.

(3) Chute discharge into collection rooms shall comply with NFPA 101.

6.4.5.2 Dimensions. The minimum cross-sectional dimension of gravity chutes shall be 2 feet (60.96 centimeters).

6.5 Materials Management

6.5.1 Receiving

The following shall be provided:

6.5.1.1 Off-street unloading facilities

6.5.1.2 Receiving area

Adequate receiving areas shall be provided to accommodate delivery trucks and other vehicles.

*(1) Location

(a) Dock areas shall be segregaged from other occupied building areas and located so that noise and odors from operation will not adversely affect building occupants.

(b) The receiving area shall be convenient to service elevators and other internal corridor systems.

(c) Receiving areas shall be segregated from waste staging and other outgoing materials-handling functions.

(2) Space requirements

(a) Adequate space shall be provided to enable breakdown, sorting, and staging of incoming materials and supplies.

(b) Balers and other devices shall be located to capture packaging for recycling or return to manufacturer or deliverer.

(c) In facilities with centralized warehousing, adequate space shall be provided at receiving points to permit the staging of reusable transport containers for supplies moving from central warehouses to individual receiving sites.

6.5.2 General Stores

In addition to supply facilities in individual departments, a central storage area shall be provided.

6.5.2.1 General

General stores may be located in a separate building on site with provisions for protection against inclement weather during transfer of supplies. The following shall be provided:

6.5.2.2 General storage room(s)

(1) Location. Location of storage in separate, concentrated areas within the institution or in one or more individual buildings on site shall be permitted. Off-site location for a portion of this storage shall be permitted.

(2) Space requirements. General storage room(s) with a total area of not less than 20 square feet (1.86 square meters) per inpatient bed shall be provided.

6.5.2.3 Additional storage areas for outpatient facilities

(1) Location. Location of additional storage areas in combination with and in addition to the general stores, or in a central area within the outpatient department, shall be permitted. Off-site location for a portion of this storage shall also be permitted.

(2) Space requirements. Additional storage areas for outpatient facilities shall be provided in an amount not less than 5 percent of the total area of those facilities.

6.5.3 Waste Management

***6.5.3.1** Collection and storage. Waste collection and storage locations shall be determined by the facility as a component of the functional program.

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A6.5.1.2 (1) The receiving area should be located to promote the safe, secure, and efficient movement of arriving materials without compromising patient areas.

(1) Location

(a) The location of compactors, balers, sharps, and recycling container staging at docks or other waste removal areas shall be stipulated by the functional program.

(b) 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

(a) The functional program shall stipulate the categories and volumes of waste for disposal and the methods of handling and disposal of waste.

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

(3) Regulated waste storage spaces

(a) 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.

(b) Refrigeration requirements for such storage facilities shall comply with state and/or local regulations.

6.5.3.2 Refuse chutes. If provided, these shall meet or exceed the following standards:

(1) Chutes shall meet the provisions described in NFPA 82.

(2) Service openings to chutes shall comply with NFPA 101.

(3) Chute discharge into collection rooms shall comply with NFPA 101.

(4) The minimum cross-sectional dimension of gravity chutes shall be 2 feet (60.96 centimeters).

Note: See Section 2.1-9.3 for text on waste processing.

6.6 Environmental Services

6.6.1 Facilities for Cleaning and Sanitizing Carts

Facilities shall be provided to clean and sanitize carts

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A6.5.3.1 Collection and storage. 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; protection of 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.

serving the central service department, dietary facilities, and linen services. These facilities shall be permitted to be centralized or departmentalized.

6.6.2 Housekeeping Rooms

In addition to the housekeeping rooms required in certain departments, sufficient housekeeping rooms shall be provided throughout the facility to maintain a clean and sanitary environment.

6.6.2.1 Number. There shall not be fewer than one housekeeping room for each floor.

6.6.2.2 Facility requirements. Each shall contain a floor receptor or service sink and storage space for housekeeping equipment and supplies.

6.7 Engineering Services and Maintenance

6.7.1 General

Sufficient space shall be included in all mechanical and electrical equipment rooms for proper maintenance of equipment. Provisions shall also be made for removal and replacement of equipment. The following shall be provided:

6.7.2 Equipment Locations

Room(s) or separate building(s) shall be provided for boilers, mechanical, and electrical equipment, except:

6.7.2.1 Rooftop air conditioning and ventilation equipment installed in weatherproof housings

6.7.2.2 Standby generators where the engine and appropriate accessories (i.e., batteries) are properly heated and enclosed in a weatherproof housing

6.7.2.3 Cooling towers and heat rejection equipment

6.7.2.4 Electrical transformers and switchgear where required to serve the facility and where installed in a weatherproof housing

6.7.2.5 Medical gas parks and equipment

6.7.2.6 Air-cooled chillers where installed in a weatherproof housing

6.7.2.7 Trash compactors and incinerators

6.7.2.8 Site lighting, post indicator valves, and other equipment normally installed on the exterior of the building

6.7.3 Engineer's Office

This shall have file space and provisions for protected storage of facility drawings, records, manuals, etc.

6.7.4 General Maintenance Shop(s)

These shall be provided to accommodate repair and maintenance requirements.

6.7.5 Medical Equipment Shop

A separate area or room shall be provided specifically for storage, repair, and testing of electronic and other medical equipment. The amount of space and type of utilities will vary with the type of equipment involved and types of outside contracts used, as specified in the functional program.

6.7.6 Equipment and Supply Storage

6.7.6.1 Supply storage

(1) A storage room shall be provided for building maintenance supplies.

(2) Storage for solvents and flammable liquids shall comply with applicable NFPA codes.

6.7.6.2 Outdoor equipment storage. Yard equipment and supply storage areas shall be provided. These shall be located so that equipment may be moved directly to the exterior without interference with other work.

7 Administrative and Public Areas

7.1 Public Areas

The following shall be provided:

7.1.1 Entrance

This shall be at grade level, sheltered from inclement weather, and accessible to the disabled.

7.1.2 Lobby

This shall include:

7.1.2.1 A counter or desk for reception and information

7.1.2.2 Public waiting area(s)

7.1.2.3 Public toilet facilities

7.1.2.4 Public telephones

7.1.2.5 Provisions for drinking water

7.1.3 Public Waiting Areas

All public waiting areas serving more than 15 people shall include toilet room(s) equipped with hand-washing stations. These toilet rooms shall be located near the waiting areas and may serve more than one such area.

7.2 Administrative and Related Support Areas

The following shall be provided:

7.2.1 Admissions Area

If required by the functional program for initial admission of inpatients, the area shall include:

7.2.1.1 A separate waiting area for patients and accompanying persons

7.2.1.2 A work counter or desk for staff

7.2.1.3 Wheelchair storage. A storage area for wheelchairs shall be provided out of the path of normal traffic.

7.2.2 Interview Space(s)

These shall include provisions for private interviews relating to social service, credit, and admissions.

7.2.3 General or Individual Office(s)

These shall be provided for business transactions, medical and financial records, and administrative and professional staff.

7.2.4 Multipurpose Room(s)

These shall be provided for conferences, meetings, and health education purposes, and shall include provisions for the use of visual aids. Several services shall be permitted to share one multipurpose room.

7.2.5 Medical Records

Rooms, areas, or offices for the following personnel and/or functions shall be provided:

7.2.5.1 Medical records administrator/technician

7.2.5.2 Review and dictation

7.2.5.3 Sorting, recording, or microfilming records

7.2.5.4 Record storage

7.2.6 Equipment and Supply Storage

Storage shall be provided for office equipment and supplies.

7.2.7 Support Areas for Employees and Volunteers

Lockers, lounges, toilets, etc. shall be provided for employees and volunteers. These shall be in addition to, and separate from, those required for medical staff and the public.

8 Construction Standards

8.1 Design and Construction, including Fire-Resistant Standards

8.1.1 Building Codes

8.1.1.1 General. Every building and portion thereof shall be designed and constructed to sustain all live and dead loads, including seismic and other environmental forces, in accordance with accepted engineering practices and standards as prescribed by local jurisdiction or the International Building Code or NFPA 5000, Building Construction and Safety Code. (See Sections 1.1-1.3.2 through 1.1-1.3.4.)

8.1.1.2 Freestanding buildings. Separate freestanding buildings for the boiler plant, laundry, shops, general storage, or other nonpatient contact areas shall be built in accordance with applicable building codes for such occupancy.

8.1.2 Construction Requirements

***8.1.2.1** General. Construction shall comply with the applicable requirements of NFPA 101, the standards

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A8.1.2.1 NFPA 101 generally covers fire/safety requirements only, whereas the building codes also apply to structural elements. The fire/safety items of NFPA 101 would take precedence over other codes in case of conflict. Appropriate application of each would minimize problems.

contained herein, and the requirements of authorities having jurisdiction. If there are no applicable local codes, the International Building Code or NFPA 5000 shall be used (see Section 1.1-7).

8.1.2.2 Fire prevention/protection measures. Compartmentation, exits, fire alarms, automatic extinguishing systems, and other fire prevention and fire protection measures, including those within existing facilities, shall comply with NFPA 101, with the following stipulation. The Fire-Safety Evaluation System (FSES) is permitted, subject to AHJ approval, in new construction and renovation. (The FSES is intended as an evaluation tool for fire safety only.) See Section 1.1-7 for exceptions.

Note: For most projects it is essential that third-party reimbursement requirements also be followed. Verify where these may be in excess of standards in these Guidelines.

8.1.2.3 Interior finishes. Interior finishing materials shall comply with the flame-spread limitations and the smoke-production limitations indicated in NFPA 101. This requirement does not apply to minor quantities of wood or other trim (see NFPA 101) or to wall covering less than 4 mil thick applied over a noncombustible base.

8.1.2.4 Insulation materials. Building insulation materials, unless sealed on all sides and edges with noncombustible material, 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.

8.1.3 Provisions for Disasters

See also Section 1.1-5.

8.1.3.1 General

(1) Unless specifically approved, hospitals shall not be built in areas subject to damage or inaccessibility due to natural floods.

(2) Where facilities may be subject to wind or water hazards, provision shall be made to ensure continuous operation.

8.1.3.2 Emergency communication system. An emergency-radio communication system shall be provided in each facility.

(1) This system shall operate independently of the building's service and emergency power systems during emergencies.

(2) The system shall have frequency capabilities to communicate with state emergency communication networks.

(3) Additional communication capabilities are required of facilities containing a formal community emergency-trauma service or other specialty services (such as regional pediatric critical care units) that utilize staffed patient transport units.

8.2 General Standards for Details and Finishes

8.2.1 General

8.2.1.1 New construction. Details and finishes in new construction projects, including additions and alterations, shall comply with the following standards (see Section 1.1-3 concerning existing facilities where total compliance is structurally impractical).

***8.2.1.2** Renovation. If approved by the authorities having jurisdiction, retained portions of existing facilities that are not required to be totally modernized due to financial or other hardships shall be permitted, as a minimum, to comply with applicable requirements of the Existing Health Care Occupancies Section of NFPA 101.

8.2.2 Details

8.2.2.1 Corridor width

(1) In outpatient suites and in areas not commonly used for patient bed or stretcher transportation, reduction of corridor width to 5 feet (1.52 meters) shall be permitted.

(2) Location of items such as drinking fountains, telephone booths, vending machines, and portable

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A8.2.1.2 A plan of correction for these portions of existing facilities should be developed and implemented.

equipment shall not restrict corridor traffic or reduce the corridor width below the minimum standard.

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

(1) Corridors, storage rooms, toilet rooms, etc. Ceilings in these spaces shall be not less than 7 feet 8 inches (2.34 meters) in height. Ceiling heights in small, normally unoccupied spaces may be reduced.

(2) Rooms with ceiling-mounted equipment/light fixtures. Ceilings in radiographic, operating, and delivery rooms, and other rooms containing ceiling-mounted equipment or ceiling-mounted surgical light fixtures, shall be of sufficient height to accommodate the equipment or fixtures and their normal movement.

(3) Seclusion treatment rooms. These rooms shall have a minimum ceiling height of 9 feet (2.74 meters).

(4) Boiler rooms. Boiler rooms shall have ceiling clearances not less than 2 feet 6 inches (76.20 centimeters) above the main boiler header and connecting piping.

(5) Clearances

(a) Suspended tracks, rails, and pipes located in the traffic path for patients in beds and/or on stretchers, including those in inpatient service areas, shall be not less than 7 feet (2.13 meters) above the floor. Clearances in other areas may be 6 feet 8 inches (2.03 meters).

(b) Where existing structures make the above ceiling clearance impractical, clearances shall be as required to avoid injury to individuals up to 6 feet 4 inches (1.93 meters) tall.

8.2.2.3 Doors

(1) Door type

(a) All doors between corridors, rooms, or spaces subject to occupancy, except elevator doors, shall be of the swing type.

(b) Manual or automatic sliding doors may be exempt from this standard where fire and other emergency exiting requirements are not compromised and where cleanliness of surfaces can be maintained.

(2) Door size

(a) General. Where used in these Guidelines, door width and height shall be the nominal dimension of the door leaf, ignoring projections of frame and stops. **Note:** Although these standards are intended to accommodate access by patients and patient equipment, size of office furniture, etc., shall also be considered.

(b) Inpatient bedrooms

(i) New construction. The minimum door size for inpatient bedrooms in new work shall be 3 feet 8 inches (1.12 meters) wide and 7 feet (2.13 meters) high to provide clearance for movement of beds and other equipment.

(ii) Renovation. Existing doors of not less than 2 feet 10 inches (86.36 centimeters) wide may be considered for acceptance where function is not adversely affected and replacement is impractical.

(c) Rooms for stretchers/wheelchairs. Doors to other rooms used for stretchers (including hospital wheeled-bed stretchers) and/or wheelchairs shall have a minimum width of 2 feet 10 inches (86.36 centimeters).

(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 might obstruct traffic flow or reduce the required corridor width. (Large walk-in-type closets are considered inhabitable spaces.)

(4) Door hardware

(a) Patient bathing/toilet facilities

(i) Rooms that contain bathtubs, sitz baths, showers, and/or water closets for inpatient use shall be equipped with doors and hardware permitting emergency access from the outside.

(ii) When such rooms have only one opening or are small, the doors shall open outward or in a manner that will avoid pressing a patient who may have collapsed within the room.

(iii) Similar considerations may be desirable for certain outpatient services.

(b) Patient toilet rooms in psychiatric units. If required by the functional program, design of door hardware on patient toilet rooms in psychiatric nursing units shall be permitted to allow staff to control access.

8.2.2.4 Thresholds and expansion joints

(1) Thresholds and expansion joint covers shall be flush with the floor surface to facilitate the use of wheelchairs and carts.

(2) Expansion and seismic joints shall be constructed to restrict the passage of smoke.

8.2.2.5 Windows

(1) Operable windows. Operable windows are not required in patient rooms. If operable windows are provided in patient rooms or suites, operation of such windows shall be restricted to inhibit possible escape or suicide.

8.2.2.6 Insect screens. Windows and outer doors that frequently may be left open shall be equipped with insect screens.

8.2.2.7 Glazing materials

Note: Provisions of this section concern safety from hazards of breakage. NFPA 101 contains additional requirements for glazing in exit corridors, etc., especially in buildings without sprinkler systems.

(1) Safety glass; wired glass; or plastic, break-resistant material that creates no dangerous cutting edges when broken shall be used in the following:

(a) Glass doors, lights, sidelights, borrowed lights, and windows located within 12 inches (30.48 centimeters) of a door jamb (with a bottom-frame height of less than 5 feet or 1.52 meters above the finished floor)

(b) Wall openings in active areas such as recreation and exercise rooms, unless otherwise required for fire safety

(2) Safety glass–tempered or plastic glazing materials shall be used for the following:

(a) Shower doors and bath enclosures

(b) Interior windows and doors, including those in pediatric and psychiatric unit corridors

(3) Flame-spread ratings. Plastic and similar materials used for glazing shall comply with the flame-spread ratings of NFPA 101.

(4) Renovation. In renovation projects, only glazing within 1 foot 6 inches (45.72 centimeters) of the floor must be changed to safety glass, wire glass, or plastic, break-resistant material.

8.2.2.8 Hand-washing stations

(1) Fittings. Location and arrangement of fittings for hand-washing stations shall permit their proper use and operation. Particular care shall be given to the clearances required for blade-type operating handles.

(2) Mirrors. Mirrors shall not be installed at hand-washing stations in food preparation areas, nurseries, clean and sterile supply areas, scrub sinks, or other areas where asepsis control would be lessened by hair combing.

(3) Provisions for hand drying

(a) Provisions for hand drying shall be included at all hand-washing stations except scrub sinks.

(b) These provisions shall be paper or cloth units enclosed to protect against dust or soil and to ensure single-unit dispensing. Hot air dryers shall be permitted provided that installation precludes possible contamination by recirculation of air.

(4) Anchoring. Lavatories and hand-washing stations shall be securely anchored to withstand an applied vertical load of not less than 250 pounds (113.4 kilograms) on the fixture front.

8.2.2.9 Grab bars. Grab bars shall be provided in all patient toilets, showers, bathtubs, and sitz baths at a wall clearance of 1-1/2 inches (3.81 centimeters). Bars, including those that are part of such fixtures as soap dishes, shall be sufficiently anchored to sustain a concentrated load of 250 pounds (113.40 kilograms).

8.2.2.10 Radiation protection

(1) Radiation protection requirements for x-ray and gamma ray installations shall conform with NCRP Report Nos. 33 and 49 and all applicable local requirements. Testing is to be coordinated with local authorities to prevent duplication of test observations or construction inspections.

(2) Provision shall be made for testing completed installations before use. All defects shall be corrected before approval.

8.2.2.11 Noise control

(1) Recreation rooms, exercise rooms, equipment rooms, and similar spaces where impact noises may be generated shall not be located directly over patient bed areas or delivery and operating suites, unless special provisions are made to minimize such noise.

(2) The noise reduction criteria shown in Table 2.1-1 shall apply to partitions, floors, and ceiling construction in patient areas.

8.2.2.12 Temperature control. Rooms containing heat-producing equipment, such as boiler or heater rooms or laundries, shall be insulated and ventilated to prevent the floor surface above and/or the adjacent walls of occupied areas from exceeding a temperature of 10°F (6°C) above ambient room temperature.

8.2.3 Finishes

8.2.3.1 Noncombustible or flame-retardant materials

(1) Cubicle curtains and draperies shall be noncombustible or flame-retardant and shall pass both the large- and small-scale tests of NFPA 701 when applicable.

(2) Materials and certain plastics known to produce noxious gases when burned shall not be used for mattresses, upholstery, and other items insofar as practical.

8.2.3.2 Floors

(1) Floor materials shall be easily cleanable and appropriately wear-resistant for the location.

(a) Floors in areas used for food preparation or food assembly shall be water-resistant.

(b) Floor surfaces, including tile joints, shall be resistant to food acids.

(c) In all areas subject to frequent wet-cleaning methods, floor materials shall not be physically affected by germicidal cleaning solutions.

(2) Floors subject to traffic while wet (such as shower and bath areas, kitchens, and similar work areas) shall have a nonslip surface.

(3) In new construction or major renovation work, the floors and wall bases of all operating rooms and any delivery rooms used for cesarean sections shall be monolithic and joint free.

(4) The floors and wall bases of kitchens, soiled workrooms, and other areas subject to frequent wet cleaning shall also be homogenous, but may have tightly sealed joints.

(5) Floors in areas and rooms in which flammable anesthetic agents are stored or administered shall comply with NFPA 99.

8.2.3.3 Walls

(1) Wall finishes. Wall finishes shall be washable. In the vicinity of plumbing fixtures, wall finishes shall be smooth and water-resistant.

(2) Dietary and food preparation areas. In these areas, wall construction, finish, and trim, including the joints between the walls and the floors, shall be free of insect- and rodent-harboring spaces.

(3) Operating rooms, cesarean delivery rooms, isolation rooms, and sterile processing rooms. In these rooms, wall finishes shall be free of fissures, open joints, or crevices that may retain or permit passage of dirt particles.

8.2.3.4 Ceilings

(1) Ceilings, including exposed structure in areas normally occupied by patients or staff in food preparation and food storage areas, shall be cleanable with routine housekeeping equipment. Acoustic and lay-in ceiling, where used, shall not interfere with infection control.

(2) In dietary areas and in other areas where dust fallout may present a problem, suspended ceilings shall be provided.

(3) Semirestricted areas

(a) Ceiling finishes in semirestricted areas such as airborne infection isolation rooms, protective environment rooms, clean corridors, central sterile supply spaces, specialized radiographic rooms, and minor surgical procedure rooms shall be smooth, scrubbable, nonabsorptive, nonperforated, capable of withstanding cleaning with chemicals, and without crevices that can harbor mold and bacterial growth.

(b) If lay-in ceiling is provided, it shall be gasketed or clipped down to prevent the passage of particles from the cavity above the ceiling plane into the semirestricted environment. Perforated, tegular, serrated cut, or highly textured tiles are not acceptable.

(4) Restricted areas. Ceiling finishes in restricted areas such as operating rooms shall be monolithic, scrubbable, and capable of withstanding chemicals. Cracks or perforations in these ceilings are not allowed.

8.2.3.5 Penetrations. Floors and walls penetrated by pipes, ducts, and conduits shall be tightly sealed to minimize entry of rodents and insects. Joints of structural elements shall be similarly sealed.

8.2.3.6 Psychiatric patient locations. In psychiatric patient rooms, toilets, and seclusion rooms, the ceiling and air distribution devices, lighting fixtures, sprinkler heads, and other appurtenances shall be of a tamper-resistant type.

8.2.3.7 Protective isolation locations. Rooms used for protective isolation and anterooms adjacent to rooms used for protective isolation shall have seamless flooring with integral coved base.

9 Special Systems

9.1 General

9.1.1 Testing

9.1.1.1 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.

9.1.1.2 Test results shall be documented for maintenance files.

9.1.2 Documentation

9.1.2.1 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, a parts lists, and complete procurement information including equipment numbers and descriptions.

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

9.1.3 Insulation

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

9.2 Elevators

9.2.1 General

All hospitals having patient facilities (such as bedrooms, dining rooms, or recreation areas) or critical services (such as operating, delivery, diagnostic, or therapeutic areas) located on other than the grade-level entrance floor shall have electric or hydraulic elevators.

9.2.2 Number

In the absence of an engineered traffic study, the following guidelines for number of elevators shall apply:

9.2.2.1 At least two hospital-type elevators shall be installed where 1 to 59 patient beds are located on any floor other than the main entrance floor.

9.2.2.2 At least two hospital-type elevators shall be installed where 60 to 200 patient beds are located on floors other than the main entrance floor, or where the major inpatient services are located on a floor other than those containing patient beds. (Reduction in elevator service shall be permitted for those floors providing only partial inpatient services.)

9.2.2.3 At least three hospital-type elevators shall be installed where 201 to 350 patient beds are located on floors other than the main entrance floor, or where the major inpatient services are located on a floor other than those containing patient beds. (Reduction in elevator service shall be permitted for those floors providing only partial inpatient services.)

9.2.2.4 For hospitals with more than 350 beds, the number of elevators shall be determined from a study of the hospital plan and the expected vertical transportation requirements.

9.2.3 Dimensions and Clearances

9.2.3.1 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.

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

9.2.3.3 In renovations, an increase in the size of existing elevators shall not be required if the elevators can accommodate patient beds used in the facility.

9.2.3.4 Additional elevators installed for visitors and material handling shall be permitted to be smaller than noted above, within restrictions set by standards for disabled access.

9.2.4 Leveling Device

Elevators shall be equipped with a two-way automatic level-maintaining device with an accuracy of ± 1/4 inch (± 6.35 millimeters).

9.2.5 Elevator Controls

9.2.5.1 Each elevator, except those for material handling, shall be equipped with an independent keyed switch for staff use for bypassing all landing button calls and responding to car button calls only.

***9.2.5.2** 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.

9.2.6 Installation and Testing

9.2.6.1 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/SEI 7 for seismic design and control systems requirements for elevators.)

9.2.6.2 Documentation. Field inspections and tests shall be made and the owner shall be furnished with

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A9.2.3.2 Elevator car doors should have a clear opening of not less than 4.5 feet (1.37 meters).

A9.2.5.2 This is so the light control feature will be overridden or disengaged should it encounter smoke at any landing.

written certification stating that the installation meets the requirements set forth in this section as well as all applicable safety regulations and codes.

9.3 Waste Processing

For waste collection and storage and refuse chute requirements, see Section 2.1-6.5.3.

9.3.1 Waste Treatment and Disposal

***9.3.1.1** 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.

9.3.1.2 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.

(2) Space requirements. These 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.

9.3.2 Nuclear Waste Disposal

See Code of Federal Regulations, Title X, parts 20 and 35, concerning the handling and disposal of nuclear materials in health care facilities.

10 Building Systems

10.1 Plumbing

10.1.1 General

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

10.1.2 Plumbing and Other Piping Systems

10.1.2.1 General piping and valves

(1) All piping, except control-line tubing, shall be identified.

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A9.3.1.1 The EPA has identified medical waste incineration as a significant contributor to air pollution worldwide.

a. Health care facilities should seek to minimize incineration of medical waste, consistent with local and state regulations and public health goals.

b. 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) All valves shall be tagged, and a valve schedule shall be provided to the facility owner for permanent record and reference.

(3) No plumbing piping 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.

10.1.2.2 Hemodialysis/hemoperfusion piping

(1) In new construction and renovation in any hospital where hemodialysis or hemoperfusion is routinely performed, a separate water supply and a drainage facility that does not interfere with hand-washing shall be provided.

(2) When the functional program includes hemodialysis, continuously circulated filtered cold water shall be provided. Piping shall be in accordance with AAMI RD6.2.

10.1.2.3 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 shall be 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 laboratories, housekeeping sinks, bedpan-flushing attachments, autopsy tables, etc.

(4) Bedpan-flushing devices. Bedpan-flushing devices (may be cold water) shall be provided in each inpatient toilet room; however, installation is optional in psychiatric and alcohol-abuse units where patients are ambulatory.

(5) Potable water storage. Potable water storage vessels (hot and cold) not intended for constant use shall not be installed.

(6) Emergency eyewash and showers shall comply with ANSI Z358.1.

10.1.2.4 Hot water systems. See Section 1.6-2.1.2.1.

10.1.2.5 Drainage systems

(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 and delivery rooms, nurseries, 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 and delivery 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) Kitchen grease traps

(a) Grease traps shall be of capacity required.

(b) Grease traps shall be located and arranged to permit easy access without the need to enter food preparation or storage areas.

(c) Grease traps 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.

10.1.2.6 Condensate drains. See Section 1.6-2.1.2.2.

10.1.3 Plumbing Fixtures

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

10.1.3.1 Clinical sinks

(1) Clinical sinks shall be trimmed with valves that can be operated without hands. Single-lever or wrist blade devices shall be permitted. 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.

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

10.1.4 Medical Gas and Vacuum Systems

10.1.4.1 Medical gas 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.)

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A10.1.2.5 (2)(b) Floor drains in cystoscopy operating rooms have been shown to disseminate a heavily contaminated spray during flushing. Unless flushed regularly with large amounts of fluid, the trap tends to dry out and permit passage of gases, vapors, odors, insects, and vermin directly into the operating room.

For new construction, if the users insist on a floor drain, the drain plate should be located away from the operative site, and should be over a frequently flushed nonsplash, horizontal-flow type of bowl, preferably with a closed system of drainage. Alternative methods include (a) an aspirator/trap installed in a wall connected to the collecting trough of the operating table by a closed, disposable tube system, or (b) a closed system using portable collecting vessels. (See NFPA 99.)

10.1.4.2 Vacuum systems

(1) Clinical vacuum system installations shall be in accordance with NFPA 99. (See Table 2.1-5 for rooms that require station outlets.)

(2) The vacuum discharge shall be located at least 25 feet from all outside air intakes, doors, and operable windows.

10.2 Heating, Ventilating, and Air-Conditioning (HVAC) Systems

*10.2.1 General

***10.2.1.1** Mechanical system design

(1) Efficiency. The mechanical system shall be designed for overall efficiency and appropriate life-cycle cost. 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 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 herein are intended to maximize appropriate use of those 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 used for heating and cooling

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A10.2.1 Remodeling and work in existing facilities may present special problems. As practicality and funding permit, existing insulation, weather stripping, etc., should be brought up to standard for maximum economy and efficiency. Consideration should be given to additional work that may be needed to achieve this.

A10.2.1.1 Protection of HVAC systems against chemical, biological, and radiological attack should be considered. System design features that should be evaluated include protection of outside air intakes, location of return air grilles, and types of filtration. The following documents provide additional information regarding these issues:

a. "Guidance for Protecting Building Environments from Airborne Chemical, Biological, or Radiological Attacks," Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health, May 2002.

b. "Protecting Buildings and their Occupants from Airborne Hazards" (draft), Army Corps of Engineers, TI 853-01, October 2001.

A10.2.1.1 (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.

purposes, such as 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 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.

***10.2.1.2** Ventilation and space conditioning requirements. All rooms and areas 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. 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.

10.2.1.3 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.

10.2.2 Requirements for Specific Locations

10.2.2.1 Airborne infection isolation rooms. The infectious disease isolation room is used for isolating the airborne spread of infectious diseases, such as measles, varicella, or tuberculosis.

(1) The design of airborne infection isolation rooms (AIIRs) shall be permitted to include provisions for normal patient care during periods not requiring isolation precautions.

(2) Use of supplemental recirculating devices shall be permitted in the patient room to increase the equivalent room air exchanges; however, such recirculating devices do not provide outside air

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A10.2.1.2 Owing to potential operational problems for the ultraviolet germicidal irradiation (UVGI) lamps, and the fact that the effectiveness of UVGI is dependent on the airflow pattern in the room, use of UVGI may be considered as a supplement to the ventilation system design, rather than the main control mechanism. The ACH of the room should therefore be set as if no UVGI system is installed.

requirements. Recirculation of air within individual isolation rooms shall be permitted if HEPA filters are used.

(3) Rooms with reversible airflow provisions for the purpose of switching between protective environment and AII functions are not acceptable.

10.2.2.2 Protective environment rooms. The protective environment (PE) room is used to protect the patient from common environmental airborne infectious microbes (i.e., Aspergillus spores).

(1) These special ventilation areas shall be designed to provide directed airflow from the cleanest patient care area to less clean areas.

(2) These rooms shall be protected with HEPA filters at 99.97 percent efficiency for a 0.3 µm sized particle in the supply airstream. These interrupting filters protect patient rooms from maintenance-derived release of environmental microbes from the ventilation system components. Recirculation HEPA filters can be used to increase the equivalent room air exchanges.

(3) Constant volume airflow is required for consistent ventilation for the protected environment.

(4) If the facility determines that airborne infection isolation is necessary for protective environment patients, an anteroom shall be provided.

(5) Rooms with reversible airflow provisions for the purpose of switching between protective environment and airborne infection isolation functions are not acceptable.

10.2.2.3 Psychiatric patient areas. Special consideration shall be given to the type of heating and cooling units, ventilation outlets, and appurtenances installed in patient-occupied areas of psychiatric units. The following shall apply:

(1) All air grilles and diffusers shall be of a type that prohibits the insertion of foreign objects. All exposed fasteners shall be tamper-resistant.

(2) All convector or HVAC enclosures exposed in the room shall be constructed with rounded corners and shall have enclosures fastened with tamper-resistant screws.

(3) HVAC equipment shall be of a type that minimizes the need for maintenance within the room.

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A10.2.2.4 (3)(a) Operating and delivery room ventilation

a. The operating and delivery room ventilation systems should operate at all times to maintain the air movement relationship to adjacent areas. The cleanliness of the spaces is compromised when the ventilation system is shut down. For example, airflow from a less clean space such as the corridor can occur, and standing water can accumulate in the ventilation system (near humidifiers or cooling coils).

b. The recommended air change rate in an operating room is 20 to 25 air changes per hour (ACH) for ceiling heights between 9 feet (2.74 meters) and 12 feet (3.66 meters).

c. The system should provide a single directional flow regime, with both high and low exhaust locations.

d. A face velocity of around 25 to 35 fpm (0.13 to 0.18 m/s) is sufficient from the non-aspirating diffuser array provided the array size itself is set correctly. The non-aspirating diffuser array size should be set appropriately such that it covers at least the area footprint of the table plus a reasonable margin around it. In the cited study, this margin is 21 inches (53.34 centimeters) on the short side and 12 inches (25.40 centimeters) on the long side.

Note: The above conclusions were derived from studies conducted by the National Institutes of Health: Farhad Memarzadeh and Andrew P. Manning, "Comparison of Operating Room Ventilation Systems in the Protection of the Surgical Site" (ASHRAE Transactions 2002, Vol. 108, pt. 2) and Farhad Memarzadeh and Zheng Jiang, "Effect of Operation Room Geometry and Ventilation System Parameter Variations on the Protection of the Surgical Site" (IAQ 2004).

e. If additional diffusers are required, they may be located outside this central diffuser array. Up to 30 percent of the central diffuser array may be allocated to non-diffuser items (medical gas columns, lights, etc.).

10.2.2.4 Operating and delivery rooms

(1) Air supply

(a) In new construction and major renovation work, air supply for operating and delivery rooms shall be from non-aspirating ceiling diffusers with a face velocity in the range of 25 to 35 fpm (0.13 to 0.18 m/s), located at the ceiling above the center of the work area. Return air shall be near the floor level, at a minimum. Return air shall be permitted high on the walls, in addition to the low returns.

(b) Each operating and delivery room shall have at least two return-air inlets located as far from each other as practical.

(c) Turbulence and other factors of air movement shall be considered to minimize the fall of particulates onto sterile surfaces.

(2) Temperature. Temperature shall be individually controlled for each operating and delivery room.

(3) Ventilation rates

*(a) Operating and delivery room ventilation systems shall operate at all times, except during maintenance and conditions requiring shutdown by the building's fire alarm system.

(b) During unoccupied hours, operating and delivery room air change rates may be reduced, provided the positive room pressure is maintained as required in Table 2.1-2.

(4) Standards for special procedures. Where extraordinary procedures, such as organ transplants, justify special designs, installation shall properly meet performance needs as determined by applicable standards. These special designs should be reviewed on a case-by-case basis.

10.2.2.5 Cough-inducing procedure rooms. Rooms used for sputum induction, aerosolized pentamadine 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.

10.2.2.6 Anesthesia storage rooms. The ventilation system for anesthesia storage rooms shall conform to the requirements of NFPA 99, including the gravity option. Mechanically operated air systems are optional in these rooms.

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

(1) A dedicated (not connected to a return air or other exhaust system) 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, and the space above the sterilizer door, as well as 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 to which the sterilizer(s) discharges 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.

10.2.2.8 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.

(4) Food preparation centers shall have ventilation systems whose air supply mechanisms are interfaced appropriately with exhaust hood controls or relief vents so that exfiltration or infiltration to or from exit corridors does not compromise the exit corridor restrictions of NFPA 90A or the pressure requirements of NFPA 96.

10.2.2.9 Fuel-fired equipment rooms. Rooms with fuel-fired equipment shall be provided with sufficient outdoor air to maintain equipment combustion rates and to limit workstation temperatures.

10.2.3 Thermal Insulation and Acoustical Provisions

See Section 1.6-2.2.1.

10.2.4 HVAC Air Distribution

10.2.4.1 Return air systems. For patient care areas, return air shall be via ducted systems.

10.2.4.2 HVAC ductwork. See Section 1.6-2.2.2.1.

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A10.2.4.3 (2) Acceptable concentrations of anesthetizing agents are unknown at this time. The absence of specific data makes it difficult to set specific standards. However, any scavenging system should be designed to remove as much of the gas as possible from the room environment. It is assumed that anesthetizing equipment will be selected and maintained to minimize leakage and contamination of room air. See Industrial Ventilation: A Manual of Recommended Practice, published by the American Conference of Governmental Industrial Hygienists (www.acgih.org), for additional information.

10.2.4.3 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.

(d) Airborne infection isolation rooms shall not be served by exhaust systems incorporating a heat wheel.

*(2) Anesthesia scavenging systems

(a) Each space routinely used for administering inhalation anesthesia and inhalation analgesia shall be served by a scavenging system to vent waste gases.

(b) When anesthesia scavenging systems are required, air supply shall be at or near the ceiling. Return or exhaust air inlets shall be near the floor level.

(c) If a vacuum system is used, the gas-collecting system shall be arranged so it does not disturb patients' respiratory systems.

(d) Gases from the scavenging system shall be exhausted directly to the outside. The anesthesia evacuation system may be combined with the room exhaust system, provided the part used for anesthesia gas scavenging exhausts directly to the outside and is not part of the recirculation system.

(e) Scavenging systems are not required for areas where gases are used only occasionally, such as the emergency department, offices for routine dental work, etc.

10.2.4.4 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.

(4) Construction requirements. The bottoms of air distribution devices (supply/return/exhaust) shall be at least 3 inches (7.62 centimeters) above the floor.

10.2.4.5 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), supplementary makeup air (filtered and preheated) 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 outdoor 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 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.

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A10.2.4.4 (1) Requirements to minimize cross-contamination between fresh air intakes and various exhaust outlets may be determined by engineering modeling or calculations performed in accordance with the *ASHRAE Handbook—Fundamentals.*

(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) Each hood shall have a minimum face velocity of 90 to 110 feet per minute (0.45 to 0.56 meters per second) with suitable pressure-independent air-modulating devices and alarms to alert staff of fan shutdown or loss of airflow.

(ii) Each shall also have filters with a 99.97 percent efficiency (based on the DOP test method) in the exhaust stream and 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) Fume hoods intended for use with radioactive isotopes shall be constructed of stainless steel or other material suitable for the particular exposure and 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.

10.2.5 HVAC Filters

10.2.5.1 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.

10.2.5.2 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.

10.2.5.3 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.

10.2.5.4 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.

10.2.5.5 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 to the manometer for field testing.

10.2.6 Steam and Hot Water Systems

See Section 1.6-2.2.3.

10.3 Electrical Systems

10.3.1 General

10.3.1.1 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.

(3) Field labeling of equipment and materials shall be permitted only when provided by a nationally recognized testing laboratory that has been certified by the Occupational Safety and Health Administration (OSHA) for that referenced standard.

10.3.1.2 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.

10.3.2 Electrical Requirements for Specific Hospital Locations

10.3.2.1 Inhalation anesthetizing locations. At inhalation anesthetizing locations, all electrical equipment and devices, receptacles, and wiring shall comply with applicable sections of NFPA 99 and NFPA 70.

10.3.3 Electrical Distribution and Transmission

10.3.3.1 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, and away from traffic lanes.

(c) Switchboards shall be located in a dry, ventilated space free of corrosive or explosive fumes, gases, or any flammable material.

(2) Overload protective devices. These shall operate properly in ambient room temperatures.

10.3.3.2 Panelboards

(1) Panelboards serving critical branch, equipment system, or normal system loads shall be located on the same floor as the loads to be served.

(2) Location of panelboards serving life safety branch loads on the floor above or the floor below the loads to be served shall be permitted.

(3) New panelboards shall not be located in public access corridors.

10.3.3.3 Ground-fault circuit interrupters

(1) Ground-fault circuit interrupters (GFCIs) shall comply with NFPA 70.

(2) When ground-fault circuit interrupters are used in critical areas, provisions shall be made to ensure that other essential equipment is not affected by activation of one interrupter.

10.3.4 Power Generating and Storing Equipment

10.3.4.1 Emergency electrical service

(1) Emergency power shall be provided for in accordance with NFPA 99, NFPA 101, and NFPA 110.

(2) Where stored fuel is required, storage capacity shall permit continuous operation for at least 4 hours.

10.3.5 Lighting

10.3.5.1 General. See Section 1.6-2.3.1.1.

10.3.5.2 Lighting for specific locations in the hospital

(1) Patient rooms. Patient rooms shall have general lighting and night lighting.

(a) A reading light shall be provided for each patient.

(i) Reading light controls shall be accessible to the patient(s) without the patient having to get out of bed.

(ii) Incandescent and halogen light sources that produce heat shall be avoided to prevent burns to the patient and/or bed linen.

(iii) Unless specifically designed to protect the space below, the light source shall be covered by a diffuser or lens.

(iv) Flexible light arms, if used, shall be mechanically controlled to prevent the lamp from contacting the bed linen.

(b) At least one night light fixture in each patient room shall be controlled at the room entrance.

(c) Lighting for coronary and intensive care bed areas shall permit staff observation of the patient while minimizing glare.

(2) Nursing unit corridors. Corridors in nursing units shall have general illumination with provisions for reducing light levels at night.

(3) Exam/treatment/trauma rooms. A portable or fixed examination light shall be provided for examination, treatment, and trauma rooms.

(4) Operating and delivery rooms. Operating and delivery rooms shall have general lighting in addition to special lighting units provided at surgical and obstetrical tables. General lighting and special lighting shall be on separate circuits.

10.3.5.3 Emergency lighting. See Section 1.6-2.3.1.2.

10.3.5.4 Exit signs. See Section 1.6-2.3.1.3.

10.3.6 Equipment

10.3.6.1 X-ray equipment

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A10.3.6.2 Special attention should be paid to safety hazards associated with equipment cabling. Every attempt should be made to minimize these hazards, where practical.

A10.3.6.3 Refer to NFPA 99 for a description of the essential electrical system.

(1) Fixed and mobile x-ray equipment installations shall conform to articles 517 and 660 of NFPA 70.

(2) The x-ray film illuminator unit or units for displaying at least two films simultaneously shall be installed in each operating room, specified emergency treatment rooms, and x-ray viewing room of the radiology department. All illuminator units within one space or room shall have lighting of uniform intensity and color value.

***10.3.6.2** Special electrical equipment. Special equipment is identified in the sections on critical care units, newborn nurseries, pediatric and adolescent unit, psychiatric nursing unit, obstetrical suite, surgical suites, emergency service, imaging suite, nuclear medicine, laboratory suite, rehabilitation therapy department, renal dialysis unit, respiratory therapy service, morgue, pharmacy, dietary facilities, administrative and public areas, medical records, central services, general stores, and linen services. These sections shall be consulted to ensure compatibility between programmatically defined equipment needs and appropriate power and other electrical connection needs.

***10.3.6.3** Hand-washing stations and scrub sinks. If operation of a scrub sink or a hand-washing station in critical care areas, emergency departments, labor and delivery, and surgical suites is dependent on the building electrical service, it shall be connected to the essential electrical system.

10.3.7 Receptacles

10.3.7.1 Receptacles in corridors

(1) 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.

(2) Receptacles in pediatric and psychiatric unit corridors shall be of the tamper-resistant type.

(3) Special receptacles marked for x-ray use shall be installed in corridors of patient areas so that mobile equipment may be used anywhere within a patient room using a cord length of 50 feet (15.24 meters) or less. If the same mobile x-ray unit is used in operating rooms and in nursing

areas, receptacles for x-ray use shall permit the use of one plug in all locations. Where capacitive discharge or battery-powered x-ray units are used, special x-ray receptacles are not required.

10.3.7.2 Receptacles in patient care areas

(1) Patient rooms. Each patient room shall have duplex-grounded receptacles.

(a) There shall be one at each side of the head of each bed; one for television, if used; one on every other wall; and one for each motorized bed.

(b) Receptacles may be omitted from exterior walls where construction or room configuration makes installation impractical.

(2) Intermediate care rooms. These shall have at least four duplex outlets per bed. The outlets shall be arranged to provide two duplex outlets on each side of the head of the bed.

(3) Critical care areas. As defined by NFPA 99 and NFPA 70, including pediatric and newborn intensive care units, critical care areas shall have at least seven duplex outlets at the head of each bed, crib, or bassinet. Approximately 50 percent of critical care outlets shall be connected to emergency system power and be so labeled.

(4) Nurseries. Nurseries shall have at least two duplex-grounded receptacles for each bassinet.

(5) LDRP rooms. LDRP rooms shall have receptacles as required for patient rooms (Section 2.1-10.3.7.2 (1)); in addition, the bassinet shall have receptacles as required for nursery bassinets (Section 2.1-10.3.7.2 (4)).

(6) Trauma and resuscitation rooms. These shall have eight duplex outlets located convenient to the head of each bed.

(7) Emergency department. Examination and treatment rooms in the emergency department shall have a minimum of six duplex outlets located convenient to the head of each bed. Approximately 50 percent of emergency care outlets shall be connected to emergency system power and be so labeled.

(8) Each general care examination and treatment table and each work table shall have access to two duplex receptacles.

(9) Operating and delivery rooms

(a) Each operating and delivery room shall have at least six receptacles convenient to the head of the procedure table.

(b) Each operating room shall have at least 16 simplex or eight duplex receptacles. Where mobile x-ray, laser, or other equipment requiring special electrical configurations is used, additional receptacles distinctively marked for x-ray or laser use shall be provided.

(10) Renal dialysis units

(a) For renal dialysis units, two duplex receptacles shall be on each side of a patient bed or lounge chair.

(b) One duplex receptacle on each side of the bed shall be connected to emergency power.

10.3.7.3 Emergency system receptacles. Electrical receptacle cover plates or electrical receptacles supplied from the emergency systems shall be distinctively colored or marked for identification. If color is used for identification purposes, the same color shall be used throughout the facility.

10.3.8 Call Systems

10.3.8.1 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.

10.3.8.2 Patient room call station. In patient areas, each patient room shall be served by at least one calling station for two-way voice communication.

(1) Each bed shall be provided with a call device. Two call devices serving adjacent beds may be served by one calling station.

(2) Signal location

(a) Calls shall activate a visible signal in the corridor at the patient's door, in the clean workroom, in the soiled workroom, in medication, charting, clean linen storage, nourishment, equipment storage, and examination/treatment room(s) and at the nursing station of the nursing unit.

(b) In multi-corridor nursing units, additional visible signals shall be installed at corridor intersections.

(c) In rooms containing two or more calling stations, indicating lights shall be provided at each station.

(3) Nurse call systems at each calling station shall be equipped with an indicating light that remains lighted as long as the voice circuit is operating.

10.3.8.3 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 that can be turned off only at the patient call station and that is distinct from the regular nurse call signal.

(2) The emergency call shall activate an annunciator panel at the nurse station, a visible signal in the corridor at the patient's door, and at other areas defined by the functional program.

(3) Specific locations in the hospital

(a) Patient toilet and bathing facilities. A nurse emergency call system shall be provided at each inpatient toilet, bath, sitz bath, and shower room. A nurse emergency call shall be accessible to a collapsed patient lying on the floor. Inclusion of a pull cord will satisfy this standard.

(b) Outpatient and treatment areas. Provisions for emergency calls shall be provided in outpatient and treatment areas where patients may be subject to incapacitation.

(c) Imaging suite. Patient toilet rooms within the imaging suite shall be equipped with a nurse emergency call.

(d) Renal dialysis units. Toilet rooms in renal dialysis units shall be served by an emergency call. The call shall activate a signal at the nurses' station.

10.3.8.4 Limited call system. In areas such as critical care, recovery, pre-op, and emergency, where patients are under constant visual surveillance, the nurse call may be limited to the following:

(1) A bedside button or station that activates a signal readily seen at the control station to summon additional assistance (see Section 2.1-10.3.8.5)

(2) An emergency code resuscitation alarm to summon medical assistance from the code team

10.3.8.5 Staff emergency assistance system

(1) Location of call system. An emergency assistance system for staff to summon additional assistance shall be provided in each operating, delivery, recovery, emergency examination, treatment, and intermediate care area, and in critical care units, nurseries, special procedure rooms, cardiac catheterization rooms, stress-test areas, triage, outpatient surgery, admission and discharge areas, and areas for psychiatric patients, including seclusion and security rooms, anterooms and toilet rooms serving them, communal toilet and bathing facility rooms, and dining, activity, therapy, exam, and treatment rooms.

(2) Location of annunciator. This system shall annunciate visibly and audibly in the clean workroom, in the soiled workroom, in medication, charting, clean linen storage, nourishment, equipment storage, and examination/treatment room(s) if provided, and at the nursing station of the nursing unit, with backup to another staffed area from which assistance can be summoned.

10.3.8.6 Emergency resuscitation alarm. In critical care units, recovery, and pre-op, the call system shall include provisions for an emergency code resuscitation alarm to summon assistance from outside the unit.

10.3.8.7 Alarm in psychiatric units. A nurse call is not required in psychiatric nursing units, but if one is included the following shall apply:

(1) Provisions shall be made for easy removal or for covering of call button outlets.

(2) In psychiatric nursing units, all hardware shall have tamper-resistant fasteners.

10.4 Telecommunications and Information Systems

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

10.4.2 A room shall be provided for central equipment locations. Special air conditioning and voltage regulation shall be provided when recommended by the manufacturer.

10.4.3 All patient care-related telecommunications and information systems shall be powered from the essential electrical system.

10.5 Electronic Safety and Security

10.5.1 Electronic Surveillance Systems

Electronic surveillance systems include but are not limited to patient elopement systems, door access/control systems, video/audio monitoring systems, patient location systems, and infant abduction prevention systems.

10.5.1.1 Electronic surveillance systems are not required, but if provided for the safety of the patients, any devices in patient areas need to be mounted so they are unobtrusive and in a tamper-resistant enclosure.

10.5.1.2 Electronic surveillance system monitoring devices need to be located so they are not readily observable by the general public or patients.

10.5.1.3 If installed, electronic surveillance systems shall receive power from the emergency electrical system in the event of a disruption of normal electrical power.

10.5.2 Fire Alarm System

All health care facilities shall be provided with a fire alarm system in accordance with NFPA 101 and NFPA 72.

Table 2.1-1
Sound Transmission Limitations in General Hospitals

	Airborne sound transmission class (STC)[1]	
	Partitions	*Floors*
New construction[2]		
Patient room to patient room	45	40
Public space to patient room[3]	55	40
Service areas to patient room[4]	65	45
Patient room access corridor[5]	45	45
Exam room to exam room	45	--
Exam room to public space	45	--
Toilet room to public space	45	--
Consultation rooms/conference rooms to public space	45	--
Consultation rooms/conference rooms to patient rooms	45	--
Staff lounges to patient rooms	45	--
Existing construction[2]		
Patient room to patient room	35	40
Public space to patient room[3]	40	40
Service areas to patient room[4]	45	45

[1] Sound transmission class (STC) shall be determined by tests in accordance with methods set forth in ASTM E90 and ASTM E413. Where partitions do not extend to the structure above, sound transmission through ceilings and composite STC performance must be considered.

[2] Treatment rooms shall be treated the same as patient rooms.

[3] Public space includes corridors (except patient room access corridors), lobbies, dining rooms, recreation rooms, and similar space.

[4] Service areas for the purposes of this table include kitchens, elevators, elevator machine rooms, laundries, garages, maintenance rooms, boiler and mechanical equipment rooms, and similar spaces of high noise. Mechanical equipment located on the same floor or above patient rooms, offices, nurses stations, and similar occupied space shall be effectively isolated from the floor.

[5] Patient room access corridors contain composite walls with doors/windows and have direct access to patient rooms.

Table 2.1-2

Ventilation Requirements for Areas Affecting Patient Care in Hospitals and Outpatient Facilities[1]

Area designation	*Air movement relationship to adjacent area[2]*	*Minimum air changes of outdoor air per hour[3]*	*Minimum total air changes per hour[4, 5]*	*All air exhausted directly to outdoors[6]*	*Recirculated by means of room units[7]*	*Relative humidity[8] (%)*	*Design temperature[9] (degrees F/C)*
NURSING UNITS							
Patient room	–	2	6[10]	–	–	–	70-75 (21–24)
Toilet room	In	–	10	Yes	–	–	–
Newborn nursery suite	–	2	6	–	No	30-60	72-78 (22-26)
Protective environment room[11]	Out	2	12	–	No	–	75 (24)
Airborne infection isolation room[11]	In	2	12	Yes[12]	No	–	75 (24)
Isolation alcove or anteroom	In/Out	–	10	Yes	No	–	–
Patient corridor	–	–	2	–	–	–	–
OBSTETRICAL FACILITIES							
Delivery room[13]	Out	3	15	–	No	30-60	68-73 (20–23)
Labor/delivery/recovery	–	2	6[10]	–	–	–	70-75 (21–24)
Labor/delivery/recovery/postpartum	–	2	6[10]	–	–	–	70-75 (21–24)
EMERGENCY, SURGERY, AND CRITICAL CARE							
Operating/surgical cystoscopic rooms[11, 13]	Out	3	15	–	No	30-60	68-73 (20–23)[14]
Recovery room[13]	–	2	6	–	No	30-60	70-75 (21-24)
Critical and intensive care	–	2	6	–	No	30-60	70-75 (21–24)
Intermediate care	–	2	6[10]	–	–	–	70-75 (21–24)
Newborn intensive care	–	2	6	–	No	30-60	72-78 (22-26)
Treatment room[15]	–	–	6	–	–	–	75 (24)
Trauma room[15]	Out	3	15	–	No	30-60	70-75 (21–24)
Bronchoscopy[11]	In	2	12	Yes	No	30-60	68-73 (20–23)
Triage	In	2	12	Yes[16]	–	–	70-75 (21-24)
ER waiting rooms	In	2	12	Yes[12, 16]	–	–	70-75 (21-24)
Procedure room	Out	3	15	–	No	30-60	70-75 (21-24)
Laser eye room	Out	3	15	–	No	30-60	70-75 (21-24)
X-ray (surgical/critical care and catheterization)	Out	3	15	–	No	30-60	70-75 (21–24)
Anesthesia gas storage	In	–	8	Yes	–	–	–
SUPPORT AREAS							
Medication room	Out	–	4	–	–	–	–
Clean workroom or clean holding	Out	–	4	–	–	–	–
Soiled workroom or soiled holding	In	–	10	Yes	No	–	–
DIAGNOSTIC AND TREATMENT AREAS							
Examination room	–	–	6	–	–	–	75 (24)
Treatment room	–	–	6	–	–	–	75 (24)
Physical therapy and hydrotherapy	In	–	6	–	–	–	75 (24)
Gastrointestinal endoscopy room	–	2	6	–	No	30-60	68-73 (20–23)
Endoscopic instrument processing room[17]	In	–	10	Yes	No	–	–
Imaging[18]							
X-ray (diagnostic & treatment)	–	–	6	–	–	–	75 (24)
Darkroom	In	–	10	Yes	No	–	–
Imaging waiting rooms	In	2	12	Yes[12, 16]	–	–	70-75 (21-24)
Laboratory[19]							
General[18]	–	–	6	–	–	–	75 (24)
Biochemistry[18]	In	–	6	Yes	No	–	75 (24)
Cytology	In	–	6	Yes	No	–	75 (24)
Glass washing	In	–	10	Yes	–	–	–

Table 2.1-2 (continued)

Ventilation Requirements for Areas Affecting Patient Care in Hospitals and Outpatient Facilities[1]

Area designation	*Air movement relationship to adjacent area[2]*	*Minimum air changes of outdoor air per hour[3]*	*Minimum total air changes per hour[4, 5]*	*All air exhausted directly to outdoors[6]*	*Recirculated by means of room units[7]*	*Relative humidity[8] (%)*	*Design temperature[9] (degrees F/C)*
Histology	In	–	6	Yes	No	–	75 (24)
Microbiology[18]	In	–	6	Yes	No	–	75 (24)
Nuclear medicine	In	–	6	Yes	No	–	75 (24)
Pathology	In	–	6	Yes	No	–	75 (24)
Serology	In	–	6	Yes	No	–	75 (24)
Sterilizing	In	–	10	Yes	–	–	–
Autopsy room[11]	In	–	12	Yes	No	–	–
Nonrefrigerated body-holding room	In	–	10	Yes	–	–	70 (21)
SERVICE AREAS							
Pharmacy	Out	–	4	–	–	–	–
Food preparation center	–	–	10	–	No	–	–
Warewashing	In	–	10	Yes	No	–	–
Dietary day storage	In	–	2	–	–	–	–
Laundry, general	–	–	10	Yes	–	–	–
Soiled linen (sorting and storage)	In	–	10	Yes	No	–	–
Clean linen storage	Out	–	2	–	–	–	–
Soiled linen and trash chute room	In	–	10	Yes	No	–	–
Bedpan room	In	–	10	Yes	–	–	–
Bathroom	In	–	10	–	–	–	75 (24)
Housekeeping room	In	–	10	Yes	No	–	–
STERILIZING AND SUPPLY							
ETO-sterilizer room	In	–	10	Yes	No	30-60	75 (24)
Sterilizer equipment room	In	–	10	Yes	–	–	–
Central medical and surgical supply							
Soiled or decontamination room	In	–	6	Yes	No	–	68-73 (20–23)
Clean workroom	Out	–	4	–	No	30-60	75 (24)
Sterile storage	Out	–	4	–	–	(Max) 70	–

[1] The ventilation rates in this table cover ventilation for comfort, as well as for asepsis and odor control in areas of acute care hospitals that directly affect patient care and are determined based on healthcare facilities being predominantly "No Smoking" facilities. Where smoking may be allowed, ventilation rates will need adjustment. Areas where specific ventilation rates are not given in the table shall be ventilated in accordance with ASHRAE Standard 62, *Ventilation for Acceptable Indoor Air Quality*, and *ASHRAE Handbook—HVAC Applications*. Specialized patient care areas, including organ transplant units, burn units, specialty procedure rooms, etc., shall have additional ventilation provisions for air quality control as may be appropriate. OSHA standards and/or NIOSH criteria require special ventilation requirements for employee health and safety within health care facilities.

[2] Design of the ventilation system shall provide air movement which is generally from clean to less clean areas. If any form of variable air volume or load shedding system is used for energy conservation, it must not compromise the corridor-to-room pressure balancing relationships or the minimum air changes required by the table.

[3] To satisfy exhaust needs, replacement air from the outside is necessary. Table 2.1-2 does not attempt to describe specific amounts of outside air to be supplied to individual spaces except for certain areas such as those listed. Distribution of the outside air, added to the system to balance required exhaust, shall be as required by good engineering practice. Minimum outside air quantities shall remain constant while the system is in operation. In variable volume systems, the minimum outside air setting on the air-handling unit shall be calculated using the ASHRAE 62 method.

[4] Number of air changes may be reduced when the room is unoccupied if provisions are made to ensure that the number of air changes indicated is reestablished any time the space is being utilized. Adjustments shall include provisions so that the direction of air movement shall remain the same when the number of air changes is reduced. Areas not indicated as having continuous directional control may have ventilation systems shut down when space is unoccupied and ventilation is not otherwise needed, if the maximum infiltration or exfiltration permitted in Note 2 is not exceeded and if adjacent pressure balancing relationships are not compromised. Air quantity calculations must account for filter loading such that the indicated air change rates are provided up until the time of filter change-out. The minimum total air change requirements for Table 2.1-2 shall be based on the supply air quantity in positive pressure rooms, and the exhaust air quantity in negative pressure rooms.

[5] Air change requirements indicated are minimum values. Higher values should be used when required to maintain indicated room conditions (temperature and humidity), based on the cooling load of the space (lights, equipment, people, exterior walls and windows, etc.).

Table 2.1-2 (continued)

Ventilation Requirements for Areas Affecting Patient Care in Hospitals and Outpatient Facilities[1]

[6] Air from areas with contamination and/or odor problems shall be exhausted to the outside and not recirculated to other areas. Note that individual circumstances may require special consideration for air exhaust to the outside, e.g., in intensive care units in which patients with pulmonary infection are treated, and rooms for burn patients.

[*7] Recirculating room HVAC units refers to those local units that are used primarily for heating and cooling of air, and not disinfection of air. Because of cleaning difficulty and potential for buildup of contamination, recirculating room units shall not be used in areas marked "No." However, for airborne infection control, air may be recirculated within individual isolation rooms if HEPA filters are used. Isolation and intensive care unit rooms may be ventilated by reheat induction units in which only the primary air supplied from a central system passes through the reheat unit. Gravity-type heating or cooling units such as radiators or convectors shall not be used in operating rooms and other special care areas. See footnote A7 (at the bottom of the page) for a description of recirculation units to be used in isolation rooms.

[8] The ranges listed are the minimum and maximum limits where control is specifically needed. The maximum and minimum limits are not intended to be independent of a space's associated temperature. The humidity is expected to be at the higher end of the range when the temperature is also at the higher end, and vice versa. See Figure 2.1-1 for a graphic representation of the indicated changes on a psychrometric chart. Shaded area is acceptable range.

[9] Where temperature ranges are indicated, the systems shall be capable of maintaining the rooms at any point within the range during normal operation. A single figure indicates a heating or cooling capacity of at least the indicated temperature. This is usually applicable when patients may be undressed and require a warmer environment. Nothing in these guidelines shall be construed as precluding the use of temperatures lower than those noted when the patients' comfort and medical conditions make lower temperatures desirable. Unoccupied areas such as storage rooms shall have temperatures appropriate for the function intended.

[10] Total air changes per room for patient rooms, intermediate care, labor/delivery/recovery rooms, and labor/delivery/recovery/postpartum rooms may be reduced to 4 when supplemental heating and/or cooling systems (radiant heating and cooling, baseboard heating, etc.) are used.

[*11] Differential pressure shall be a minimum of 0.01" water gauge (2.5 Pa). If alarms are installed, allowances shall be made to prevent nuisance alarms of monitoring devices.

[12] If it is not practical to exhaust the air from the airborne infection isolation room to the outside, the air may be returned through HEPA filters to the air-handling system exclusively serving the isolation room.

[13] National Institute for Occupational Safety and Health (NIOSH) Criteria Documents regarding Occupational Exposure to Waste Anesthetic Gases and Vapors, and Control of Occupational Exposure to Nitrous Oxide indicate a need for both local exhaust (scavenging) systems and general ventilation of the areas in which the respective gases are utilized.

[14] Some surgeons may require room temperatures that are outside of the indicated range. All operating room design conditions shall be developed in consultation with surgeons, anesthesiologists, and nursing staff.

[15] The term trauma room as used here is the operating room space in the emergency department or other trauma reception area that is used for emergency surgery. The first aid room and/or "emergency room" used for initial treatment of accident victims may be ventilated as noted for the "treatment room." Treatment rooms used for bronchoscopy shall be treated as bronchoscopy rooms. Treatment rooms used for cryosurgery procedures with nitrous oxide shall contain provisions for exhausting waste gases.

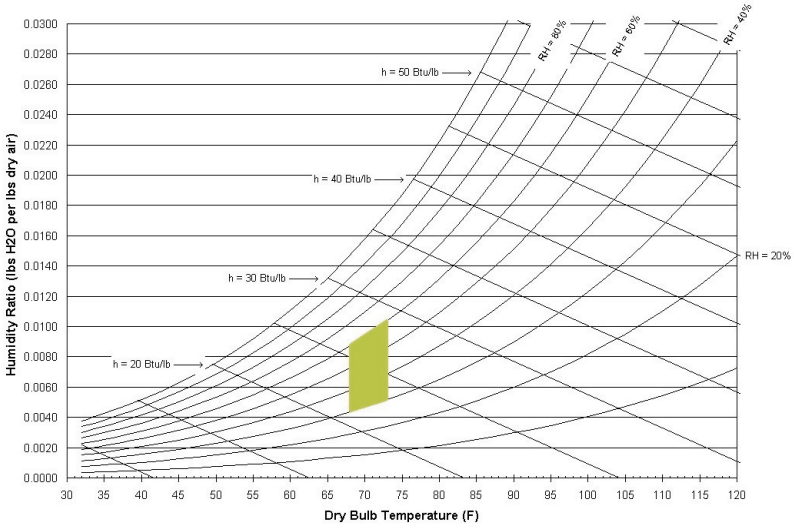
[16] In a ventilation system that recirculates air, HEPA filters can be used in lieu of exhausting the air from these spaces to the outside. In this application, the return air shall be passed through the HEPA filters before it is introduced into any other spaces.

[17] The endoscopic instrument processing room is a room adjacent to the gastrointestinal endoscopy room that is used for cleaning endoscopic equipment and instruments.

[18] When required, appropriate hoods and exhaust devices for the removal of noxious gases or chemical vapors shall be provided (see Section 2.1-10.2.4.5. (2) and NFPA 99).

[19] The air movement relationships for laboratories apply between laboratory and adjacent non-laboratory spaces. Reference DHHS publication "Biosafety in Microbiological and Biomedical Laboratories" (CDC and NIH) on the CDC Web site.

Psychrometric Chart



APPENDIX

[A7] Recirculating devices with HEPA filters may have potential uses in existing facilities as interim, supplemental environmental controls to meet requirements for the control of airborne infectious agents. Limitations in design must be recognized. The design of either portable or fixed systems should prevent stagnation and short circuiting of airflow. The supply and exhaust locations should direct clean air to areas where health care workers are likely to work, across the infectious source, and then to the exhaust, so that the health care worker is not in position between the infectious source and the exhaust location. The design of such systems should also allow for easy access for scheduled preventative maintenance and cleaning.

[A11] The verification of airflow direction can include a simple visual method such as smoke trail, ball-in-tube, or flutterstrip. These devices will require a minimum differential air pressure to indicate airflow direction.

Table 2.1-3
Filter Efficiencies for Central Ventilation and Air Conditioning Systems in General Hospitals

Area designation	*No. filter beds*	*Filter bed no. 1 (MERV, %)*	*Filter bed no. 2 (MERV, %)*
All areas for inpatient care, treatment, and diagnosis, and those areas providing direct service or clean supplies such as sterile and clean processing, etc.	2	8 (30%)	14 (90%)
Protective environment room	2	8 (30%)	17 (99.97%)
Laboratories	1	13 (80%)	–
Administrative, bulk storage, soiled holding areas, food preparation areas, and laundries	1	8 (30%)	–

Notes

1. Additional roughing or prefilters should be considered to reduce maintenance required for filters with efficiency higher than 75 percent.
2. MERV = minimum efficiency rating value. MERVs are based on ASHRAE 52.2.
3. The filtration efficiency ratings are based on average dust spot efficiency per ASHRAE 52.1.

Table 2.1-4
Hot Water Use—General Hospital

	Clinical	*Dietary*	*Laundry*
Liters per hour per bed[1]	11.9	7.2	7.6
Gallons per hour per bed[1]	3	2	2
Temperature (°C)	41-49[2]	49[3]	71[4]
Temperature (°F)	105-120[2]	120[3]	160[4]

[1] Quantities indicated for design demand of hot water are for general reference minimums and shall not substitute for accepted engineering design procedures using actual number and types of fixtures to be installed. Design will also be affected by temperatures of cold water used for mixing, length of run and insulation relative to heat loss, etc. As an example, total quantity of hot water needed will be less when temperature available at the outlet is very nearly that of the source tank and the cold water used for tempering is relatively warm.

[2] The range represents the maximum and minimum allowable temperatures.

[3] Provisions shall be made to provide 180°F (82°C) rinse water at warewasher (may be by separate booster) unless a chemical rinse is provided.

[4] Provisions shall be made to provide 160°F (71°C) hot water at the laundry equipment when needed. (This may be by steam jet or separate booster heater.) However, it is emphasized that this does not imply that all water used would be at this temperature. Water temperatures required for acceptable laundry results will vary according to type of cycle, time of operation, and formula of soap and bleach as well as type and degree of soil. Lower temperatures may be adequate for most procedures in many facilities, but the higher 160°F (71°C) should be available when needed for special conditions.

Table 2.1-5
Station Outlets for Oxygen, Vacuum (Suction), and Medical Air Systems in Hospitals[1]

Section	*Location*	*Oxygen*	*Vacuum*	*Medical Air*
2.1-3.1.1	Patient rooms (medical and surgical)	1/bed	1/bed	—
2.1-3.1.3	Examination/treatment (medical, surgical, and postpartum care)	1/room	1/room	—
2.1-3.2.2/3.2.3	Airborne infection isolation/protective environment rooms	1/bed	1/bed	—
2.1-3.2.4	Seclusion room (medical, surgical, and postpartum)	1/bed	1/bed	—
2.1-3.3	Intermediate care	2/bed	2/bed	1/bed
2.1-3.4.2	Critical care (general)	3/bed	3/bed	1/bed
2.1-3.4.2.2	Airborne infection isolation	3/bed	3/bed	1/bed
2.1-3.4.3	Coronary critical care	3/bed	2/bed	1/bed
2.1-3.4.5	Pediatric critical care	3/bed	3/bed	1/bed
2.1-3.4.6	Newborn intensive care	3/bassinet	3/bassinet	3/bassinet
2.1-3.6.6	Newborn nursery (full-term)	1/4 bassinets[2]	1/4 bassinets[2]	1/4 bassinets[2]
2.1-3.6.8	Pediatric nursery	1/bassinet	1/bassinet	1/bassinet
2.1-3.7.1	Pediatric and adolescent	1/bed	1/bed	1/bed
2.1-3.8.2	Psychiatric patient rooms	—	—	—
2.1-3.8.3	Seclusion treatment room	—	—	—
2.1-5.3.2.1	General operating room	2/room	3/room	—
2.1-5.3.2.2	Cardio, ortho, neurological	2/room	3/room	—
2.1-5.3.2.3	Orthopedic surgery	2/room	3/room	—
2.1-5.3.2.4	Surgical cysto and endo	1/room	3/room	—
2.1-5.3.3.2	Post-anesthesia care unit	1/bed	3/bed	1/bed
2.1-5.3.3.3	Phase II recovery[3]	1/bed	3/bed	—
2.1-5.3.5.11	Anesthesia workroom	1 per workstation	—	1 per workstation
2.1-4.2.1	Postpartum bedroom	1/bed	1/bed	—
2.1-4.3.1	Labor room	1/room	1/room	1/room
2.1-4.3.2/4.3.3	Cesarean/delivery room	2/room	3/room	1/room
2.1-4.3.4	Infant resuscitation space[4]	1/bassinet	1/bassinet	1/bassinet
2.1-4.3.5	OB recovery room	1/bed	3/bed	1/room
2.1-4.4	Labor/delivery/recovery (LDR)	1/bed	1/bed	—
2.1-4.4	Labor/delivery/recovery/postpartum (LDRP)	1/bed	1/bed	—
2.1-5.1.2.5	Initial emergency management	1/bed	1/bed	—
2.1-5.1.3.4	Triage area (definitive emergency care)	1/station	1/station	—
2.1-5.1.3.7 (1)	Definitive emergency care exam/treatment rooms	1/bed	1/bed	1/bed
2.1-5.1.3.8 (2)	Definitive emergency care observation unit	1/bed	1/bed	—
2.1-5.1.3.7 (1)	Trauma/cardiac room(s)	2/bed	3/bed	1/bed
2.1-5.1.3.7 (3)	Orthopedic and cast room	1/room	1/room	—
2.1-5.5.5	MRI	1/room	1/room	1/room
2.1-5.4.1	Cardiac catheterization lab	2/bed	2/bed	2/bed
2.1-5.12.2.2	Autopsy room	—	1 per workstation	—

[1] For any area or room not described above, the facility clinical staff shall determine outlet requirements after consultation with the authority having jurisdiction.

[2] Four bassinets may share one outlet that is accessible to each bassinet.

[3] If the Phase II recovery area is a separate area from the PACU, only one vacuum per bed or station shall be required.

[4] When infant resuscitation takes place in a room such as cesarean section/delivery or LDRP, then the infant resuscitation services must be provided in that room in addition to the minimum service required for the mother.