2.1 Common Elements for Outpatient Facilities

Appendix material, intended to be advisory only, is offset and begins with the letter “A” following the corresponding requirement in the main text.

*2.1-1 General

A2.1-1 Common elements for outpatient facilities. This chapter contains design elements that are common to most types of outpatient facilities. The outpatient facilities included in the Guidelines for Design and Construction of Outpatient Facilities are used primarily by patients who are able to travel or be transported to a facility for treatment, including those confined to wheelchairs. These facilities may be an outpatient unit of a hospital, a freestanding facility, or an outpatient facility in a multiple-use building.

2.1-1.1 Application

All outpatient projects, including those located in hospitals, shall meet the requirements in the Guidelines for Design and Construction of Outpatient Facilities.

2.1-1.1.1 Application of Part 1

All projects shall meet the standards in Part 1 of these Guidelines as amended in Section 2.1-1 (Common Elements for Outpatient Facilities—General).

2.1-1.1.2 Approaches to Application of Parts 2 and 3

Two approaches to applying the requirements in Parts 2 and 3 of the Outpatient Guidelines shall be permitted—Approach 1 and Approach 2.

*2.1-1.1.2.1 Approach 1

A2.1-1.1.2.1 Approach 1 is meant to be used for projects for which the scope of services is comprehensively described in one of the specific outpatient facility chapters in Part 2 of this document. The prescriptive requirements adequately address risks and can be accommodated by the design without adversely impacting the intended function of the space.

(1) If a project is for one of the specific facility types listed in this section, the requirements of that chapter shall apply.

(a) Chapter 2.2, Specific Requirements for General and Specialty Medical Services Facilities

(b) Chapter 2.3, Specific Requirements for Outpatient Imaging Facilities

(c) Chapter 2.4, Specific Requirements for Birth Centers

(d) Chapter 2.5, Specific Requirements for Urgent Care Centers

(e) Chapter 2.6, Specific Requirements for Infusion Centers

(f) Chapter 2.7, Specific Requirements for Outpatient Surgery Facilities
2.1 Common Elements (sections 1 – 3)

(g) Chapter 2.8, Specific Requirements for Freestanding Emergency Facilities
(h) Chapter 2.9, Specific Requirements for Endoscopy Facilities
(i) Chapter 2.10, Specific Requirements for Renal Dialysis Centers
(j) Chapter 2.11, Specific Requirements for Outpatient Behavioral and Mental Health Centers Psychiatric Facilities
(k) Chapter 2.12, Specific Requirements for Outpatient Rehabilitation Therapy Facilities
(l) Chapter 2.13, Specific Requirements for Mobile/Transportable Medical Units
(m) Chapter 2.14, Specific Requirements for Dental Facilities

(2) When using Approach 1, the common elements in this chapter shall be required for a project when they are referenced from the specific outpatient facility chapter applied to the project.

2.1-1.1.2.2 Approach 2

*(1) If a project is for a facility type that is not listed in Section 2.1-1.1.2.1 (Approach 1) but will include elements in one or more of those facility chapters and/or elements in this common elements chapter (Chapter 2.1), those specific requirements shall be applied to the project.

A2.1-1.1.2.2 (1) Projects suited to Approach 2. Approach 2 is intended to be used for projects where the scope of services is not adequately described in only one of the outpatient facility chapters listed in Section 2.1-1.1.2.1. This approach identifies minimum requirements found in the common elements chapter and in any facility chapters that are relevant to the project.

*(a) The requirements in the common elements chapter and in the facility chapters in Part 2 that support the services to be included in the project shall be identified during the planning phase.

*(b) The common element and specific facility chapter requirements identified as part of the project during the planning phase shall be documented in the basis of design.

A2.1-1.1.2.2 (1)(a) and (1)(b) Approach 2 process for identifying and documenting relevant requirements. Development of specialty outpatient facilities that are not included in the Outpatient Guidelines will depend on a detailed and specific functional program to establish physical environment requirements. Thus, Approach 2 is based on the performance assessment for the project space that underpins the functional program as well as practical application of relevant standards.

a. Identification of services for Approach 2. The project team using Approach 2 should identify the services to be included in the project, including both clinical and support services.

b. Identification of sections of the Guidelines that apply to the project. Once the services included in the project have been identified, the team should identify the sections of the Outpatient Guidelines that contain requirements for those functions. For example, a small clinic may choose to offer dialysis services. Chapter 2.2, Specific Requirements for General and Specialty Medical Services Facilities, which includes clinic requirements, does not contain requirements for
dialysis, but Chapter 2.10, Specific Requirements for Renal Dialysis Centers, does. In this example, Approach 2 allows the design team and the AHJ to apply requirements from both Chapter 2.2 and Chapter 2.10, including shared support services based on risk and function.

In addition to space requirements for clinical spaces included in the project, careful attention should be paid to requirements for all associated support areas, architectural details, surfaces, and building systems needed to meet minimum standards for the clinical spaces. These include, but are not limited to:

— Clinical support areas, such as clean and soiled workrooms or work areas
— Staff support areas
— Patient support areas
— Architectural details and surfaces for walls, floors, and ceilings
— Mechanical filtration, air changes, humidity controls
— Electrical systems
— Plumbing systems

*Note:* Specialty outpatient facility projects to which Approach 2 is applied may also have project elements that are not addressed in the Guidelines.

*(2)* If required by the authority having jurisdiction (AHJ), the identified requirements shall be presented to the AHJ for review and approval prior to completion of design.

**A2.1-1.2.2 (2) AHJ review of project scope.** The project-specific Approach 2 is subject to interpretation and relies on early communication with the AHJ to be successful. Information shared with the AHJ is intended to facilitate discussion of the project requirements.

The AHJ should be presented with an accurate scope of services that forms the basis of design. Working toward a joint understanding of building functions will facilitate the identification of risks and consequent minimum standards to be applied to the project. Specific information presented to the AHJ may include:

— Accurate list of services to be provided
— Preliminary functional program
— Bubble diagram showing space relationships
— List of Guidelines sections to be applied

Validating the scope of the project and the application of the Outpatient Guidelines requirements early in the project delivery process allows the design to proceed in an informed manner with minimized risk.

**2.1-1.2 Functional Program**

**2.1-1.2.1 – 2.1-1.2.2 Reserved**
2.1 Common Elements

*2.1-1.2.3 Shared/Purchased Services

If space and/or services are to be shared or purchased, details of such shared or purchased space and/or services shall be indicated in the functional program to ensure design and infection prevention considerations are addressed for services to be provided in the facility.

**A2.1-1.2.3 Shared/purchased services.** Shared/purchased space and/or services may include space and/or services for storage, laundry, public areas, environmental services, housekeeping facilities, and waste management.

2.1-1.3 Reserved

*2.1-1.4 Facility Layout

Facility layout shall preclude unrelated traffic through patient care areas.

**A2.1-1.4 Facility layout.** In general, public traffic should not go through patient care areas. Consideration should be given to avoiding mixing patient populations from one clinical service with patient populations from another clinical service, although this is permissible when services are shared (e.g., imaging services).

2.1-2 Accommodations for Care of Individuals of Size

2.1-2.1 General

During project planning, health care organizations providing services in outpatient facilities shall determine their need to provide spaces designed to enable safe care of individuals of size as required in Section 1.2-6.4.1 (Projected Need for Accommodations for Care of Individuals of Size). (See the glossary for a definition of “individual of size.”)

2.1-2.1.1 Application

2.1-2.1.1.1 All patient care areas designated for care of individuals of size shall meet the requirements in this section.

*2.1-2.1.1.2 A patient handling and movement assessment shall determine the need for expanded-capacity lifts and architectural details that support movement of individuals of size in spaces where these patients may be seen receive care. See sections 1.2-6.4.1.3 (Projected number of expanded-capacity lifts required) and 1.2-6.4.2 (Design Response for Accommodations for Individuals of Size).

**A2.1-2.1.1.2 Patient lift system.** Accommodations for patient handling, movement, and mobilization can be provided by either an overhead lift system or a floor-based full-body sling lift and standing assist lifts. Lifts chosen should be capable of accommodating the threshold weight capacity of individuals of size identified in the planning phase. See sections 1.2-4.3 (Patient Handling and Movement Assessment) and 1.2-6.4.1.1 (Projected weight capacities for individuals of size in population to be served).

Overhead lift systems have some advantages over floor-based lifts. In addition to needing smaller room dimensions than floor-based lifts, overhead systems biomechanically impact the musculoskeletal system of health care providers less than floor-based models. As well, staff prefer and are more compliant in using...
2.1 Common Elements (sections 1 – 3)

overhead lifts, reducing the musculoskeletal injury risk to staff and improving the quality of patient care.

For additional information on the use of patient lifts, see the guidance in the HHS publication “Americans with Disabilities Act: Access to Medical Care for Individuals with Mobility Disabilities.”

2.1-2.1.2 Location

Spaces designated for care of or use by individuals of size shall be provided in locations to accommodate the population expected to be served by the facility.

2.1-2.2 – 2.1-2.4 Reserved

2.1-2.5 Hand-Washing Station

2.1-2.5.1 Hand-washing stations in toilet rooms designated for use by individuals of size shall meet the requirements in Section 2.1-3.8.7 (Hand-Washing Station) as amended in this section.

2.1-2.5.2 The downward static force required for hand-washing stations designated for individuals of size shall be identified during the planning phase and accommodate the maximum patient weight of the patient population.

2.1-2.6 Patient Toilet Room

Toilet rooms designated for use by individuals of size shall meet the requirements in this section.

2.1-2.6.1 Space Requirements

2.1-2.6.1.1 Where an expanded-capacity toilet is used, it shall be mounted a minimum of 36 inches (91.44 centimeters) from the finished wall to the centerline of the toilet on both sides where a ceiling-based or floor-based lift is provided (for caregiver assistance), and/or use of a floor-based lift).

2.1-2.6.2.1 2.1-2.6.2 Where a regular toilet is used, the toilet shall be mounted a minimum of 44 inches (1.12 meters) from the centerline of the toilet on both sides to finished walls to allow for positioning of an expanded-capacity commode over the toilet when the weight capacity of the existing toilet will not accommodate the necessary patient weight.

2.1-2.6.3.1 2.1-2.6.3 A rectangular clear floor area that is 46 inches (1.17 meters) wide shall extend 72 inches (1.83 meters) from the front of the toilet.

2.1-2.6.2 2.1-2.6.4 Grab Bars

2.1-2.6.2.1 See Section 2.1-7.2.2.9 (Grab bars) for grab bar requirements as amended in this section.

*2.1-2.6.2.2 An adjustable/foldable grab bar mounted on a horizontally movable track shall be provided.

A2.1-2.6.2.2 Due to the variation in width of individuals of size, installing fixed grab bars is problematic. For independent patient use, the grab bars would be too far away for use by most, whereas grab bars attached to horizontally movable tracks allow the grab bar to move to the location necessary for use by each individual of size.

2.1-2.7 Single-Patient Examination/Observation Room
2.1 Common Elements

An exam room designated for care of individuals of size shall meet requirements in Section 2.1-3.2.1 (Examination Rooms) as amended in this section.

2.1-2.7.1 Space Requirements

2.1-2.7.1.1 Clearances. Rooms shall be sized to permit the clearances in this section.

(1) At the foot of the expanded-capacity exam table: 5 feet (1.52 meters)

(2) On the non-transfer side of the expanded-capacity exam table: 3 feet (91.44 centimeters)

*(3) On the transfer side of the expanded-capacity exam table:

A2.1-2.7.1.1 (3) **Floor space for using patient lifts.** The transfer side clearance for an exam room with a ceiling- or wall-mounted lift is specified to accommodate a patient who is upright for transfer. In rooms where mobile lifts will be used, more floor space is required to accommodate the lift footprint and the staff needed to help an individual of size transfer from a wheelchair to an exam table.

(a) Where a ceiling- or wall-mounted lift is provided: 5 feet (1.52 meters) from the edge of the table

(b) In rooms without a ceiling- or wall-mounted lift: 7 feet (2.13 meters) from the edge of the table

2.1-2.7.1.2 When not in use for an individual of size, this examination room shall be permitted to be subdivided with cubicle curtains or movable partitions to accommodate two patients if each resulting bay or cubicle:

(1) Meets the area and clearance requirements for patient care stations in Section 2.5-3.3.2.1 (Multiple-patient examination room—Space requirements) following minimum clearance requirements:

(a) 5 feet (1.52 meters) between the sides of adjacent patient beds

(b) 4 feet (1.22 meters) between the sides of patient beds and adjacent walls or partitions

(2) Has direct access to a hand-washing station.

(3) Meets all nurse call, electrical, and medical gas requirements.

*2.1-2.8 Equipment and Supply Storage

When sizing equipment storage for areas where care will be provided for individuals of size, space shall be provided to accommodate the size of the expanded-capacity equipment (e.g., floor-based lifts, lift slings and accessories, etc.) and supplies that will be used.

A2.1-2.8 Expanded-capacity floor-based lifts, slings, and accessories for individuals of size are larger than standard equipment and thus require larger storage spaces.

2.1-2.9 Waiting Areas

*2.1-2.9.1 Seating for individuals of size shall be provided in waiting areas in outpatient facilities.
**A2.1-2.9.1 Seating capacity for individuals of size.** See recommendations in appendix table A2.1-a (Waiting Area Seating Capacity).

*2.1-2.9.2* Waiting areas shall be sized to accommodate the expanded-capacity furniture required for patients and visitors of size.

A2.1-2.9.2 Where seating for individuals of size is provided, a portion of the seating should be able to accommodate a person who weighs 600 pounds (272 kilograms) or more.

### 2.1-2.10 Special Design Elements for Spaces for Care of Individuals of Size

*2.1-2.10.1* All plumbing fixtures, handrails, grab bars, patient lift equipment, built-in furniture, and other furnishings and equipment shall be designed to accommodate the maximum patient weight established in the planning phase.

A2.1-2.10.1 Support for individuals of size should be considered in the design of wall-mounted architectural elements.

#### 2.1-2.10.2 Door Openings

Door openings shall be provided in accordance with Section 2.1-7.2.2.3 (2) (Door openings) as amended in this section.

*2.1-2.10.2.1* All door openings used for the path of travel to public areas and areas where care will be provided for individuals of size shall have a minimum clear width of 45.5 inches (1.16 meters) to provide access for expanded-capacity wheelchairs.

A2.1-2.10.2.1 Access for expanded-capacity gurneys may will require additional clear width.

2.1-2.10.2.2 Door openings to toilet rooms designated for individuals of size shall have a minimum clear width of 45.5 inches (1.16 meters).

### 2.1-3 Patient Care and Diagnostic Areas

#### 2.1-3.1 General

#### 2.1-3.1.1 Application

Where the following clinical and support areas are provided in an outpatient facility, the requirements in this section shall apply.

*2.1-3.1.2 Patient Privacy*

Each facility design shall ensure appropriate levels of patient speech and visual privacy and dignity throughout the care process.

A2.1-3.1.2 Patient privacy

a. *Visual privacy.* Visual privacy can be achieved using various means, including cubicle curtains, blinds, and electronically controlled vision panels. In single-patient rooms, the entry room door can be used to achieve visual privacy.
provided the door is solid or has non-transparent glass. Where doors with vision panels or transparent glass are used, provisions for visual privacy should be made. Consideration should be given to designing the room so the foot of the table does not face the door, using door orientation, privacy hinges, or a cubicle curtain to provide visual privacy.

b. **Speech privacy.** Speech privacy can be enhanced through use of full-height partitions and/or sound-masking. As well, speech privacy for patients in bays and cubicles can be achieved by using an exam or consultation room for patient communication.

*Note:* For more information, see Section 1.1-4.4 (National Standards for the Protection of Patient Health Information).

2.1-3.2 Clinical Service Rooms and Facilities

*2.1-3.2.1 Examination Rooms*

Where an examination room is provided, it shall meet the requirements in this section for the room type selected.

A2.1-3.2.1 Offices and/or practitioner consultation rooms may be combined with examination rooms.

2.1-3.2.1.1 General

(1) Patient privacy

   (a) See Section 2.1-3.1.2 (Patient Privacy) for requirements.

   (b) Provision shall be made to preserve patient privacy from observation from outside an examination room.

(2) Building system components. See the following tables for exam room requirements:

   (a) Table 2.1-1 (Electrical Receptacles for Patient Care Areas in Outpatient Facilities)

   (b) Table 2.1-2 (Station Outlets for Oxygen, Vacuum, Medical Air, and Instrument Air Systems in Outpatient Facilities)

   (c) Table 2.1-3 (Locations for Nurse Call Devices in Outpatient Facilities)

2.1-3.2.1.2 Single-patient examination/observation room

(1) General

   (a) Where an examination room is used as an observation room, it shall be immediately accessible to the nurse or control station and a toilet room.

   (b) A room arrangement in which an examination table, recliner, or chair is placed at an angle, closer to one wall than another, or against a wall to accommodate the type of patient being served shall be permitted.

(2) Space requirements
(a) Single-patient exam/observation room

(i) Area. Each single-patient examination/observation room shall have a minimum clear floor area of 80 square feet (7.43 square meters) as long as the clearances below can be met with the exam table or recliner that will be used.

(ii) Clearances. Room size shall accommodate a minimum clearance of 2 feet 8 inches (81.28 centimeters) at each side and at the foot of the examination table or recliner.

*(b) Single-patient examination/observation room with dual entry

(i) Area. Each dual-entry single-patient exam room shall have a minimum clear floor area of 100 square feet (9.29 square meters).

A2.1-3.2.1.2 (2)(b) Dual-entry single-patient examination/observation room. Separate entries are provided for patients and staff with the intention of separating their paths of travel.

(ii) Clearances. Room size shall accommodate a minimum clearance of 2 feet 8 inches (81.28 centimeters) at each side and at the foot of the examination table or recliner.

*(c) Single-patient exam room for specialty clinical services

A2.1-3.2.1.2 (2) (c)(b) Specialty exam room. Rooms in specialty clinics (e.g., rooms for eye or ear, nose, and throat examinations) should be sized for the services provided, including necessary equipment.

(i) Area. Single-patient rooms for specialty clinical services that require larger examination rooms shall have a minimum clear floor area of 100 square feet (9.29 square meters).

*(ii) Clearances. Room size shall accommodate the following minimum clearances:

- 3 feet 6 inches (1.07 meters) at the side(s), head, or foot of the exam table or chair that correspond(s) with the care provider(s)’ expected work position(s)
- 1 foot (30.48 centimeters) at all sides (side, head, or foot) of the exam table or chair other than the work position(s)

A2.1-3.2.1.2 (2)(c)(b)(ii) Clearances at patient care positions in specialty exam rooms are not adequately or appropriately assured by centering the care position with clearances at sides and foot. The issue is adequate clearance at positions used by care providers, which may involve more than one provider and could include the head of the patient position. Where access to a patient position is unnecessary (e.g., at the head and on one side in eye exam lanes), smaller clearances are acceptable.

(3) Room features. The exam room shall contain the following:

(a) Portable or fixed examination light as indicated in Section 2.1-8.3.4.3 (1) (Lighting for specific locations in outpatient facilities—Exam/treatment/trauma rooms)

(b) Storage for supplies

(c) Accommodations for written and/or electronic documentation
(d) Space for a visitor’s chair

(e) Hand-washing station that complies with Section 2.1-3.8.7.2 (Hand-Washing Station—Design requirements)

**2.1-3.2.1.3 Sexual assault forensic examination room.** Where a sexual assault forensic examination room is provided, it shall meet the requirements in Section 2.1-3.2.1.2 (Single-patient examination/observation room) as amended in this section.

(1) Each sexual assault forensic examination room shall contain a pelvic examination bed/table.

*(2) A private toilet room with shower and storage space for clothing, shoes, linens, and bathing products shall be immediately accessible to the sexual assault forensic examination room.

**A2.1-3.2.1.3 (2) Private toilet and shower.** Provision of a directly accessible toilet room with shower should be considered.

*(3) Provisions for lockable storage for forensic collection kits, laboratory supplies, and equipment shall be provided.

**A2.1-3.2.1.3 (3) Provisions for lockable storage.** Timely transfer of evidence to law enforcement is a priority; however, a temporary hold of evidence in a secure location under environmentally appropriate conditions may be necessary until the evidence can be transferred to law enforcement. Lockable storage may be provided in the sexual assault forensic exam room or in a secure area outside the room. Increasingly, the onus is falling on the health care facility to secure evidence for longer periods before transfer to law enforcement. This leads to a need for chain-of-custody protocols and storage for equipment and evidence (e.g., drying racks, evidence refrigerators, contaminated clothing, etc.).

(4) A room for consultation, family, support services, and law enforcement shall be readily accessible to the sexual assault forensic examination room.

**2.1-3.2.2 Procedure Room**

**2.1-3.2.2.1 General**

(1) Application

*(a) This section shall apply to outpatient facilities that include a procedure room as defined in the glossary.

**A2.1-3.2.2.1 (1)(a) Procedures that are not defined as invasive in the glossary may be performed in an operating room. However, invasive procedures should not be performed in a procedure room even if it is located in the semi-restricted area.

(i) The governing body shall perform a clinical assessment of the procedures to be performed in a facility to determine the appropriate room type and location for these procedures and document this in the functional program.

(ii) Where it is determined the design requirements for a procedure room as shown in Table 2.1-4 (Examination/Treatment, Procedure, and Operating Room Classification) and in Part 3
2.1 Common Elements (sections 1 – 3)

(ANSI/ASHRAE/ASHE 170: *Ventilation of Health Care Facilities*) are appropriate, the requirements in this section shall be met.

(b) Where a procedure room is used for multiple procedure types, the room shall meet the most stringent requirements for the space.

*(c) Where procedures that require a negative pressure environment are performed, a procedure room(s) with negative pressure shall be provided and identified with a sign. See Part 3 (ANSI/ASHRAE/ASHE 170: *Ventilation of Health Care Facilities*) for more information.

**A2.1-3.2.2.1 (1)(c)** Procedures that require different pressure relationships cannot be provided in the same procedure room. For example, procedure rooms where bronchoscopies will be performed require negative pressure; if these rooms are also used for other procedures, the other procedures must be able to be performed in a negative pressure environment. Signage identifying rooms with negative pressure can help users choose appropriate rooms for procedures such as bronchoscopy.

(2) Location

(a) The procedure room shall meet the requirements of a semi-restricted area.

(b) The procedure room shall be permitted to be accessed from a semi-restricted corridor or from an unrestricted corridor.

**2.1-3.2.2.2 Space requirements**

(1) Area

(a) Procedure rooms shall have a minimum clear floor area of 130 square feet (12.08 square meters).

(b) Procedure rooms where anesthetics will be administered using an anesthesia machine and supply cart shall have a minimum clear floor area of 160 square feet (14.86 square meters).

(c) Procedure rooms where procedures will be performed that require additional personnel and/or large equipment shall be sized to accommodate the personnel and equipment planned to be in the room during procedures, including any additional personnel and equipment needed for emergency rescue.

(2) Clearances

(a) Procedure rooms shall have the following minimum clearances around the procedure table, gurney, or procedural chair:

(i) 3 feet 6 inches (1.07 meters) on each side

(ii) 3 feet (91.44 centimeters) at the head and foot

*(b) Where an anesthesia machine and associated supply cart are used, the clearance at the head shall be 6 feet (1.83 meters) to provide space for an anesthesia work zone with a clear floor area of 6 feet x 8 feet (1.83 meters x 2.44 meters).*
A2.1-3.2.2.2 (2)(b) **Anesthesia work zone.** On the outside edge of the anesthesia work zone, 2 feet x 8 feet (60.96 centimeters x 2.44 meters) may serve as part of the circulation pathway.

(c) Where large mobile equipment (e.g., a C-arm) is used, the procedure room shall meet the space requirements, including clearances, in Section 2.1-3.5.2.2 (Imaging Rooms—Space requirements).

(3) Fixed encroachments into the minimum clear floor area. Fixed encroachments shall be permitted to be included when determining the minimum clear floor area for a procedure room as long as:

(a) The encroachments do not extend more than 12 inches (30.48 centimeters) into the minimum clear floor area.

(b) Where a sterile field is provided, the encroachment shall not extend into the sterile field.

(c) The encroachment width along each wall does not exceed 10 percent of the length of that wall.

### 2.1-3.2.2.3 Documentation area

(1) Accommodations for written and/or electronic documentation shall be provided in the procedure room. See appendix section A2.1-3.8.3 (Documentation area) for recommendations.

(2) Where a built-in feature is provided for documentation, it shall allow for direct observation of the patient when in use.

### 2.1-3.2.2.4 Patient privacy.

Provisions shall be made for patient privacy in accordance with Section 2.1-3.1.2 (Patient Privacy).

### 2.1-3.2.2.5 Hand-washing station

(1) A hand-washing station shall be provided in the procedure room in accordance with Section 2.1-3.8.7 (Hand-Washing Station).

(2) Where a hand scrub station is directly accessible to the procedure room, omission of the hand-washing station shall be permitted.

### 2.1-3.2.2.6 Reserved

### 2.1-3.2.2.7 Other design requirements

(1) Doors and door hardware. See Section 2.1-7.2.2.3 (2) (Door openings) for requirements.

(2) Surfaces. See Section 2.1-7.2.3 (Surfaces) for requirements.

(3) Building system requirements

(a) HVAC system

(i) See Part 3 (ANSI/ASHRAE/ASHE 170: Ventilation of Health Care Facilities) for ventilation requirements for procedure rooms.

(ii) Anesthetic gas scavenging system. For procedure rooms where general anesthesia is provided, see note m in Table 8.1 (Design Parameters) in ASHRAE/ASHE 170.
(b) Electrical receptacles. See Table 2.1-1 (Electrical Receptacles for Patient Care Areas in Outpatient Facilities) for requirements.

(c) Plumbing

(i) Drainage system. See Section 2.1-8.4.2.6 (Drainage systems) for requirements.

(ii) Medical gas outlets. See Table 2.1-2 (Station Outlets for Oxygen, Vacuum, Medical Air, and Instrument Air in Outpatient Facilities) for requirements.

(d) Call system. See Table 2.1-3 (Locations for Nurse Call Devices in Outpatient Facilities) for requirements.

2.1-3.2.2.8 Support areas for the procedure room

(1) General

(a) Facilities that have a procedure room(s) shall have the support areas in this section.

(b) Sharing of these support areas with other clinical services in the facility shall be permitted.

(2) – (7) Reserved

(8) Medication safety zone. See Section 2.1-3.8.8 (Medication Safety Zones) for requirements.

(9) – (10) Reserved

(11) Clean storage

(a) A storage area for clean/sterile supplies shall be provided.

(b) Facilities with more than one procedure room shall have a clean workroom.

*(12) Soiled holding. A space for holding soiled materials shall be provided that is separate from the clean storage area.

**A2.1-3.2.2.8 (12)** A cabinet could serve this purpose in a small facility with low patient turnover in the procedure room.

(13) Equipment and supply storage. Where equipment-intensive procedures are performed or large mobile equipment is used in a procedure room, storage space for this equipment shall be provided.

(14) – (15) Reserved

(16) Sterile processing facilities. Where sterile processing is performed on-site, sterile processing facilities shall be provided in accordance with Section 2.1-4.3.2 (Facilities for On-Site Sterile Processing).

(17) Pre- and post-procedure patient care. Where pre- and post-procedure patient care is required to support the procedures performed in the procedure room, the requirements in this section shall be met.

(a) Location. Pre- and post-procedure patient care station(s) shall be permitted to be located in the procedure room or in a specifically designated patient care area.
(b) Design requirements. Where pre- and post-procedure patient care stations are located in a specifically designated patient care area, see Section 2.1-3.7 (Pre- and Post-Procedure Patient Care) for requirements.

2.1-3.2.9 Reserved

2.1-3.2.10 Support areas for patients. Provisions shall be made for securing patients’ personal effects during procedures.

*2.1-3.2.3 Operating Rooms

A2.1-3.2.3 Provisions for patients with airborne infectious diseases. Where invasive procedures may need to be performed on persons known or suspected of having an airborne infectious disease and the procedures must be performed in an operating room, the recommendations outlined in the CDC “Guidelines for Environmental Infection Control in Health-Care Facilities” or the CDC “Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Facilities” should be followed.

2.1-3.2.3.1 General

*(1) Application. This section shall apply to rooms designated for the performance of invasive procedures as defined in the glossary.

A2.1-3.2.3.1 (1) Procedures not defined as an “invasive procedure” in the glossary may be performed either in an operating room, a procedure room, or an examination/treatment room; see Table 2.1-4 (Examination/Treatment, Procedure, and Operating Room Classification) for details. Nothing in the Guidelines requires a facility where invasive procedures are not performed to have an operating room.

(2) The outpatient operating room shall meet the requirements of a restricted area.

*2.1-3.2.3.2 Space requirements

A2.1-3.2.3.2 Determining operating room space requirements. Operating room size should be based on the procedures to be performed, including the number of staff required and the amount and size of equipment to be used.

a. The minimum clear floor area requirements for an operating room in the main text were determined by combining the following:

—Clearances for the 255-square-foot (23.69-square-meter) operating room:
  • Sterile field: 3 feet (91.44 centimeters) on each side and at the head and foot of an operating table, gurney, or procedural chair
  • Combined circulation pathway and mobile equipment zone: 3 feet (91.44 centimeters) on both sides and 2 feet (60.96 centimeters) at the head and foot of the sterile field

—Clearances for the 270-square-foot (25.08-square-meter) operating room:
  • Sterile field: 3 feet (91.44 centimeters) on each side and at the foot of an operating table, gurney, or procedural chair
2.1 Common Elements (sections 1 – 3)

- Combined circulation pathway and mobile equipment zone: 3 feet (91.44 centimeters) on both sides and 2 feet (60.96 centimeters) at the foot of the sterile field
- Anesthesia work zone: 6 x 8 feet (1.83 x 2.44 meters) at the head of the operating table, gurney, or procedural chair

---Clearances for the 400-square-foot (37.16-square meter) operating room:

- Sterile field: 3 feet (91.44 centimeters) on each side and at the foot of an operating table, gurney, or procedural chair
- Circulation pathway: 3 feet (91.44 centimeters) on both sides and 2 feet (60.96 centimeters) at the foot of the sterile field
- Movable equipment zone: 2 feet 6 inches (76.2 centimeters) on the sides and 2 feet (60.96 centimeters) at the foot of the circulation pathway
- Anesthesia work zone: 6 x 8 feet (1.83 x 2.44 meters) at the head of the operating table, gurney, or procedural chair

The sterile field includes the OR table (measuring 3 x 7 feet or 91.44 x 2.13 meters), and clearance on each side and at the foot to accommodate personnel, and sterile instrument tables used during the surgical procedure.

The circulation pathway provides space for two people to meet and pass each other without touching either non-sterile surfaces (e.g., walls, people, or equipment) on one side or personnel wearing sterile attire who are standing at the sterile field on the other side. The circulation pathway is intended to provide space for personnel to do the following:

- Set up a sterile field prior to the procedure,
- Assist with safe patient transport and transfer, evacuation using a stretcher in case of an emergency,
- Pass between the back table and the wall during the procedure, and
- Pass at the head of the patient without interfering with care being provided by the anesthesia care provider(s).

The movable equipment zone provides space on each side and at the foot of the table around the sterile field to accommodate the minimum equipment for the surgical procedure. The circulation pathway and movable equipment zone are allowed to overlap in the 255- and 270-square-foot (23.69- and 25.08-square-meter) operating rooms; it is assumed there will not be a lot of equipment so the circulation pathway and movable equipment zone are combined.

The anesthesia work zone is a 6 x 8-foot (1.83 x 2.44-meter) space usually positioned at the head of the table and should not be used as a through-pathway during anesthetic induction or extubation; but once anesthetic delivery and monitoring have been established, 2 feet (60.96 centimeters) at the top of that zone can be used as part of the circulation pathway.

b. In determining the size of an operating room, the minimum equipment for the surgical procedures to be performed should be considered. This may include the following:
- Anesthesia machine
2.1 Common Elements (sections 1 – 3)

—Anesthesia supply cart
—Chair for the anesthesia care provider
—Intravenous pole or table
—Case cart/equipment delivery system cart
—Prep stand
—Portable documentation station with chair
—Back instrument table
—Ring stand
—Two trash containers
—Soiled linen container
—Hazardous waste receptacle
—Mayo stand
—Kick bucket
—Surgical field suction
—Image viewers, Visual information display
—Sharps disposal receptacle

When calculating the clear floor area and clearances needed to accommodate the minimum amount of equipment, it was assumed all equipment would fit tightly together; however, this frequently is not possible due to the shape of the equipment so more space may be needed.

c. The number of required personnel for the procedures to be performed should also be considered in determining operating room size. Required personnel may include a surgeon, scrub nurse/technician, circulating nurse, and anesthesia care provider(s).

*(1) Area

A2.1-3.2.3.2 (1) Space requirements for operating rooms for procedures that require additional personnel/large equipment. Operating rooms for surgical procedures that require additional personnel and/or large equipment should be sized to accommodate the personnel and equipment planned to be in the room during procedures, including any additional personnel and equipment that will be needed for emergency rescue. These operating rooms may need to have a clear floor area of 600 to 1,000 square feet (55.74 to 92.9 square meters).

(a) An operating room shall have a minimum clear floor area of 255 square feet (23.69 square meters).

(b) An operating room where anesthetics will be administered using an anesthesia machine and supply cart shall have a minimum clear floor area of 270 square feet (25.08 square meters).

*(c) An operating room where surgery that may require additional staff and equipment will be performed shall have a minimum clear floor area of 400 square feet (37.16 square meters).
A2.1-3.2.3.2 (1)(c) To allow for an operating room to be used for different procedures in the future, a health care organization may choose to build a larger operating room than needed for the services they are currently providing.

(2) Clearances. The following minimum clearances shall be provided around the operating table, gurney, or procedural chair:

(a) For a 255-square-foot (23.69-square-meter) operating room:
   (i) 6 feet (1.83 meters) on each side
   (ii) 5 feet (1.52 meters) at the head and foot

(b) For a 270-square-foot (25.08-square-meter) operating room:
   (i) 6 feet (1.83 meters) on each side
   (ii) 6 feet x 8 feet (1.83 meters x 2.44 meters) at the head. This shall result in an anesthesia work zone with a clear floor area of 48 square feet (4.46 square meters).
   (iii) 5 feet (1.52 meters) at the foot

(c) For a 400-square-foot (37.16-square-meter) operating room:
   (i) 8 feet 6 inches (2.59 meters) on each side
   (ii) 6 feet (1.83 meters) at the head. This dimension shall result in an anesthesia work zone with a clear floor area of 48 square feet (4.46 square meters).
   (iii) 7 feet (2.13 meters) at the foot

(3) Fixed encroachments into the minimum clear floor area. Fixed encroachments shall be permitted to be included when determining the minimum clear floor area for an operating room as long as:

(a) There are no encroachments into the sterile field.

(b) The encroachments do not extend more than 12 inches (30.48 centimeters) on any side into the minimum clear floor area outside the sterile field.

(b) (c) The encroachment width along each wall does not exceed 10 percent of the length of that wall.

2.1-3.2.3.3 Documentation area

(1) Accommodations for written and/or electronic documentation shall be provided in the operating room.

(2) Where a built-in feature is provided for documentation, it shall allow for direct observation of the patient when in use.

*2.1-3.2.3.4 Visual information display, Image viewer. Each operating room shall have access to at least one medical image viewer visual information display located to provide the visibility needed to perform procedures.

A2.1-3.2.3.4 Visual information displays should allow positioning features (e.g., adjustable height and viewing angle) to support multiple types of users and visual needs.
2.1-3.2.3.5 *Hand scrub facilities.* Hand scrub facilities shall be provided in accordance with Section 2.1-3.8.6 (Hand Scrub Facilities).

2.1-3.2.3.6 Reserved

2.1-3.2.3.7 *Other design requirements*

(1) Surfaces. See Section 2.1-7.2.3 (Surfaces) for requirements.

(2) Building system requirements

(a) HVAC system


(ii) Anesthetic gas scavenging system. For operating rooms where general anesthesia is provided, see note m in Table 8.1 (Design Parameters—Outpatient Spaces) in ASHRAE/ASHE 170.

(b) Electrical receptacles. See Table 2.1-1 (Electrical Receptacles for Patient Care Areas in Outpatient Facilities) for requirements.

(c) Plumbing systems

(i) See Section 2.1-8.4.2.6 (Drainage systems) for requirements.

(ii) Medical gas requirements. See Table 2.1-2 (Station Outlets for Oxygen, Vacuum, Medical Air, and Instrument Air Systems in Outpatient Facilities) for requirements.

(d) Communications systems

(i) All operating rooms shall be equipped with an emergency communication system that incorporates push activation of an emergency call switch.

(ii) For nurse call device requirements, see Table 2.1-3 (Locations for Nurse Call Devices in Outpatient Facilities).

2.1-3.2.3.8 *Support areas for the operating room*

(1) General

(a) Facilities that have an operating room(s) shall have the support areas in this section.

(b) Sharing of these support areas with other clinical services in the facility shall be permitted.

(2) – (7) Reserved

(8) Medication safety zone. See Section 2.1-3.8.8 (Medication Safety Zones) for requirements.

(9) – (10) Reserved

(11) Clean storage

(a) A storage area for clean/sterile supplies shall be provided.

(b) Facilities with more than one operating room shall have a clean workroom.
(12) Soiled holding. A space for holding soiled materials shall be provided that is separate from the clean storage area.

(13) – (15) Reserved

(16) Sterile processing facilities. Where sterile processing is performed on-site, sterile processing facilities shall be provided in accordance with Section 2.1-4.3.2 (Facilities for On-Site Sterile Processing).

(17) Pre- and post-procedure patient care. Where pre- and post-procedure patient care is required to support the procedures performed in the operating room, the requirements in this section shall be met.

(a) Location. Pre- and post-procedure patient care stations(s) shall be permitted to be located in the operating room or in a specifically designated patient care area.

(b) Design requirements. Where pre- and post-procedure patient care stations are located in a specifically designated patient care area, see Section 2.1-3.7 (Pre- and Post-Procedure Patient Care) for requirements.

2.1-3.2.3.9 Reserved

2.1-3.2.3.10 Support areas for patients. Storage for patients’ belongings. Provisions shall be made for securing patients’ personal effects during surgery.

2.1-3.2.4 Hyperbaric Oxygen Therapy Facilities

Where clinical hyperbaric oxygen therapy services are provided, the requirements in this section shall be met.

2.1-3.2.4.1 Hyperbaric treatment area

(1) General. The hyperbaric treatment area shall meet the requirements of the “Hyperbaric Facilities” chapter in NFPA 99: Health Care Facilities Code.

*(2) Hyperbaric chambers

   A2.1-3.2.4.1 (2) For additional information on the design of hyperbaric chambers and the rooms that chambers are housed in, contact the Undersea and Hyperbaric Medical Society (www.uhms.org).

(a) Multiplace (Class A chamber) facilities

   (i) Area. The space provided to house Class A chambers and supporting equipment shall accommodate the equipment manufacturer’s technical specifications, but shall not be less than the space required to meet the clearances in Section 2.1-3.2.4.1 (2)(a)(ii) (Clearances).

   (ii) Clearances. There shall be a minimum clearance of 3 feet (91.44 centimeters) around the chamber except as follows:

   • Gurney access. The area in front of chamber entries designed for gurney access shall have a minimum clearance of 8 feet (2.44 meters) for gurney approach.

   • Wheelchair access. The area in front of chamber entries designed for ambulatory or wheelchair access only shall have a minimum clearance of 5 feet (1.52 meters) for wheelchair approach.
2.1 Common Elements (sections 1 – 3)

*(iii) Entries
- Entries designed for wheelchairs or gurneys shall be provided with access ramps that are flush with the chamber entry doorway.
- Chamber entries not designed for gurney access shall be a minimum of 3 feet (91.44 centimeters).

A2.1-3.2.4.1 (2)(a)(iii) Chamber entries not designed for gurney access are locks or entry compartments with a circular entry hatchway or door.

(b) Monoplace (Class B chamber) facilities

(i) Area. The space provided to house Class B chambers and supporting equipment shall accommodate the equipment manufacturer’s technical specifications, but shall not be less than the space required to provide the clearances in Section 2.1-3.2.4.1 (2)(b)(ii) (Clearances).

(ii) Clearances. There shall be a minimum clearance of 2 feet (60.96 centimeters) around the chamber except as follows:
- A minimum clearance of 3 feet (91.44 centimeters) shall be provided between the control sides of two chambers.
- A minimum passage of 12 inches (30.48 centimeters) shall be provided between the foot of each chamber and any wall or obstruction.
- The area in front of the chamber entry shall be designed for gurney access. A minimum clearance of 8 feet (2.44 meters) shall be provided for gurney approach.

*(iii) An oxygen service valve shall be provided for each chamber.

A2.1-3.2.4.1 (2)(b)(iii) Individual chamber oxygen service valve. The oxygen service shutoff valve is provided for facility startup and shutdown as well as for service of the chamber without needing to shut down all chambers in the area. This is in addition to the zone valve that is required to control the oxygen flow to the entire room. The service valve should be located so it is visible and accessible to the chamber operators, as required by NFPA 99.

2.1-3.2.4.2 – 2.1-3.2.4.3 Reserved

2.1-3.2.4.4 Pre-procedure patient care area

(1) General. A patient holding area shall be provided.

(a) Location. The patient holding area shall be:

(i) Under staff control.

(ii) Located out of the traffic flow from the chamber so that gurney patients in the holding area are out of the direct line of normal traffic.

(iii) Located so that access to and from the hyperbaric treatment area is not obstructed.

(b) Hyperbaric facilities designed for incidental inpatient services (i.e., two or fewer inpatients at one time) that still maintain outpatient occupancy designation shall have separate inpatient and outpatient holding areas screened to provide visual and acoustic privacy between them.
(c) Omission of the patient holding area shall be permitted for facilities with two or fewer Class B hyperbaric chambers.

(2) Space requirements. The patient holding area shall be sized to accommodate patients on gurneys.

(3) Medical gas requirements. See Table 2.1-2 (Station Outlets for Oxygen, Vacuum, Medical Air, and Instrument Air Systems in Outpatient Facilities).

2.1-3.2.4.5 – 2.1-3.2.4.7 Reserved

2.1-3.2.4.8 Support areas for the hyperbaric suite

(1) General

(a) The support areas in Section 2.6-3.8 (Support Areas for the Infusion Center) shall be provided for the hyperbaric facility as amended in this section.

(b) Where the hyperbaric facility is included as an integral portion of another service (e.g., a wound care service), support areas shall be permitted to be shared.

(2) Reception/control desk

(3) Reserved

(4) Consultation/examination room. A room(s) for individual consultation and treatment shall be provided.

(5) – (12) Reserved

(13) Equipment and supply storage

(a) Clean linen and supply storage

(i) Storage shall be provided for clean supplies and linens.

(ii) Where a separate supply storage room is provided, it shall be permitted to be shared with another area or clinical space in the facility.

(b) A gas cylinder room shall be provided for Class A facilities.

(i) The gas cylinder room shall provide, at minimum, space to house eight (H) cylinders and two gas manifolds, consisting of at least two (H) cylinders on each manifold.

(ii) Where dedicated medical gases are not provided from another area of the facility, this room shall be large enough to accommodate storage of enough (H) cylinders and manifolds for the reserve medical gases required for chamber operations.

(14) Environmental services room. An environmental services room shall be provided in accordance with Section 2.1-5.3 (Environmental Services Room) as amended in this section.

(a) The environmental services room shall be immediately accessible to the hyperbaric suite.

(b) Where a separate storage room for environmental services supplies is provided, it shall be permitted to be shared with another area or clinical space in the facility.
2.1 Common Elements (sections 1 – 3)

(15) Reserved

(16) Compressor room

(a) The compressor room shall be large enough to house the chamber compressors, accumulator tanks, and fire suppression system and to allow them to meet the requirements of the NFPA 99 “Hyperbaric Facilities” chapter.

(b) Reserve breathing gases shall be permitted to be housed in the compressor room if the room is located in the hyperbaric suite.

2.1-3.2.4.9 Support areas for staff. A staff toilet room(s) with a hand-washing station(s) that meets the requirements in Section 2.1-3.8.7 (Hand-Washing Station) shall be immediately accessible to the hyperbaric suite.

2.1-3.2.4.10 Support areas for patients

(1) Patient waiting area

(a) Location. The patient waiting area shall be:

(i) Screened from unrelated traffic.

(ii) Under staff control.

(iii) Separated from the hyperbaric suite by a door.

(b) Space requirements

(i) Seating capacity shall be provided to accommodate the maximum expected patient volume.

(ii) Where the waiting area will also be used as a patient holding area, it shall be large enough to accommodate the clinical program and chamber mix; see Section 2.1-3.2.4.4 (Pre-procedure patient care area).

(c) Omission of the patient waiting area shall be permitted for facilities with two or fewer Class B hyperbaric chambers.

(2) Patient toilet room. A toilet room(s) with a hand-washing station(s) that meets the requirements in Section 2.1-3.8.7 (Hand-Washing Station) shall be directly accessible to the hyperbaric suite.

(3) Patient changing room

(a) Changing rooms for patients shall be provided and shall include:

(i) A seat or bench made of non-absorbent material

(ii) A mirror

(iii) Provisions for hanging patients’ clothing

(iv) Provisions for securing valuables

(b) At least one changing room that can accommodate wheelchair patients shall be provided.
2.1-3.3 Special Patient Care Rooms

2.1-3.3.1 General

Requirements for other types of special patient care rooms are located in the facility chapters.

2.1-3.3.2 Airborne Infection Isolation (AII) Room

*2.1-3.3.2.1 General

A2.1-3.3.2.1 For additional information, refer to the Centers for Disease Control and Prevention (CDC) publication “Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings” and “Guidelines for Environmental Infection Control in Health-Care Facilities,” both available on the CDC website.

(1) In facilities that serve patients with known infectious disease, the need for and number of airborne infection isolation rooms shall be determined by an infection control risk assessment (ICRA).

(2) Where an AII room(s) is provided, it shall meet the requirements for the clinical space (e.g., exam room, procedure room) and the requirements in this section.

2.1-3.3.2.2 AII room requirements

(1) Capacity. Each room shall accommodate only one patient.

(2) Hand-washing station. A hand-washing station shall be located in each AII room.

(3) Personal protective equipment (PPE) storage. Provision shall be made for PPE storage and disposal at the entrance to the room.

*2.1-3.3.2.3 Anteroom.

(1) Whether an anteroom is required shall be determined by an infection control risk assessment (ICRA). See Section 1.2-4.2.2.2.1 (1) (ICRA Considerations: Design elements—AII rooms) for requirements.

(2) An anteroom is not required; however, where an anteroom is provided, it shall meet the following requirements:

(a) The anteroom shall provide space for persons to don PPE before entering the AII room and doff PPE after leaving the room.

(b) All doors to the anteroom shall have self-closing devices.

(c) The anteroom shall be equipped with at least the following:

(i) Hand-washing station

(ii) Storage for unused PPE

(iii) Disposal/holding container for used PPE

2.1-3.3.2.4 Architectural details and furnishings. The requirements in this section are in addition to those in Section 2.1-7.2 (Architectural Details, Surfaces, and Furnishings) that apply to AII rooms.
(1) Architectural details

(a) All room perimeter walls, ceiling, and floor, including penetrations, shall be constructed to prevent air exfiltration; see Section 7.2.1 (AII rooms) in Part 3: ANSI/ASHRAE/ASHE Standard 170.

(b) Doors

(i) All rooms shall have self-closing devices on all room exit doors. Omission of these devices shall be permitted if the alarm required in Section 2.1-3.3.2.5 (Pressure alarm) has an arrangement that allows activation of the audible alarm when the AII room is in use as an isolation room.

(ii) Edge seals shall be provided along the sides and top of the doorframe for any door into the AII room.

*(iii) Use of bottom edge door sweeps to assist in maintaining negative pressure shall be permitted.

A2.1-3.3.2.4 (1)(b)(iii) Door sweeps. To support maintenance of negative pressure, the opening under the door should be the minimum required for proper door operation. However, if the AII room is not sealed well and the negative pressure of the room cannot be maintained at negative 0.01 inches of water column (negative 2.5 pascals) without a door sweep, provision of a sweep is necessary.

(2) Furnishings

(a) Window treatments shall be provided in accordance with Section 2.1-7.2.4.2 (Window treatments in patient care areas) except that fabric drapes and curtains shall not be used.

*(b) Use of fabric privacy curtains shall be permitted if they are washable.

A2.1-3.3.2.4 (2)(b) Use of a wipeable fabric with a smooth surface is preferable.

2.1-3.3.2.5 Pressure alarm. A visual or audible alarm that indicates if negative pressure is not maintained in the room shall be provided for the AII room.

*2.1-3.4 Accommodations for Telemedicine Services

A2.1-3.4 Patient experience. Remote communications via electronic equipment, although not a replacement for in-person care, may be offered as a supplement where in-person care is not available or medically necessary. To assist in the adoption of telemedicine and maximize its benefits for elderly patients, those unaccustomed to electronic communication, and those with vision, hearing, or cognitive impairments, care should be given to remove technological barriers and provide telemedicine endpoints that facilitate natural communication for the widest range of participants. Facilities and systems used for telemedicine communications should strive to maintain the level of safety, privacy, quality of care, and patient experience that would be expected for in-person communication.

*2.1-3.4.1 General
Where clinical telemedicine services are provided in a health care facility, telemedicine spaces to accommodate those services shall meet the requirements in this section.

**A2.1-3.4.1 Telemedicine service types**

a. Services may include one-on-one interactions, consultations with a patient and family members (e.g., pediatric or elderly patients), examinations supported by a telemedicine presenter located with the patient, or specialty services such as dermatology or orthopedics. Each type of service may have specific needs for lighting and space to support the clinical function; for example, evaluation of patient gait requires unobstructed space to walk from one end of the bay, cubicle, or room to the other. Therefore, to achieve a functional design, it is important to know what services will be provided.

b. The requirements in this section are not intended to apply to virtual visits that do not require a physical examination of the patient or visits that originate from a physician’s or patient’s home.

**2.1-3.4.2 Telemedicine Bay, Cubicle, or Room**

A bay, cubicle, or room shall be provided for telemedicine services.

**A2.1-3.4.2 Design considerations**

a. *Equipment*

   — Camera placement should be set so recipients perceive the exchange as happening eye-to-eye. The discrepancy between gaze angle should be minimal.

   — Temperature control should be considered based on the amount of electronic equipment that may generate significant amounts of heat.

   — Depending on the complexity of equipment used, multiple outlets may be required for equipment. Outlets should be located near the unit to avoid wires/cables on the floor.

b. *Architectural details*

   — Doors in view of the main camera should be able to be closed to assure maximum privacy during the telemedicine appointment.

   — Placement of doors behind the patient should be avoided as this can make patients uncomfortable.

**2.1-3.4.2.1 General**

1. Where clinical telemedicine services are provided, the telemedicine bay, cubicle, or room shall meet the requirements of the section of the Guidelines that directly relates to the services provided and the patient population served.

2. Where patient volume does not justify provision of a dedicated telemedicine room, a telemedicine room shall be permitted to serve other functions such as physician’s office, exam room, or conference room.
*2.1-3.4.2.2 Space requirements.* Where used for examination purposes, the telemedicine bay, cubicle, or room shall be sized to accommodate the following:

**A2.1-3.4.2.2 Sizing considerations**

a. Where a separate camera and microphone are used rather than a computer or other electronic device, the distance between walls will determine the proximity of the camera and microphone to the patient. Use of a small bay, cubicle, or room may force the camera to be located too close to the patient, limiting the view of the clinician presenting the patient for consultation. Therefore, the camera and exam table should be positioned so a presenter using and manipulating telemedicine peripherals can see both the patient and the monitor of images being transmitted to the remote clinician’s site.

b. Stationary cameras should be placed on top of the monitor used for viewing and directed toward the patient to capture the most information possible (i.e., head plus full-body shots). This is easier with dedicated telemedicine carts than with desktop or mobile units.

c. Where the microphone is not embedded in the device being used (e.g., desktop, laptop, smartphone, or similar device), space for microphones should be placed in front of and close to the individuals speaking in the videoconference, ideally at least 4 feet (1.22 meters) from the telemedicine workstation to prevent audio feedback.

d. The bay, cubicle, or room should be large enough for the patient and the patient presenter, if one is present, to move around comfortably. The patient should be able to sit in a chair as well as use the examination table. Where necessary, a fax machine should be directly accessible. A second chair should be available for a family member.

e. Where the examination includes gait evaluation, the bay, cubicle, or room should provide sufficient space for this activity to be captured by the camera.

(1) An examination table situated within view of the camera

(2) Telemedicine equipment (fixed or mobile)

(3) Peripheral devices

(4) An on-site caregiver or patient presenter

(5) A hand-washing station where hands-on patient examinations are provided

(6) A documentation area

**2.1-3.4.2.3 Privacy**

(1) The telemedicine bay, cubicle, or room shall provide speech and visual privacy with adjacent spaces based on the bay, cubicle, or room’s clinical function, as indicated in Table 1.2-7 (Design Criteria for Speech Privacy for Enclosed Rooms and Open-Plan Spaces).

(2) Space shall permit arrangement of monitors, screens, or other projections of images or data so they are not visible to casual observers outside the telemedicine bay, cubicle, or room.
2.1-3.4.2.4 Acoustic considerations

**A2.1-3.4.2.4 Acoustic considerations.** The acoustic environment should be designed to facilitate speech intelligibility and communication. The telemedicine bay, cubicle, or room should be in a quiet location that minimizes exposure to noise that can be picked up by microphones. Noise sources may include, but are not limited to, open office areas, busy corridors, stairwells, parking lots, waiting rooms or areas, HVAC systems, and toilet rooms. Cooling fans for equipment should be controlled and limited for telemedicine bays, cubicles, or rooms.

(1) Speech intelligibility. Telemedicine rooms shall maintain the minimum sound absorption coefficient for the room’s clinical requirement in Table 1.2-4 (Minimum Design Room Sound Absorption Coefficients) or 0.10 (absolute), whichever is greater.

*(2) Sound isolation. Telemedicine rooms shall achieve the minimum STC rating for the room’s clinical requirement in Table 1.2-6 (Design Criteria for Minimum Sound Isolation Performance Between Enclosed Rooms).

**A2.1-3.4.2.4 (2)** In designing to achieve the minimum STC rating, all portions of the room’s envelope should be considered, including walls, floor/ceiling assemblies, doors, and glazing, as well as field conditions that may affect the performance of these elements.

(3) Background noise. Telemedicine bays, cubicles, or rooms shall maintain background noise levels for the room’s clinical requirement in Table 1.2-5 (Maximum Design Criteria for Noise in Interior Spaces Caused by Building Systems).

2.1-3.4.2.5 Lighting

*(1) The bay, cubicle, or room shall provide the ability for direct frontal lighting.

**A2.1-3.4.2.5 (1) Lighting considerations**

a. Direct and indirect lighting should be provided to create images that have even lighting and accurately reproduced colors.

b. Full-spectrum or warm, white light (3200–4000 K) should be provided.

c. A minimum light level of 150 foot-candles should be provided.

*(2) Means for controlling glare from natural and artificial light sources shall be provided.

**A2.1-3.4.2.5 (2) Controlling glare**

a. Bays, cubicles, or rooms with windows should have shades or blinds to reduce light and glare, although this may not be enough to achieve acceptable images. In rooms with windows, it should be possible for clinicians and/or patients to avoid sitting in front of a window unless the backlighting can be adequately addressed.

b. A good source of diffused light is needed in front of the patient shining diagonally toward the patient to reduce shadows that occur on the face if only overhead lighting is used or if there is a light source behind the patient. Spotlights or harsh directional lighting can create unwanted shadows. Egg-crate diffusers are not recommended due to hot spots.
2.1-3.4.2.6 Interior surfaces

*(1) Bay, cubicle, or room finishes and colors shall be selected to maintain natural rendition of color and pattern.

A2.1-3.4.2.6 (1) Interior surfaces

a. Light to medium blue or light gray matte finishes are recommended for proper color rendition and to facilitate picture clarity. These shades are preferred because they offer the desired minimal light absorption and light reflectivity. (Although green is the color of choice for a surgical suite because it offers visual comfort when viewing pink and red tissues for a prolonged time, it is not appropriate here.)

b. Use of this color can be limited to the walls that will be the background for the camera views. This may include more than one wall depending on the configuration of the bay, cubicle, or room.

c. Screens or curtains may be used to provide the appropriate background color or to hide clutter (e.g., bookshelves, framed pictures with glass).

*(2) Backdrop wall color shall have a light reflectance value of 30 to 40 percent.

A2.1-3.4.2.6 (2) Avoiding glare and contrast

a. A surface finish gloss rating level 1 or 2 (flat finish) should be used rather than gloss level 5 (semi-gloss) or gloss level 6 (gloss finish) to avoid glare and reflections. Reference the Master Painters Institute Gloss and Sheen Standards for latex versus alkyd paint gloss ratings.

b. Glare and contrast problems in the visual environment may be avoided by specifying the following light reflectance values for surfaces in the telemedicine bay, cubicle, or room:

— Ceilings: 80-90 percent
— Furniture: 25-45 percent
— Flooring: 20-40 percent

*2.1-3.4.2.7 Site identification. Facility identification shall be provided at the site so it appears in the transmitted image unless it is embedded in the telemedicine platform.

A2.1-3.4.2.7 Site identification. Facility identification may be provided through signage, such as a sign with the name of the site in the background, or site identification incorporated into the telemedicine technology platform. Identification can help keep everyone oriented and may be required for reimbursement.

*2.1-3.4.3 Support Areas for Telemedicine Bays, Cubicles, or Rooms

Where portable equipment and peripheral devices are used (e.g., digital camera and task lighting, portable EKG devices, smartphones, roaming robots), secure storage shall be provided.
A2.1-3.4.3 Infection prevention considerations for telemedicine spaces. Telemedicine equipment should be selected and installed to facilitate cleaning and infection prevention practices.

*2.1-3.5 Imaging Services

A2.1-3.5 Imaging services. Imaging services commonly include radiography, fluoroscopy, mammography, tomography, computed tomography (CT), ultrasound, magnetic resonance imaging (MRI), hybrid imaging/therapy technologies (e.g., MRI/linear accelerators), and other imaging modalities. Of the various imaging modalities used, many are performed for diagnostic purposes by projecting energy through a mass (the patient) and recording the resultant energy characteristics. Some procedures involve various forms of therapeutic interventional imaging or image guidance in conjunction with invasive procedures. Others—such as nuclear imaging—place radioactive substances inside the patient and record metabolic energy emissions. For guidelines on radiosurgery and proton therapy facilities, see Section 2.1-3.6 (Radiation Therapy).

*2.1-3.5.1 General

A2.1-3.5.1 Location. Where physical proximity cannot be provided, or where imaging services serve a specific population (e.g., CT scanner located in the emergency department), distributed imaging services may be considered in lieu of physical proximity, but this arrangement should not result in the need for inefficient duplication of staff or equipment. Particular attention should be paid to the management of outpatients for preparation, holding, and observation. Emergency, surgery, cystoscopy, and outpatient clinics should be accessible to imaging services.

2.1-3.5.1.1 Application

1. Where imaging services are provided in an outpatient facility, facilities for the modalities offered shall meet the requirements in this section.

2. The requirements in this section shall not apply to imaging services provided in mobile/transportable medical units except as noted in Chapter 2.13, Specific Requirements for Mobile/Transportable Medical Units.

2.1-3.5.1.2 Imaging room classification. To differentiate the design and construction requirements needed to achieve the environmental controls and other requirements that support the amount of intervention to be provided, imaging rooms shall be classified as described in Table 2.1-5 (Classification of Room Types for Imaging Services). [moved to 2.1-3.5.2.1 (1)]

*2.1-3.5.1.2 2.1-3.5.1.3 Radiation protection. For imaging services that require radiation protection, a certified radiation physicist or equally 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 imaging services layout and equipment selections.

A2.1-3.5.1.2 A2.1-3.5.1.3 Shielding for an ionizing radiation enclosure may also be subject to acceptance testing, which should be performed by the certified radiation physicist or qualified expert as specified in applicable local, state, or federal requirements.
(1) Shielded control room or alcove. Each imaging room containing non-portable radiation-emitting imaging equipment or imaging equipment requiring shielding from external sources of interference shall include a fixed shielded control room or alcove to minimize radiation exposure of technologists and others. Movable imaging equipment affixed to rails, tracks, or booms shall not be considered portable.

(a) Space requirements. The control room or alcove shall be, at minimum, sized and configured in compliance with the equipment manufacturer’s recommendations for installation, service, and maintenance.

*(b) Shared control room or alcove

*(i) A control room or alcove shall be permitted to serve more than one imaging room, provided the manufacturer’s recommendations for installation, service, and maintenance are accommodated for all rooms served.

A2.1-3.5.1.3 (1b)(i) Shared control rooms are sometimes not desirable, especially in Class 2 and Class 3 imaging rooms, due to excessive noise, **lack of patient privacy due to sight lines between rooms**, and possible infection prevention issues.

*(ii) Where a control room serves more than one imaging room, means shall be provided to prevent a patient in one imaging room from viewing a patient in another imaging room through the shared control room.

A2.1-3.5.1.3 (1b)(ii) Means to avoid direct sight lines between imaging rooms through the control room might include view windows with integral blinds, electro-chromatic glass, or reflective one-way glass that prevents patients from seeing into and across the control room. An alternate approach might be to arrange the imaging rooms so that sight lines between the rooms are prevented entirely.

*(c) Shielded view window. The control room or alcove shall include a shielded view window designed to provide a full view of the examination/procedure table and the patient at all times, including a full view of the patient during imaging activities (e.g., when the table is tilted or the chest x-ray is in use). If a direct line of sight cannot be accommodated due to functional requirements, use of closed-circuit video monitoring shall be permitted.

A2.1-3.5.1.3 (1c) **Shielded view window.** A certified radiation physicist or other qualified expert representing the owner or appropriate state agency should determine the minimum distance to be provided between the outside edge of the shielded view window and the outside partition edge to prevent exposure of technologists or others positioned near the outside edge of the window.

(d) **Control room or alcove for Class 2 or Class 3 imaging room**

*(i) Where a The control room is provided for a Class 2 or Class 3 imaging room, it shall be physically separated from the Class 2 or Class 3 imaging room with walls and a door.

*(ii) Where an imaging room requires positive (or negative) pressure, a Omission of the control room door shall be permitted where provided between the control room serves only one Class 2 or Class 3 and the imaging room and is built, maintained, and controlled the same as the imaging room.
A2.1-3.5.1.3 (1)(d)(ii) “Built, maintained, and controlled” means the control room shall have monolithic ceilings, operating room finishes, laminar flow diffuser array, low returns, air changes, etc.

*(c)(f)* Omission of the control room or alcove shall be permitted in electrophysiology labs if approved by a certified radiation physicist and provisions are made for individual staff radiation shielding.

A2.1-3.5.1.3 (1)(e)(f) Provisions for individual staff radiation shielding may include mobile lead barriers or leaded apparel.

*(2)* Radiation protection requirements shall be incorporated into the specifications and the building plans.

A2.1-3.5.1.3 (2) Data required by the physicist may include the following:

a. Make, model, and placement of imaging equipment

b. Room size and configuration (including horizontal and vertical dimensions)

c. Anticipated frequency and duration of radiation emissions

d. Description of adjacent occupants (above, below, and horizontally)

e. Room and building construction materials and assemblies

2.1-3.5.2 Imaging Rooms

2.1-3.5.2.1 General

(1) The requirements in this section shall apply to imaging rooms for all modalities except where indicated.

(2) **2.1-3.5.1.2** Imaging room classification. To differentiate the design and construction requirements needed to achieve the environmental controls and other requirements that support the amount of intervention to be provided, imaging rooms shall be classified as Class 1, Class 2, or Class 3 imaging rooms as described in Table 2.1-5 (Classification of Room Types for Imaging Services).

(3) (2) Where an imaging room will be used for Class 1 and Class 2 procedures, the more stringent requirements for the higher class room shall be followed.

(4) (3) Where an imaging room intended for Class 3 procedures is provided, it shall meet a hybrid operating room that meets the requirements for the applicable imaging modality and the requirements for an operating room in Section 2.1-3.2.3 (Operating Rooms), except for Section 2.1-3.2.3.2 (Operating Rooms—Space requirements), shall be provided.

*2.1-3.5.2.2 Space requirements.* Space shall be provided to accommodate the equipment and staff needed for planned imaging services.

A2.1-3.5.2.2 Space layouts should be developed to meet the minimum requirements in the manufacturer’s technical specifications because area requirements may vary from machine to machine. However, manufacturers’ recommendations should not be used as the sole determinant for room size as they may not take into consideration the clinical needs at a particular facility. As
well, because technology changes and siting requirements frequently vary from manufacturer to manufacturer, rooms may be sized larger than manufacturer’s minimum technical specifications to allow for upgrading of equipment over time.

Consideration should also be given for the space needs of other equipment (e.g., physiological monitoring or dye injectors).

(1) **Clearances.** Imaging rooms shall be sized and configured, at minimum, to comply with the manufacturer’s recommendations for installation, service, and maintenance. (2) Imaging rooms shall be sized to provide the following minimum clearances:

(a) **All imaging rooms**

   (i) Manufacturer’s recommended clearances for installation, service, and maintenance

   (ii) 5 feet (1.52 meters) on at least one designated patient transfer side(s) of the patient table/bed/couch, gantry, or assembly

(b) **Class 1 imaging rooms:** 3 feet (91.44 meters) 4 feet (122 centimeters) around the imaging device

   (i) This clearance shall be provided on all circulating sides of a freestanding imaging device, including the patient table/bed/couch, gantry, or assembly.

   (ii) Omission of this clearance shall be permitted on the side(s) of an imaging device that is mounted to/placed against a wall (e.g., a bone densitometry table).

(b) **Other clearances in accordance with clinical needs (e.g., medical gas service, anesthesia cart, clinical staff)**

(c) **Class 2 imaging rooms:** 4 feet (1.22 meters) around the imaging device

   (i) This clearance shall be provided on all sides of a freestanding imaging device, including a patient table/bed/couch, gantry, or assembly.

   (ii) Omission of this clearance shall be permitted on the side(s) of an imaging device that is mounted to/placed against a wall.

(d) **Imaging rooms where an anesthesia machine will be used:** Clearances shall be provided in accordance with Section 2.2-3.3.2.2 (2)(b) (Where an anesthetich...)

(2) Where examinations or procedures will be performed that require additional personnel and/or large equipment, imaging rooms shall be sized to accommodate the personnel and equipment planned to be in the room, including any that will be needed for emergency rescue.

**2.1-3.5.2.3 Hand-washing station or hand scrub facilities.** Hand-washing stations and hand scrub facilities shall comply with the requirements in Section 2.1-3.8.7 (Hand-Washing Station) and Section 2.1-3.8.6 (Hand Scrub Facilities).

(1) A hand-washing station shall be provided in Class 1 imaging rooms unless specified otherwise for a specific imaging modality.

(2) A hand-washing station or hand scrub facilities shall be provided for Class 2 imaging rooms.
(a) Where a hand-washing station is provided, it shall be directly accessible to the Class 2 imaging room.

(b) Where hand scrub facilities are provided, a hand scrub position shall be directly outside the entrance to the Class 2 imaging room.

(3) Hand scrub facilities shall be provided directly outside the entrance to Class 3 imaging rooms.

2.1-3.5.2.4 Other design elements. The following shall apply to all imaging rooms, with noted exceptions:

(1) Architectural details and surfaces

(a) Floor

(i) Class 2 and Class 3 imaging rooms shall meet the flooring requirements in Section 2.1-7.2.3.1 (6) (Floor and wall base assemblies).

(ii) Floor finishes shall be selected to conform to imaging equipment technical requirements (e.g., electrostatic dissipation), rolling resistance to carts and tables, and service limitations (e.g., no powered floor cleaners in an MRI scanner room).

(b) Ceiling

(i) Where only general diagnostic procedures are performed, use of a lay-in ceiling shall be permitted.

(ii) Class 2 imaging rooms shall be provided with ceiling assemblies that meet the requirements in Section 2.1-7.2.3.3 (2) (Ceilings—Semi-restricted areas).

(iii) Class 3 imaging rooms shall be provided with ceiling assemblies that meet the requirements in Section 2.1-7.2.3.3 (3) (Ceilings—Restricted areas).

(c) Door openings. Imaging rooms shall have entrance door openings that comply with Section 2.1-7.2.2.3 (Doors and door hardware).

*(d) Structural support. The floor and, if applicable, ceiling structures in imaging rooms shall be designed to support the weight of the imaging equipment as well as other fixed ancillary equipment (e.g., lights, service columns) and movable ancillary equipment.

A2.1-3.5.2.4 (1)(d) Structural support. The design team should consider the long-term flexibility of imaging rooms when designing equipment supports. In lieu of customized supports for each suspended item, a regularly spaced grid of overhead structural members may enable rapid changes to the room, such as repositioning surgical lights and service columns, and facilitate future equipment replacement. However, any deviation from manufacturer-furnished structural support requirements should be reviewed with equipment manufacturers.

*(e) Protection from vibration and other disturbances. Imaging room(s) shall be protected from environmental vibrations and other disturbances in accordance with the imaging equipment manufacturer’s technical specifications.

A2.1-3.5.2.4 (1)(e) Protection from environmental disruptions
2.1 Common Elements (sections 1 – 3)

a. Many imaging systems are highly sensitive to vibration, electromagnetic interference, and other forces that arise from adjacent equipment movement, electrical rooms, and unassociated building equipment. These forces can result in serious degradation of images. Project teams should consult with equipment manufacturers to determine whether site readiness testing is required prior to equipment installation and to strategize about control mechanisms to mitigate such forces.

b. Many imaging systems are cooled via closed liquid-based cooling loops that must necessarily cross into imaging rooms. Such cooling loops require protective means to reduce the possibility of water leakage into ceiling or wall cavities surrounding invasive fluoroscopy rooms. The design team should consider double-jacketing horizontal or vertical cooling lines and installing protective drip pans with water-sensing devices below lines in ceiling cavities.

(2) Building system components

(a) Electrical receptacles. For requirements, see Table 2.1-1 (Electrical Receptacles for Patient Care Areas in Outpatient Facilities).

(b) Medical gas systems. For requirements, see Table 2.1-2 (Station Outlets for Oxygen, Vacuum, Medical Air, and Instrument Air Systems in Outpatient Facilities).

(c) Call systems. For requirements, see Table 2.1-3 (Locations for Nurse Call Devices in Outpatient Facilities).

*2.1-3.5.2.5 System component room. Where a system component room is provided, it shall meet the requirements in this section.

**A2.1-3.5.2.5 Purposes for a system component room.** Many imaging modalities require the use of electronics components that may be required or preferred to be located in a room unto themselves for heat load, infection control, noise, or serviceability reasons (or combinations thereof).

(1) Location.

*(a) For Class 2 and Class 3 imaging rooms, the system component room shall not open into the imaging room or any restricted space.

**A2.1-3.5.2.5 (1)(a) System component room maintenance access.** If equipment requires technicians to view the imaging equipment during maintenance, a window between the system component room and the imaging room or a closed-circuit video camera can be used to provide this access.

*(b) A system component room shall be permitted to be shared among multiple imaging rooms provided the equipment manufacturer(s) permits such sharing and that manufacturer recommendations for installation, service, and maintenance are accommodated for all rooms served.

*(2) Space requirements. The system component room shall be sized to accommodate the following as indicated by the imaging equipment manufacturer(s), including the clear floor area:
2.1 Common Elements

A2.1-3.5.2.5 (2) System component room space requirements. The size of the system component room should be based on the equipment manufacturer’s space requirements for imaging system components as well as on the amount of additional gear that may be required. The project team should consider space needs for electrical transformers and panels, supplemental cooling units, heat exchangers, pumps, and other gear that may not be readily evident from manufacturer-provided installation documents. Many of these items need clear floor space on one or more sides to allow for service access. The project team should also consider ancillary equipment that may not be accounted for in the imaging equipment manufacturer’s documentation but is nonetheless critical to functionality of the room. Many of these items need clear floor space on one or more sides to allow for service access.

(a) Transformers
(b) Power distribution equipment
(c) Power conditioning/UPS equipment
(d) Computers
(e) Associated electronics and electrical gear

*2.1-3.5.2.6 Multiple-modality devices. Where two or more individual imaging or therapy modalities are integrated into one imaging device (e.g., PET/CT, SPECT/CT or PET/MRI), the minimum design requirements for that room shall include the design criteria for each individual contributing modality.

A2.1-3.5.2.6 Multiple-modality devices. Multiple-modality devices include dual-diagnostic devices such as SPECT/CT or PET/MRI, but may also include unions of diagnostic and therapeutic technologies, such as MRI/Linac.

Nuclear imaging exquisitely depicts metabolic activity but does not necessarily clearly convey anatomic structure. Radiographic images typically clearly convey anatomic structure, but not necessarily metabolic or functional information. Magnetic resonance exquisitely conveys anatomic structure. Certain types of magnetic resonance imaging, such as magnetic resonance angiography (MRA), also convey metabolic activity clearly. Multiple-modality devices make it possible to achieve complementary imaging results from one procedure.

Although such multiple-modality devices are sometimes referred to as “hybrid” machines, this term is not used here to avoid confusing rooms where these devices are used with “hybrid operating rooms.” A hybrid operating room typically integrates any one of (or several) image-guided modalities (e.g., fluoroscopy, magnetic resonance, CT, PET, etc.) with surgical procedures.

Both multiple-modality devices and hybrid operating rooms exist in numerous configurations involving a variety of imaging techniques. It is anticipated that the diversity of imaging modalities used in these spaces will only increase in the future, and it is important to recognize that the design requirements of these spaces must respond to the myriad—and often complex—physical requirements of each imaging modality incorporated in the space.

*2.1-3.5.3 Computed Tomography (CT) Facilities
A2.1-3.5.3 Interventional CT scan procedures to be performed in a facility should be identified in the functional program. Guidelines requirements related to those procedures should be applied if the intervention is performed in the CT scanner room.

2.1-3.5.3.1 CT scanner room

(1) The CT scanner room shall meet the requirements in sections 2.1-3.5.1 (Imaging Services—General) and 2.1-3.5.2 (Imaging Rooms) as amended in this section.

(2) A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided in the CT scanner room.

2.1-3.5.3.2 Control room or alcove. A control room or alcove that meets the requirements in Section 2.1-3.5.1.3 (1) (Shielded control room or alcove) shall be provided.

2.1-3.5.3.3 System component room. Where provided, a system component room shall meet the requirements in Section 2.1-3.5.2.5 (System component room).

2.1-3.5.4 Radiography Facilities

2.1-3.5.4.1 General

(1) All imaging rooms where radiography services are performed shall meet the requirements in Section 2.1-3.5.1 (Imaging Services—General).

(2) Room design and equipment siting shall accommodate the manufacturer’s operational, service, and safety clearances for the imaging equipment used.

(3) Shielded control alcove

(a) See Section 2.1-3.5.1.3 (1) (Shielded control room or alcove) for requirements.

(b) For mammography machines with built-in shielding for the operator, omission of a shielded control alcove shall be permitted when approved by the certified radiation physicist or authority having jurisdiction.

2.1-3.5.4.2 Radiography room

(1) Radiography rooms shall meet the requirements in Section 2.1-3.5.4.1 (Radiography Facilities—General) and Section 2.1-3.5.2 (Imaging Rooms).

(2) A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided in the radiography room.

2.1-3.5.4.3 Fluoroscopy room. Fluoroscopy rooms shall meet the requirements in Section 2.1-3.5.2 (Imaging Rooms) as amended in this section.

(1) A separate toilet room with hand-washing station shall be directly accessible from each dedicated Class 1 fluoroscopy room or combination radiography/fluoroscopy room. Patients shall be able to leave the toilet room without reentering the fluoroscopy room.
(2) Location of Class 2 and Class 3 fluoroscopy rooms used for different clinical applications in the same area or suite of rooms shall be permitted. These rooms shall be permitted to share common support areas.

(3) Hand-washing station or hand scrub facilities. Fluoroscopy rooms shall meet the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities).

(4) Control room or alcove for fluoroscopy

(a) For Class 1 and Class 2 fluoroscopy rooms, a control room or alcove that meets the requirements in Section 2.1-3.5.1.3 (1) (Shielded control room or alcove) shall be provided.

(b) For Class 3 fluoroscopy rooms, a control room that meets the requirements in Section 2.1-3.5.1.3 (1) (Shielded control room or alcove) shall be provided.

(c) The control room door in Section 2.1-3.5.1.3 (1)(d) shall not be required where the control room serves only one fluoroscopy room that meets the requirements of a Class 2 or Class 3 imaging room and the control room is built, maintained, and controlled the same as a Class 2 or Class 3 imaging room.

*2.1-3.5.4.4 Mammography room. Mammography rooms shall meet the requirements in Section 2.1-3.5.4.1 (Radiography Facilities—General) and Section 2.1-3.5.2 (Imaging Rooms) as amended in this section.

A2.1-3.5.4.4 Mammography room. Where needle localization procedures are performed, a discreet patient route of travel (i.e., one that does not pass through public circulation routes) should be provided from the mammography room to a biopsy procedure room.

(1) Mammography rooms shall be sized to provide the following minimum clearances:

(a) 3 feet (91.44 centimeters) on all circulating sides of the patient position

(b) Other clearances in accordance with clinical needs

(2) Visual privacy of patients shall be provided. Views into the mammography room by the public or other patients shall be prevented when the room is in use.

(3) A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided in the mammography room.

(4) Where patients do not change in the mammography room, changing room(s) for mammography patients shall be immediately accessible to the waiting area and imaging room(s).

(a) Changing room(s) shall comply with the requirements of Section 2.1-3.5.10.3 (Patient changing rooms).

(b) Combination of mammography changing room(s) with changing areas for other imaging services shall be permitted.

2.1-3.5.5 Magnetic Resonance Imaging (MRI) Facilities

2.1-3.5.5.1 Configuration of the MRI suite.
2.1 Common Elements (sections 1 – 3)

(1) Application

(a) The requirements in this section shall apply to MRI equipment that is affixed to the building (i.e., shall not apply to portable MRI equipment).

(b) Suites for MRI equipment with a static magnetic field of 5 gauss (0.5 millitesla) that is contained within the MRI scanner device shall conform with the manufacturer’s siting guidance.

(2) Suites for MRI equipment with a static magnetic field of 5 gauss (0.5 millitesla) that extends beyond the MRI scanner device shall meet the following requirements:


(b) MRI suites as well as spaces around, above, and below (as applicable) shall adhere to requirements in International Electrotechnical Commission (IEC) Standard 60601-2-33: Medical electrical equipment – Part 2-33: Particular requirements for the basic safety and essential performance of magnetic resonance equipment for medical diagnosis that were established to prevent unscreened individuals from entering the 5-gauss (0.5-millitesla) volume around the MRI equipment and to minimize electromagnetic or radiofrequency interference to, or from, other equipment.

(c) In addition to the clinical and support areas in this section, the following shall be provided in the MRI suite:

(i) Space for patient interviews and physical and clinical screening separate from the MRI scanner

(b) Space for physical screening

* (ii) 2.1-3.5.5.6 Patient treatment/resuscitation area. An area adjacent to the MRI scanner room shall be provided for patient code treatment/resuscitation.

A2.1-3.5.5.1 (2)(c)(ii) A2.1-3.5.5.6 Patient treatment/resuscitation area. The patient treatment/resuscitation area should be located in the MRI suite as specified in the American College of Radiology’s “ACR Manual on MR Safety.” “ACR Guidance Document on MR Safe Practices.”

(iii) Ferromagnetic (only) detection and warning systems

(iv) Access control

(v) Space to accommodate site-specific clinical and operational requirements such as image-guided procedures, emergent imaging, or general anesthesia support

(vi) Space for containment of non-MRI-safe objects outside restricted MRI safety zones

(vii) Space for storage (patient lockers) of patient belongings and non-MRI-safe items

*(d) Any area in which the magnetic field strength is equal to or greater than 5 gauss (0.5 millitesla) shall be physically restricted by the use of key locks or pass-key locking systems.
A2.1-3.5.5.1 (2)(d) (4) A risk of injury or death is posed by the penetration of areas in which the magnetic field strength is equal to or greater than 5 gauss by unscreened persons or ferromagnetic objects or equipment.

2.1-3.5.5.2 MRI scanner room

*(1) MRI scanner rooms shall meet the requirements in sections 2.1-3.5.1 (Imaging Services—General) and 2.1-3.5.2 (Imaging Rooms) as amended in this section.

A2.1-3.5.5.2 (1) If use of anesthesia support is anticipated in the MRI scanner room, additional space, electrical outlets, and gas lines may be required.

(2) Hand-washing station

(a) A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided.

(b) Location of the hand-washing station directly outside the entrance to the MRI scanner room shall be permitted.

#2.1-3.5.5.3 Superconducting MRI cryogen venting. A system for cryogen venting, emergency exhaust, and passive pressure relief shall be provided in accordance with the equipment manufacturer’s technical specifications. Where a superconducting MRI system for which the manufacturer requires cryogen venting is installed, the requirements in this section shall be met.

*(1) MRI equipment protection. A cryogen vent (quench) pipe shall be provided in accordance with the equipment manufacturer’s technical specifications.

A2.1-3.5.5.3 (1) Cryogen venting pipe. Superconducting MRI systems that use trivial amounts of cryogen do not require quench pipes.

a. To protect occupants in the event of a cryogen escape, an insulated cryogen quench exhaust pipe as well as room exhaust and pressure equalization should be provided where superconducting MRI scanners are installed.

(b) Cryogen venting points of discharge shall have minimum clearances from air intakes, operable windows, or doors as defined by the MRI system manufacturer.

(c) Cryogen venting points of discharge shall be designed with weather head sufficient to protect against the ingress of horizontally driven rain.

(d) Accessible areas around cryogen vent points of discharge shall be marked to indicate the safety exclusion zone in accordance with MRI equipment manufacturer standards.

(2) Building/occupant protection. Emergency exhaust and passive pressure relief shall be provided in accordance with the equipment manufacturer’s technical specifications.

2.1-3.5.5.4 MRI control room. When the equipment manufacturer recommends an MRI control room for a typical equipment siting, a control room that meets the requirements in Section 2.1-3.5.1.3 (1) (Shielded control room or alcove) shall be provided as amended in this section.
2.1 Common Elements (sections 1 – 3)

(1) The operator’s console shall be positioned so the operator has a full view of the principal approach and entrance to the MRI scanner room.

(2) Where there is an outward-swinging door, in the open position the door shall not obstruct the view of the entry opening from the operator’s console.

2.1-3.5.5.5 Entry vestibule

(1) The entry vestibule shall be located outside the MRI scanner room so that patients, health care personnel, and other employees must pass through it before entering the MRI scanner room.

(2) The entry vestibule shall be permitted to be either a part of the MRI control room or directly visible from the control room.

[Moved to Section 2.1-3.5.5.1 (2)(c)(ii)]

2.1-3.5.5.6 Patient treatment/resuscitation area. An area adjacent to the MRI room shall be provided for patient code treatment/resuscitation.

A2.1-3.5.5.6 The patient treatment/resuscitation area should be located in the MRI suite as specified in the American College of Radiology’s “ACR Guidance Document on MR Safe Practices.”

2.1-3.5.5.7 System component room. A system component room that meets the requirements in Section 2.1-3.5.2.5 (System component room) shall be provided.

2.1-3.5.5.8 Equipment installation requirements... [Moved to Section 2.1-3.5.5.7 (3)]

2.1-3.5.5.9 Special design elements for the MRI scanner room

(1) General

(a) Ferromagnetic materials that may become detached or otherwise interfere with the operation of the MRI scanner shall not be used in MRI scanner rooms. [Moved to Section 2.1-3.5.5.7 (1)(a)]

*(b) The MRI scanner room shall be located and/or shielded to avoid electromagnetic interference from elevators or other electromagnetic equipment.

A2.1-3.5.5.9 (1)(b) The location, quantity, and distance of structural steel should also be considered in locating the MRI unit.

*(1) (2) Architectural details

A2.1-3.5.5.7 (1) A2.1-3.5.5.9 (2) Architectural details for the MRI scanner room

a. Radiofrequency (RF) and magnetic shielding. All doors, windows, and penetrations into the RF-shielded enclosure should be RF-shielded. Therefore, wall, floor, and ceiling assemblies should accommodate the installation of RF-shielded assemblies.

In addition, individual sites may require magnetic shielding to restrict magnetic interference. Floor and ceiling assemblies as well as the building structure should accommodate magnetic shielding. Note: Floor assemblies are required to minimize disturbance to the MRI scanner’s magnetic field; see Section 2.1-3.5.5.7 2.1-3.5.5.9 (2)(a) (The floor structure...).
2.1 Common Elements (sections 1 – 3)

Space adequate to accommodate the manufacturer’s shielding requirements and ground isolation cavities should be allocated between the inside finished face of the MRI scanner room and the outside face of the scanner room “parent wall.”

Penetrations through RF shielding should include a penetration panel and/or wave guides to assure proper performance of the RF enclosure. Wall, floor, and ceiling construction should prevent moisture from degrading or compromising the integrity of the RF shield.

b. Delivery path. Access for delivery and removal of scanner. Provision of a knock-out panel or roof hatch is recommended. Provisions for delivery and removal of an MRI scanner should be considered during design for the reasons given here, as MRI scanners are typically too large to fit through even double-doors; therefore, the delivery path planned for MRI equipment should anticipate the size of the equipment as well as its weight. Removal of conventional doors and frames and demolition of partitions to facilitate delivery/removal of MRI scanners, while avoidable, is not unheard of. The delivery path may also require temporary structural shoring and/or floor protection to protect the building from dynamic point loads and substantial structural loading that may exceed design parameters, standard door openings.

c. Surfaces, fixtures and equipment. The dangers of magnetic fields make servicing surfaces, fixtures, and equipment inside the MRI scanner room potentially hazardous. Surfaces, fixtures, and equipment should be selected to minimize the need for maintenance and servicing.

Facilities may wish to use surfaces or markings to identify the spatial extent of the critical magnetic field strengths surrounding the MRI scanner, including the 5-gauss (0.5-millitesla) exclusion zone or other magnetic field strength values that may impair the operation of MR-conditional equipment such as ventilators, pumps, or anesthesia machines.

(a) The floor structure shall be designed to support the weight of MRI scanner equipment, minimize disturbance to the MRI magnetic field, and mitigate disruptive environmental vibrations.

(b) MRI rooms shall be marked with a lighted sign with a red light to indicate that the magnet is always on. [moved to Section 2.1-3.5.5.7 (3)(b)]

(a) **2.1-3.5.5.9 (1)(a)** Ferromagnetic materials that may become detached or otherwise interfere with the operation of the MRI scanner shall not be used in MRI scanner rooms.

(b) **2.1-3.5.5.8 (2)** Radiofrequency (RF) shielding shall be provided for clinical MRI installations to attenuate stray radio frequencies that could interfere with the MRI imaging process.

*(c) 2.1-3.5.5.9 (1)(b)* The MRI scanner room shall be located and/or shielded to avoid electromagnetic interference from elevators or other electromagnetic equipment.

*(d) 2.1-3.5.5.8 (3)* At sites where magnetic field hazards or interferences are not adequately controlled through facility planning (i.e., by physical distance), the need for magnetic shielding
shall be assessed by a certified physicist experienced in magnetic shielding design or an equally qualified expert.

**A2.1-3.5.5.7 (1)(d) A2.1-3.5.5.8 (3)** Magnetic shielding can often be avoided in new construction when suite design and planning are employed to mitigate magnetic field hazards. However, magnetic shielding may be required to restrict the magnetic field plot. The area around, above, and below the MRI suite should be reviewed and evaluated for the following:

—Possible occupancy by person(s) who could have pacemakers or other implants

—Equipment that can be disrupted by a magnetic field. Examples include but are not limited to (e.g., computers, CT scanners, nuclear cameras).

**Review and evaluation of** After reviewing and evaluating the surrounding space, may reveal that appropriate magnetic shielding may be required based on the type of MRI scanner to be installed.

**(c) (e)** Acoustic control shall be provided to mitigate the noise emitted by the MRI scanner. For requirements, see Table 1.2-6 (Design Criteria for Minimum Sound Isolation Performance Between Enclosed Rooms).

**(2) Structural details**

**(a) 2.1-3.5.5.9 (2)(a)** The floor structure shall be designed to support the weight of MRI scanner equipment, minimize disturbance to the MRI magnetic field, and mitigate disruptive environmental vibrations.

**(b) Structural designs shall keep ferrous content at or below MRI manufacturer requirements, based on mass and proximity to the MRI scanner.**

**(3) Electrical details**

**2.1-3.5.5.8 Equipment installation requirements**

* *(a) (†)* Power conditioning and/or uninterruptible power supplies shall be provided as indicated by the MRI manufacturer’s power requirements and specific facility conditions.

**A2.1-3.5.5.7 (3)(a) A2.1-3.5.5.8 (1)** Power conditioning and voltage regulation equipment as well as direct current (DC) may be required.

**(b) 2.1-3.5.5.9 (2)** MRI rooms shall be marked with a lighted sign with a red light to indicate the magnet is always on except for MRI systems for which the magnetic field is regularly de-energized. For such systems, lighted signage shall be permitted to indicate when the magnet is on.

**(2) Radiofrequency (RF) shielding shall be provided for clinical MRI installations to attenuate stray radio frequencies that could interfere with the MRI imaging process.**

* *(3) At sites where magnetic field hazards or interferences are not adequately controlled through facility planning (i.e., by physical distance), the need for magnetic shielding shall be assessed by a certified physicist experienced in magnetic shielding design or an equally qualified expert.*

**(A2.1-3.5.5.8 (3)** Magnetic shielding can often be avoided in new construction when suite design and planning are employed to mitigate magnetic field hazards. 

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**DRAFT 2022 FGI Guidelines for Design and Construction of Outpatient Facilities**

42
Magnetic shielding may be required to restrict the magnetic field plot. The area around, above, and below the MRI suite should be reviewed and evaluated for the following:

— Possible occupancy by person(s) who could have pacemakers or other implants
— Equipment that can be disrupted by a magnetic field. Examples include but are not limited to computers, CT scanners, and nuclear cameras.

After reviewing and evaluating the surrounding space, appropriate magnetic shielding may be required based on the type of MRI scanner to be installed.

2.1-3.5.6 Ultrasound Facilities

2.1-3.5.6.1 Ultrasound room. Ultrasound rooms shall meet the requirements in Section 2.1-3.5.1 (Imaging Services—General) and Section 2.1-3.5.2 (Imaging Rooms) as amended in this section.

(1) Clearances. Ultrasound rooms shall be sized to provide the following minimum clearances:
   (a) 3 feet (91.44 centimeters) on all circulating sides of the patient table or procedural chair
   (b) Other clearances in accordance with clinical needs

(2) Hand-washing station. A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided in the imaging room.

2.1-3.5.6.2 Patient toilet room. See Section 2.1-3.5.10.2 (2) (Toilet rooms for imaging rooms) for requirements.

*2.1-3.5.7 Nuclear/Molecular Imaging Services

A2.1-3.5.7 The services included in this section are nuclear-enabled diagnostic imaging modalities conducted using low-level radioactive materials that are typically injected into or ingested by the patient. Sometime later, the radioactive emission and uptake of those substances by various structures and/or organs is measured by radiation detectors integral to various types of nuclear imaging devices.

2.1-3.5.7.1 General

*(1) Application. Where nuclear imaging services are offered, space to support those services shall be provided in accordance with the requirements in this section.

A2.1-3.5.7.1 (1) Space requirements will vary depending on the specific requirements of each nuclear imaging device. Common to all nuclear imaging services, however, is the need for:

a. Secure storage of radioactive materials. This is provided in accordance with applicable state and federal law.

b. Identification of controlled and non-controlled zones. Where radioactive pharmaceuticals are used, controlled zones are restricted (e.g., no food is permitted in controlled zones).
(2) Nuclear imaging room. Nuclear imaging rooms shall meet the requirements in Section sections 2.1-3.5.1 (Imaging Services—General) and 2.1-3.5.2 (Imaging Rooms) as amended in this section.

(3) Exercise area or room. Where patients are required to exercise before imaging is conducted, space shall be provided for the following in the imaging room or in a separate room directly accessible to the imaging room:

(a) Exercise equipment (e.g., stationary bicycle, treadmill). Clearance shall be provided for patient and caregiver access to the equipment on the primary access side and one adjacent side.

(b) Staff workspace

(4) Hand-washing stations. Hand-washing stations shall be provided throughout the nuclear imaging suite at location(s) of patient contact and at locations where radiopharmaceutical materials are handled, prepared, or disposed of. See sections on specific nuclear imaging modalities for additional requirements.

*(5) Nuclear imaging dose administration area. A dose administration area shall be provided.

A2.1-3.5.7.1 (5) Dose administration area. Because patients in this area may be held for long periods, the design of the area should incorporate such features as comfortable seating, varied lighting, an entertainment center, music headphones, and availability of reading materials.

(a) The dose administration area shall be located near the preparation area.

(b) Because several hours may elapse before a dose takes effect, the area shall provide for visual privacy from other areas.

(c) Combination of this area with a pre-procedure patient care area(s) as described in Section 2.1-3.7 (Pre- and Post-Procedure Patient Care) shall be permitted provided there is visual privacy between the areas.

(d) For PET services, combination of this area with a patient uptake room as described in Section 2.1-3.5.7.3 (7) (6) (Patient u Up Take/cooldown room) shall be permitted.

(6) Surfaces. Surfaces throughout the nuclear imaging suite shall be constructed of cleanable, nonporous materials that can be decontaminated.

*2.1-3.5.7.2 Scintigraphy (gamma camera services) facilities

A2.1-3.5.7.2 Radiation protection for scintigraphy facilities. Scintigraphy/gamma camera services typically use lower-energy radiopharmaceuticals than PET services, reducing—but not eliminating—the infrastructure necessary for radiation protection. Most commonly used for cardiac imaging, new gamma-specific clinical applications (e.g., gamma-specific breast imaging) increase the range of devices and settings that may be called upon to support these services.

*(1) Scintigraphy areas rooms shall meet the requirements in sections 2.1-3.5.1 (Imaging Services—General) and 2.1-3.5.2 (Imaging Rooms) as amended in this section.

A2.1-3.5.7.2 (1) Control room. Due to the comparatively low energy of the most common gamma-specific radiopharmaceuticals, separate shielded control rooms
are not typically required for scintigraphy areas. Shielding requirements should be determined by a radiation physiologist.

(2) Hand-washing station. A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided in the scintigraphy room.

*2.1-3.5.7.3 Positron emission tomography (PET) facilities

**A2.1-3.5.7.3** Positron emission tomography (PET) services involve imaging of patients who have ingested, inhaled, or been injected with a radioactive material. In contrast to x-ray-based studies or procedures, the PET scanner itself does not emit ionizing radiation. PET scanners are typically coupled with either computed tomography (PET/CT) or magnetic resonance imaging (PET/MRI) technology. Radiation protection in the design of PET facilities is centered on requirements for radiopharmaceutical storage, transport, dosing, administration, duration within the patient, excretions from the patient, and incidental contamination of materials.

(1) Where two or more imaging or therapy modalities are integrated into one imaging device (e.g., PET/CT or PET/MRI), see the requirements in Section 2.1-3.5.2.6 (Multiple-modality devices).

**(2) PET suite configuration

**A2.1-3.5.7.3 (2) PET suite configuration**

a. **Radiation shielding.** PET scanners and other nuclear imaging detectors can be adversely affected by the nearby presence and/or movement of patients who have received internally administered radioactive substances. Therefore, radiation shielding is sometimes recommended to prevent inaccurate detector readings, in addition to radiation shielding for human exposure control.

b. **Sound and light abatement.** Patients who have been administered radioactive uptake substances prior to their examination may be adversely affected by ambient noise and/or light. Therefore, sound and light abatement is recommended for holding areas for these patients.

c. **Segregated flow for radioactive substances.** In facilities where different radioactive substances are administered for PET and non-PET nuclear imaging examinations, consideration should be given to segregating the flow of these radioactive materials, including the pathway of delivery and disposal within the facility.

(a) PET suites shall be designed and positioned in the facility to restrict incidental exposure to ionizing radiation sources by persons not immediately involved in the PET examination.

(b) A certified radiation physicist or other qualified person shall determine if, and to what extent, radiation shielding is required at radiopharmacy, hot lab, scanner, patient holding, and other spaces.

**(3) PET scanner room

(a) PET scanner rooms shall meet the requirements in sections 2.1-3.5.1 (Imaging Services—General) and 2.1-3.5.2 (Imaging Rooms) as amended in this section.
(b) A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided in the PET scanner room.

(4) (3) Control room. (a) A control room that meets the requirements in Section 2.1-3.5.1.3 (1) (Shielded control room or alcove) and is designed to accommodate the controls for the equipment shall be provided.

(b) A control room shall be permitted to serve more than one PET scanner room.

(5) (4) System component room. Where a system component room is provided, it shall meet the requirements in Section 2.1-3.5.2.5 (System component room).

(6) (5) Cyclotron room. Where radiopharmaceuticals are prepared on-site, a cyclotron shall be provided. A cyclotron shall not be required when radiopharmaceuticals are provided by commercial sources.

(a) Where provided, cyclotron facilities shall be located in access-restricted areas in accordance with applicable state and federal laws.

(b) Shielding requirements for cyclotron facilities shall be coordinated between the equipment manufacturer and a reviewing medical physicist.

(c) A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided in the cyclotron room.

* (7) (6) Patient uptake/cooldown room. A shielded room(s) shall be provided for patient uptake/cooldown.

A2.1-3.5.7.3 (7) (6) Patient uptake/cooldown room. Uptake rooms may also serve as cooldown rooms for patients who, post-examination, retain sufficient radiopharmaceuticals that it is inadvisable for them to be in close proximity to others.

(a) Uptake rooms shall be provided as appropriate to the examinations and radiopharmaceuticals used for the PET service.

(b) Uptake rooms shall be configured and appointed to minimize patient movement during the radiopharmaceutical uptake period.

* (c) A toilet room with a hand-washing station and a dedicated hot toilet to accommodate radioactive sanitary waste shall be directly accessible or adjacent to the uptake/cooldown room.

A2.1-3.5.7.3 (7)(e) (6)(e) Toilet room. The intent of the Guidelines is to have a toilet room adjacent and dedicated physically attached to the patient uptake room so a patient with a bad reaction to the preparation can quickly access a dedicated toilet. As well, patients may need access to a toilet room before entering the scanner room.

2.1-3.5.7.4 Single-photon emission computed tomography (SPECT) facilities

(1) SPECT rooms shall meet the requirements in sections 2.1-3.5.1 (Imaging Services—General) and 2.1-3.5.2 (Imaging Rooms).

(2) A hand-washing station that meets the requirements in Section 2.1-3.5.2.3 (Hand-washing station or hand scrub facilities) shall be provided in the SPECT room.
2.1 Common Elements (sections 1 – 3)

2.1-3.5.8 Support Areas for Imaging Services

2.1-3.5.8.1 General. Sharing of these support areas with other clinical services in the same facility shall be permitted.

2.1-3.5.8.2 Reception area with control desk. A reception area with control desk shall be provided.

2.1-3.5.8.3 Documentation area. Documentation space that meets the requirements in Section 2.1-3.8.3 (Documentation Area) Accommodations for written and/or electronic documentation shall be provided for staff.

2.1-3.5.8.4 Consultation area.

(1) An area shall be provided for consultation with patients or the referring clinician, including

(2) Where remote consultation with referring clinicians is offered in the facility, see See Section 2.1-3.4 (Accommodations for Telemedicine Services) for more information on spaces for remote consultation.

2.1-3.5.8.5 – 2.1-3.5.8.7 Reserved

2.1-3.5.8.8 Medication safety zone and storage. Where medications are administered as part of the imaging services provided, the following requirements shall be met:

(1) A medication safety zone as described in Section 2.1-3.8.8 (Medication Safety Zones) shall be immediately accessible from pre- and post-procedure patient care areas.

(2) Provision shall be made for locked storage of medications.

2.1-3.5.8.9 – 2.1-3.5.8.10 Reserved

2.1-3.5.8.11 Clean supply room

(1) Storage for clean supplies and linens that meets the requirements in Section 2.1-3.8.11 (Clean Workroom or Clean Supply Room) shall be readily accessible to imaging rooms.

(2) This storage shall be permitted to be shared with other clinical services in the same facility.

2.1-3.5.8.12 Soiled workroom or soiled holding room

(1) A soiled workroom or soiled holding room shall be provided in accordance with Section 2.1-3.8.12 (Soiled Workroom or Soiled Holding Room).

(2) Where an imaging facility will not generate enough waste to justify a dedicated soiled workroom or holding room, sharing of such a room with other clinical services shall be permitted if it is readily accessible to the imaging facility.

(3) Hot Contaminated (hot) soiled holding

*(a) Where nuclear imaging services are offered and a medical physicist has determined it is necessary, a contaminated soiled holding area that is separate from other waste holding areas shall be provided in the soiled workroom or soiled holding room.

2.1-3.5.8.13 Reserved

2.1-3.5.8.14 Clean workroom or clean holding room

(1) A clean workroom or clean holding room shall be provided in accordance with Section 2.1-3.8.14 (Clean Workroom or Clean Holding Room).

(2) Where an imaging facility will not generate enough waste to justify a dedicated clean workroom or holding room, sharing of such a room with other clinical services shall be permitted if it is readily accessible to the imaging facility.

(3) Hot Contaminated (hot) clean holding

*(a) Where nuclear imaging services are offered and a medical physicist has determined it is necessary, a contaminated clean holding area that is separate from other waste holding areas shall be provided in the clean workroom or clean holding room.

A2.1-3.5.8.12 (3)(a) (2)(a) Soiled materials from nuclear imaging patients may remain modestly radioactive for a period following patient use. To minimize
incidental exposure to ionizing radiation by persons providing environmental services in nuclear imaging areas, the contaminated soiled holding area is operationally integrated.

(b) Radiation, occupational, and environmental protections for contaminated holding area(s) shall be provided as defined by a medical physicist.

(c) A dedicated hot soiled holding area or room shall be permitted to be shared between two adjacent clinical services that produce hot waste.

2.1-3.5.8.13 Equipment and supply storage

(1) Clean linen storage. A storage area for clean linen shall be provided.

2.1-3.5.8.14 Environmental services room

(1) An environmental services room with immediate access to the imaging suite shall be provided in accordance with Section 2.1-5.3.1 (Environmental Services Room).

(2) Sharing of the environmental services room with other clinical services shall be permitted.

2.1-3.5.8.15 Pre- and post-procedure patient care area

(1) For Class 1 imaging rooms in which patients receive point-of-care lab work or injection preparation, a minimum of one patient care station shall be provided for every three Class 1 imaging rooms or fraction thereof where patients receive point-of-care lab work or injection preparation with non-radiopharmaceutical contrast agents.

*(2) For Class 2 imaging rooms, one patient care station shall be provided for each Class 2 imaging room unless the safety risk assessment determines another ratio is needed.

*(3) For Class 2 and Class 3 imaging rooms, pre- and post-procedure patient care area(s) shall be provided in accordance with Section 2.1-3.4 (Pre- and Post-Procedure Patient Care).

A2.2-3.4.8.15 (32) More patient care stations may be needed for imaging rooms where Class 2 and Class 3 imaging procedures take place.

(3) Where surgery facilities are adjacent to imaging facilities, pre- and post-procedure patient care areas shall be permitted to be shared between imaging and surgical services.

2.1-3.5.8.16 Contrast media preparation area

(1) Where contrast media are prepared in the imaging department, this area shall include:

(a) Sink

(b) Counter

(c) Storage to accommodate preparation of contrast media

(d) Secure, lockable storage

(2) Where contrast prepared media are used will not be prepared in the imaging facility, omission of the sink and counter shall be permitted.
(3) One contrast media preparation area shall be permitted to serve multiple imaging rooms.

(4) The contrast media preparation area shall be permitted to be part of a medication preparation area. See Section 2.1-3.8.8 (Medication Safety Zones) for information.

2.1-3.5.8.17 Image management system

(1) Space shall be provided Provisions for a digital image management system shall be made in accordance with Section 2.1-6.3.5 (Medical Records), to be used for image acquisition and transmission.

(2) Location of the image management system off-site shall be permitted.

*2.1-3.5.8.18 Image interpretation/reading rooms. Space shall be provided to accommodate equipment for image interpretation or “reading” of medical images.

A2.1-3.5.8.18 Image interpretation/reading rooms

a. Computer systems and monitors appropriate for diagnostic-quality interpretation of images, associated patient medical records, and other relevant information found on the radiology information system (RIS) should be provided.

b. Ergonomically adjustable work surface(s), monitor heights and angles, and chair(s) should be provided in quantities indicated by the services provided and staffing levels.

(1) Remote location of image interpretation/reading areas shall be permitted, provided radiologists are immediately available when interventional imaging procedures are performed.

(2) Where provided on-site, image interpretation/reading areas shall include the following:

(a) Lighting

   (i) Adjustable ambient lighting with minimal glare projected onto computer monitors

   (ii) A higher level of illumination for room maintenance (that can be activated separate from ambient reading lighting)

   (iii) Workstation task lighting for writing or reading hard copy

(b) Acoustic control. Where multiple radiologists interpret images in a contiguous space, materials, finishes, and sound masking that together provide acoustic control to minimize disruption from conversational speaking, dictation, and surrounding noise shall be specified.

*2.1-3.5.8.19 Facilities for processing ultrasound probes. Where cleaning and high-level disinfection of ultrasound probes are performed in a dedicated room or area, the following requirements shall be met:

A2.1-3.5.8.19 Processing ultrasound probes in a soiled workroom. Some organizations process endocavitary ultrasound probes in a soiled workroom; see Section 2.1-3.8.12 (Soiled Workroom or Soiled Holding Room) for general requirements for a soiled workroom. For soiled workrooms where ultrasound probe or other semi-critical instrument decontamination is performed, an instrument-washing sink would be required.
(1) Where an ultrasound probe processing room is provided, it shall meet the following requirements:

(a) The processing room shall be permitted to serve multiple rooms where ultrasound exams are performed.

(b) The size of the processing room shall be dictated by the equipment used and the number of probes to be processed.

(c) The processing room shall allow for the flow of ultrasound probes from the decontamination area to a clean area and then to storage.

(d) The decontamination area shall be equipped with the following:

   (i) Work counter
   (ii) Instrument-washing sink appropriate to the method of decontamination used
   (iii) Hand-washing station
   (iv) Space and utility connections to support the high-level disinfection process and equipment used

*(2) Where ultrasound probes are processed at the point of use or in a separate room or area using a self-contained, automated high-level disinfection unit specifically designed for ultrasound probes:

   **A2.1-3.5.8.19 (2) High-level disinfection unit.** The device mentioned in this paragraph is intended to be a unit that does not require plumbing or special ventilation and has been approved solely for the disinfection of ultrasound probes.

   (a) Space for the device with access to an electrical receptacle shall be provided.

   (b) Access to a soiled workroom with an instrument-washing sink shall be provided in the same clinical area to support probe decontamination when necessary.

*(3) Clean ultrasound probe storage. Storage for clean ultrasound probes shall be provided.

   **A2.1-3.5.8.19 (3) Ultrasound probe storage.** Storage for clean probes may be provided in a closed cabinet, or probes may be covered and stored in the imaging room.

2.1-3.5.8.20 **Computer room.** Where a centralized computer area is provided, it shall be a separate room with access terminals available in the imaging rooms.

*2.1-3.5.8.20 2.1-3.5.8.21 Radiopharmaceutical production pharmacy.** Where radiopharmaceutical preparation is performed on-site, an area to house a radiopharmacy shall be provided with appropriate shielding.

   **A2.1-3.5.8.20 A2.1-3.5.8.21 Radiation protection for the radiopharmacy.** This area may require shielding to protect other portions of the facility.

*(1) Space requirements
Radiopharmacy space requirements. If materials prepared off-site are used, the storage and calculation space needed may be considerably smaller than for on-site preparation.

(a) Space shall be provided for dose calibration, quality assurance, and record-keeping activities.

(b) Space shall be provided for storage of radionuclides, chemicals for preparation, dose calibrators, and records.

(2) Surfaces. Floors and walls shall be constructed of easily decontaminated materials.

(3) HVAC system. Hoods for pharmaceutical preparation shall meet applicable standards.

Hot lab for nuclear/molecular imaging services. Where scintigraphy, PET, and SPECT services are provided, a securable area or room(s) shall be provided in which radiopharmaceuticals can be safely stored and doses can be calculated and prepared.

(1) A single hot lab shall be permitted to serve multiple nuclear imaging scanners.

(2) The hot lab shall be shielded with radiation protection in accordance with Section 2.1-3.5.1.3 (Radiation protection), according to the manufacturer’s technical specifications.

(3) The hot lab shall include the following:

(a) Source storage area

(b) Dose storage area

(c) Storage area for syringe shields

(d) Emergency eyewash and/or shower

Support Areas for Imaging Services Staff

The following spaces shall be provided:

Staff lounge

(1) A staff lounge shall be readily accessible to the imaging facilities.

(2) The staff lounge shall be permitted to be shared with other clinical services.

Staff toilet room

(1) A staff toilet room(s) shall be adjacent readily accessible to the staff lounge.

(2) In suites of three or more imaging rooms, staff toilets shall be immediately accessible to the imaging suite.

Reserved Storage for staff

(1) Provisions shall be made for securing staff belongings.

(2) Location of these provisions outside the staff lounge shall be permitted.

Staff changing area
(1) For Class 2 and Class 3 imaging rooms, a staff changing area that meets the requirements in Section 2.1-3.9.4 (Staff Changing Area) shall be provided.

(2) The staff changing area shall be permitted to be shared with surgery services.

2.1-3.5.10 Support Areas for Imaging Patients

The following spaces shall be provided:

2.1-3.5.10.1 Reserved

2.1-3.5.10.2 Patient toilet room

(1) Patient toilet rooms with hand-washing stations shall be immediately accessible to waiting rooms or areas and, where provided, to patient changing rooms.

(2) Toilet rooms for imaging rooms

*(a) Where procedures performed require patient access to toilets, a patient toilet room shall be directly accessible from the imaging room.

A2.1-3.5.10.2 (2)(a) For patient comfort, some diagnostic imaging procedures (e.g., fluoroscopy, ultrasound, CT scanning) necessitate direct access to a toilet room.

*(b) A patient toilet room shall be permitted to serve more than one imaging room.

A2.1-3.5.10.2 (2)(b) Where a patient toilet room serves more than one imaging room, in-use (occupied) lights may be used.

*(c) Shared toilet rooms shall have interlocking door access hardware.

A2.1-3.5.10.2 (2)(c) Interlocking door access hardware is used to prevent access by more than one patient simultaneously.

(3) Toilet rooms for nuclear imaging patients

(a) Toilet rooms reserved for nuclear imaging patients shall be immediately accessible to waiting rooms or areas and nuclear imaging rooms.

(b) For dosed nuclear imaging patients, dedicated hot toilets, restricted from the use of all others for a duration from last use set by a medical physicist, shall be provided in quantities and locations to meet the needs of nuclear imaging patients.

2.1-3.5.10.3 Patient changing rooms

(1) Where changing rooms are provided required, they shall be located adjacent to the imaging rooms.

(2) Each room shall include a seat or bench and mirror.

(3) Means Provisions for hanging patients' individual lockable storage of patient clothing and securing valuables shall be immediately accessible to changing rooms, provided either in the patient changing room or in shared secured storage.

2.1-3.5.10.4 Patient waiting room or area
(1) Waiting areas shall be screened and separated from unrelated traffic and under staff control.

(2) Seating capacity shall be provided to accommodate the maximum expected patient volume.

(1) A waiting room or area with the following shall be provided as needed for general waiting for imaging services:

(a) Toilet facilities

(b) Provisions for drinking water

(c) Provisions for telephone access

(2) Sub-waiting area(s)

(a) Provision of sub-waiting areas for individual modalities, or sharing of waiting areas among similar modalities, shall be permitted where patient waiting in areas adjacent to the imaging room(s) is desired.

(b) Sub-waiting areas shall be separated from unrelated traffic and under staff control.

*(3) Low-level hot patient waiting area

(a) Where imaging services will result in patients with low levels of radiation (low-level hot), a sub-waiting area to isolate these patients shall be provided.

(b) Omission of this area shall be permitted if a medical physicist’s report indicates it is not necessary.

A2.1-3.5.10.4 (3) Where a low-level hot patient waiting area is integrated into or adjacent to waiting facilities serving general patient populations, separation distance and/or shielding requirements should be determined by a medical physicist. Low-level hot patients are more typical of PET imaging procedures and would require shielded uptake/cooldown room(s) in accordance with Section 2.1-3.5.7.3 (7) (Uptake/cooldown room).

*(4) If so determined by an ICRA, a diagnostic imaging waiting room or area shall have special measures to reduce the risk of airborne infection transmission. These measures shall include enhanced general ventilation and air disinfection techniques similar to the requirements for airborne infection isolation rooms in Part 3 (ANSI/ASHRAE/ASHE 170: Ventilation of Health Care Facilities).

A2.1-3.5.10.4 (4) See the CDC “Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health Care Facilities” for more information.

*2.1-3.6 Radiation Therapy

A2.1-3.6 Radiation therapy

a. Radiation therapy services. The services included in this section are radiation treatment modalities that use high-energy, non-radioactive beams. The exception to this is brachytherapy, which is a radiation therapy that involves placement of low-dose radioactive material in the body.
b. Hybrid imaging/therapy systems. Where external beam radiation therapy systems are combined with a concurrent imaging option (e.g., CT or MRI), the full design criteria for both contributing imaging/therapy devices should be applied to the hybrid service.

2.1-3.6.1 General

Space shall be provided to accommodate the equipment and staff needed for planned radiation therapy services.

*2.1-3.6.2 External Beam Radiation Therapy Suite

A2.1-3.6.2 Simulator room. Although it is not recommended, a simulator room may be omitted in small linear accelerator facilities where other positioning geometry is provided.

2.1-3.6.2.1 Examination room:

(1) An examination room that meets the requirements in Section 2.1-3.2.2 (Single-Patient Examination Room), as amended in this section, shall be provided for each external beam radiation therapy room. See Section 2.1-3.6.8.15 (Support Areas for Radiation Therapy—Examination room) for requirement.

(2) 2.1-3.6.8.15 (1) The examination room shall have a minimum clear floor area of 100 square feet (9.29 square meters).

2.1-3.6.2.2 Radiation therapy room

*(1) Space requirements

A2.1-3.6.2.2 (1) Radiation therapy space requirements. The equipment manufacturer’s technical specifications should be sought and followed, since space requirements may vary from one machine to another and one manufacturer to another.

(a) Simulator, accelerator, brachytherapy, and cobalt rooms shall be sized to accommodate the following:

(i) Equipment

(ii) Access to equipment for patient on a gurney

(iii) Medical staff access to the equipment and patient

(iv) Service access to equipment

(b) Radiation therapy rooms shall be sized in compliance with the manufacturer’s technical specifications.

(i) Where a table is used, the room shall be sized to provide a minimum clearance of 4 feet (1.22 meters) on three sides of the table to facilitate bed transfer and provide access to the patient.

(ii) The door swing shall not encroach on the equipment or on patient circulation or transfer space.

2.1-3.6.2.3 Support areas for the external beam radiation therapy suite
2.1 Common Elements (sections 1 – 3)

(1) Support areas for the linear accelerator. Combining the mold and block rooms shall be permitted.

   (a) A mold room with exhaust hood and hand-washing station shall be provided. Where toxic materials will be manipulated (e.g., melted, reformed, machined) in this room, an exhaust hood shall be provided.

   (b) A block room with storage shall be provided.

(2) Support area for the cobalt room. A hot lab shall be provided in accordance with Section 2.1-3.5.8.22 (Hot lab for nuclear imaging services).

*2.1-3.6.3 Radiosurgery Suite

A2.1-3.6.3 The radiosurgery suite houses rotating, robotic, or gantry-based external beam therapy systems of higher power and accuracy than conventional external beam therapy systems. These are called gamma knife or cyber knife systems.

2.1-3.6.3.1 General

(1) The radiosurgery suite shall be readily accessible to the imaging services suite to facilitate image acquisition prior to radiosurgery treatment.

(2) Examination room

   (a) An examination room that meets the requirements in Section 2.1-3.2.2 (Single-Patient Examination Room), as amended in this section, shall be provided for each radiosurgery room, except where private pre- and post-procedure patient care stations are provided in the radiosurgery suite; in that case, omission of the examination rooms shall be permitted.

   (b) See Section 2.1-3.6.8.15 (Support Areas for Radiation Therapy—Examination room) for requirements.

   (c) 2.1-3.6.8.15 The examination room shall have a minimum clear floor area of 100 square feet (9.29 square meters).

2.1-3.6.3.2 Radiosurgery rooms

(1) Space requirements

   (a) Area

      (i) Radiosurgery (i.e., gamma knife/cyber knife) rooms shall be sized to accommodate patient access on a gurney, medical staff access to the equipment and patient, and service access.

      (ii) Radiosurgery rooms shall be sized and configured to accommodate the manufacturer’s technical specifications.

   (b) Clearances

      (i) A minimum clearance of 4 feet (1.22 meters) shall be provided on all sides of the patient table for maintenance access and clearance around the table sufficient to facilitate patient transfer.

      (ii) The door swing shall not encroach on the equipment or on patient circulation or transfer space.
(2) Hand-washing station. A hand-washing station shall be provided in each radiosurgery room.

2.1-3.6.3.3 Pre- and post-procedure/recovery accommodations. Where provided, pre- and post-procedure/recovery patient care stations shall meet the requirements in Section 2.1-3.7 (Pre- and Post-Procedure Patient Care).

*(2) A gurney holding area shall not be required if each patient care station has a gurney.

A2.1-3.6.3.3 (2) The gurney holding area is not required in this case because the gurney moves with the patient.

2.1-3.6.3.4 Support areas for radiosurgery rooms. The following support spaces and/or areas shall be provided:

(1) Space for sterilization of head frames
(2) Target planning
(3) Medication safety zone. See Section 2.1-3.8.8 (Medication Safety Zones) for requirements.
(4) Nourishment/mini-fridge
(5) Storage for head frames. Location of this at each pre- and post-procedure patient care station shall be permitted.
(6) Separate toilet room(s) for patients and staff
(7) Area for sedation of pediatric patients

2.1-3.6.3.5 Additional support areas for the radiosurgery device

(1) Frame pin sterilization. A work counter to accommodate a small autoclave shall be provided. Access to a one-room sterile processing facility shall be provided unless sterile processing is provided off-site. See Section 2.1-4.3.2.3 (One-room sterile processing facility) for requirements.

(2) Source delivery route. Where a radiosurgery device that uses a radioactive source is installed, a delivery route that meets the manufacturer’s requirements shall be provided.

2.1-3.6.3.6 Support areas for patients in the radiosurgery suite

(1) Where individual pre-procedure/recovery positions in cubicles or rooms are provided, separate patient changing areas shall not be required.

(2) Storage for patient belongings shall be provided.

2.1-3.6.4 Proton Therapy Suite

*2.1-3.6.4.1 General

A2.1-3.6.4.1 The proton therapy suite will contain neutron beam therapy and possibly diagnostic x-ray radiation equipment. Proton therapy technology is provided under a wide range of beam dose preparation technologies and dose applications.
(1) Application. Rooms and spaces shall be provided to accommodate the equipment manufacturer’s technical specifications.

(2) Location. Location of proton therapy facilities in a radiation therapy suite shall be permitted.

(3) Examination room.

   (a) Two examination rooms that meet the requirements in Section 2.1-3.2.2 (Single-Patient Examination Room), as amended in this section, shall be provided for each proton therapy room. See Section 2.1-3.6.8.15 (Support Areas for Radiation Therapy—Examination room) for requirements.

   (b) 2.1-3.6.8.15 The examination room shall have a minimum clear floor area of 100 square feet (9.29 square meters).

*2.1-3.6.4.2 Proton therapy room

A2.1-3.6.4.2 Proton therapy equipment requirements. The space, clearance, access, building system support, and shielding requirements for proton therapy equipment vary greatly from vendor to vendor. Therefore, before undertaking planning and design, the type of proton therapy device to be used should be determined.

*(1) Space requirements. The proton therapy room(s) shall be sized to:

   A2.1-3.6.4.2 (1) Minimum room size volume and configuration can vary significantly depending on the equipment used.

(a) Accommodate the following:

   (i) Proton therapy equipment

   (ii) Patient access on a gurney

   (iii) Medical staff access to the equipment

   (iv) Patient in-room storage of equipment devices

   (v) Service access

(b) Accommodate a balance between clinical support requirements and the needs of the specific equipment.

   (i) The room shall be sized to provide a minimum clearance of 4 feet (1.22 meters) on three sides of the patient table to facilitate bed transfer and provide access to the patient.

   (ii) The door swing shall not encroach on the equipment or on patient circulation or transfer space.

(2) Cyclotron vault. Cyclotron facility program requirements depend on specific proton therapy equipment and facility equipment type.

(3) A hand sanitation dispenser shall be located immediately inside or outside the entrance to the proton therapy room.
2.1-3.6.4.3 Gurney bays. Two gurney hold bays shall be provided for each proton therapy room.

(1) These shall be located adjacent to the proton therapy rooms and screened for privacy.

(2) A separate waiting area shall be provided for queued patients.

2.1-3.6.4.4 – 2.1-3.6.4.5 Reserved

2.1-3.6.4.6 Support areas for proton accelerators. The following shall be provided:

(1) General supply storage in proton therapy room for patient care supplies

(2) Storage for patient positioning devices. Location of this storage shall be permitted to be immediately accessible to the proton therapy room.

*(3) Storage for patient-specific therapy devices (e.g., apertures and compensators)

A2.1-3.6.4.6 (3) These devices are normally stored in the proton therapy room. They can be heavy and sometimes require a cart or wheeled trolley to move and position.

*(4) Post-treatment storage for patient-specific therapy devices (e.g., apertures and range compensators)

(a) This shall be a separate shielded room. Requirements for radioactive shielding shall be verified by a certified radiophysicist.

(b) This storage room does not need to be in the immediate vicinity of the proton therapy suite.

(c) Sharing of this room with other services shall be permitted.

A2.1-3.6.4.6 (4) The need for this storage should be anticipated to allow for the radioactivity level to fall below NRC regulatory limits.

2.1-3.6.5 – 2.1-3.6.6 Reserved

2.1-3.6.7 Special Design Elements for the Radiation Therapy Suite

2.1-3.6.7.1 Architectural details

(1) The floor structure shall meet the minimum load requirements for equipment, patients, and personnel.

(2) Ceiling-mounted equipment shall have properly designed rigid support structures located above the finished ceiling.

*(3) Where entry into the radiation vault is via direct-shielded door, both a motor-driven automatic opening system and a manual emergency opening system shall be provided.

A2.1-3.6.7.1 (3) Use of a maze can greatly decrease the shielding requirement for the shielded door. For higher energy rooms, an extra door constructed of thermal neutron-absorbing material at the inside of the maze may reduce the required length for the maze or the shielding requirement for the outside door.

(4) The height and width of doorways, elevators, and mazes shall allow for delivery of equipment and replacement sources into radiation therapy rooms.
*(5) Radiation protection requirements

**A2.1-3.6.7.1 (5)** Detailed discussion and design criteria can be obtained through the documents listed. Also see Section 2.1-7.2.2.11 (Radiation protection).


b. NCRP Report 144: Radiation Protection for Particle Accelerator Facilities


d. Nuclear Regulatory Commission Title 10 CFR Part 20: Standards for Protection Against Radiation


(a) Radiation protection shall be provided in the following rooms:

(i) Cobalt, linear accelerator, and simulation rooms

(ii) Radiosurgery rooms

(iii) Proton therapy rooms

(b) Both photons and neutrons shall be taken into account in the shielding for electron accelerators of higher energy.

(c) Layouts shall be designed to prevent the escape of radioactive particles.

*(d) 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.

**A2.1-3.6.7.1 (5)(d) Ductwork placement.** Ducts should be oriented to minimize direct radiation passing through the aperture and to allow the least possible amount of concrete displacement in the direction of the radiation beam. For rooms that have mazes, the ideal location for duct penetrations is directly through the shielding above the door since that location has the lowest neutron and photon flux. For rooms without mazes, the walls parallel to the gantry (which have lower shielding requirements than those in the gantry rotation plane) should be used for duct penetrations. Detailed discussion of this topic can be found in NCRP Report 151: Structural Shielding Design and Evaluation for Megavoltage X- and Gamma-Ray Radiotherapy Facilities.

(e) Physicist and vendor input shall be obtained in the design process.
(i) 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 layout and equipment selection.

(ii) The architect shall incorporate these specifications into the building plans.

2.1-3.6.8 Support Areas for Radiation Therapy

2.1-3.6.8.1 General

(1) The support areas in this section shall be provided.

(2) Sharing of these areas between different services in the radiation therapy suite or other areas shall be permitted.

2.1-3.6.8.2 – 2.1-3.6.8.3 Reserved

2.1-3.6.8.4 Business office and/or reception/control area

2.1-3.6.8.5 – 2.1-3.6.8.12 Reserved

2.1-3.6.8.13 Equipment and supply storage

(1) A gurney storage area shall be immediately accessible to the radiation therapy rooms.

(2) The gurney storage area shall be permitted to be combined with a waiting area.

2.1-3.6.8.14 Environmental services room. This shall be provided in accordance with Section 2.1-5.3.1 (Environmental Services Room).

2.1-3.6.8.15 Reserved Examination room

(1) Each examination room shall have a minimum clear floor area of 100 square feet (9.29 square meters).

(2) Each examination room shall be equipped with a hand-washing station.

*2.1-3.6.8.16 Optional support areas for radiation therapy. Where the support areas listed are provided, they shall meet the requirements in this section.

A2.1-3.6.8.16 Other support areas for radiation therapy. In addition to the optional support areas in the main text, the following support areas may be needed to support radiation therapy services:

a. Treatment planning and record room

b. Computer control area, usually located just outside the entry to the radiation therapy room(s)

c. Dosimetry equipment area or storage for calibration phantoms

d. Workstation/nutrition station

(1) Offices

(a) Oncologist’s office. Combination of this office with a consultation room shall be permitted.
(b) Physicist’s office. Combination of this office with the treatment planning and record room shall be permitted.

(2) Consultation room. Private prep/holding rooms shall be permitted to be used in lieu of a dedicated consultation room.

(3) Quality control area. This area shall have an image viewing station.

2.1-3.6.9 Reserved

2.1-3.6.10 Support Areas for Patients

2.1-3.6.10.1 Reserved

2.1-3.6.10.2 Patient toilet room. Toilet rooms reserved for radiation therapy patients shall be directly accessible to waiting areas and procedure rooms.

2.1-3.6.10.3 Patient changing area. Two gowning cubicles shall be provided for each proton therapy room.

(1) Secure storage for valuables and clothing shall be provided.

(2) At least one space shall be large enough for staff-assisted dressing.

2.1-3.6.10.4 Patient waiting areas

(1) A waiting area for gowned patients shall be provided adjacent to the changing area.

(2) Provisions shall be made for patient privacy in the waiting area.

2.1-3.7 Pre- and Post-Procedure Patient Care

2.1-3.7.1 General

2.1-3.7.1.1 Application. Patient care stations shall be provided to accommodate lounge chairs, gurneys, or beds for pre- and post-procedure (recovery) patient care as well as seating space for family/visitors.

2.1-3.7.1.2 Location. The pre- and post-procedure patient care area(s) shall be an unrestricted areas.

2.1-3.7.1.3 Layout

(1) Layout. The following arrangements shall be permitted as long as all patient care stations combined in the same area meet the most restrictive requirements of the areas to be combined.

   (a) Combination of pre-\text{procedure} and post-procedure (Phase I and Phase II) patient care stations in one patient care area

   (b) Separate pre-procedure patient care area and post-procedure recovery area(s)

   (c) Three separate areas: pre-procedure patient care area, Phase I post-anesthesia care unit (PACU), and Phase II recovery area

*2.1-3.7.1.4 Number of patient care stations
A2.1-3.7.1.4 Determining the number of patient care stations. When designing the pre- and post-procedure patient care area(s) and determining the number of patient care stations required, consideration should be given to the types of surgery and procedures performed, volume of patients to be served, and anticipated staffing levels.

(1) Where pre- and post-procedure patient care stations are combined in one patient care area, at least one patient care station shall be provided for each imaging, procedure, or operating room.

(2) Where separate pre-procedure and recovery areas are provided, the number of patient care stations shall be as required in these sections:

(i) Section 2.1-3.7.3 (Pre-Procedure Patient Care Room or Area)
(ii) Section 2.1-3.7.4 (Phase I Post-Anesthesia Recovery Room)
(iii) Section 2.1-3.7.5 (Phase II Recovery Room or Area)

2.1-3.7.2 Patient Care Station Design

2.1-3.7.2.1 Bays, cubicles, or single-patient rooms that meet the requirements in this section shall be permitted to serve as patient care stations.

2.1-3.7.2.2 Space requirements

(1) Area. When determining the area for a patient care station, space shall be provided to accommodate the equipment to be used.

*(2) Clearances

A2.1-3.7.2.2 (2) Two bays may be used to accommodate non-standard equipment (e.g., an expanded-capacity patient bed), but clearances do not include any area that would have to be shared to meet the standard. Clearances noted around gurneys are between the normal use position of the gurney and any adjacent fixed surface or between adjacent gurneys.

(a) Where bays are used, the following minimum clearances shall be provided:

(i) 5 feet (1.52 meters) between the sides of patient beds/gurneys/lounge chairs

(ii) 3 feet (91.44 centimeters) between the sides of beds/gurneys/lounge chairs and adjacent walls or partitions

(iii) 2 feet (60.96 centimeters) between the foot of beds/gurneys/lounge chairs and the cubicle curtain

(b) Where cubicles are used, the following minimum clearances shall be provided:

(i) 3 feet (91.44 centimeters) between the sides and foot of beds/gurneys/lounge chairs and adjacent walls or partitions.

(ii) 2 feet (60.96 centimeters) between the foot of beds/gurneys/lounge chairs and the cubicle curtain
(c) Where bays or cubicles face each other, an aisle with a minimum clearance of 8 feet (2.44 meters) independent of the foot clearance between patient stations or other fixed objects shall be provided.

(d) Where single-patient rooms are used, 3 feet (91.44 centimeters) shall be provided between the sides and foot of beds/gurneys/lounge chairs and adjacent walls or partitions.

2.1-3.7.2.3 Reserved

2.1-3.7.2.4 Patient privacy. Provisions shall be made for patient privacy in accordance with Section 2.1-3.1.2 (Patient Privacy).

2.1-3.7.2.5 Hand-washing station(s). See Section 2.1-3.8.7 (Hand-Washing Station) for requirements.

2.1-3.7.2.6 Building system components Other-design requirements

(1) For electrical receptacle requirements, see Table 2.1-1 (Electrical Receptacles for Patient Care Areas in Outpatient Facilities).

(2) For nurse call requirements, see Table 2.1-3 (Locations for Nurse Call Devices in Outpatient Facilities).

(3) For oxygen and vacuum requirements, see Table 2.1-2 (Station Outlets for Oxygen, Vacuum, Medical Air, and Instrument Air Systems in Outpatient Facilities).

2.1-3.7.3 Pre-Procedure Patient Care Room or Area

Where a separate pre-procedure patient care room or area is provided, a minimum of one patient care station per Class 2 imaging, Class 3 imaging, procedure, or operating room shall be provided.

2.1-3.7.4 Phase I Post-Anesthesia Recovery Room(s)

2.1-3.7.4.1 A minimum of one Phase I patient care station per Class 3 imaging or operating room shall be provided.

2.1-3.7.4.2 At least one door to the recovery room shall provide access directly from the semi-restricted area without crossing a public corridor.

2.1-3.7.4.3 The design of the Phase I recovery area shall provide observation of all patient care stations from the nurse station(s).

2.1-3.7.5 Phase II Recovery Room or Area

A minimum of one Phase II patient care station per Class 2 and Class 3 imaging, procedure, or operating room shall be provided.

2.1-3.8 Support Areas for Patient Care and Diagnostic Areas

2.1-3.8.1 Reserved

*2.1-3.8.2 Nurse Station

A nurse station shall include the following:

A2.1-3.8.2 This area is often referred to as a care team station.
2.1 Common Elements (sections 1 – 3)

2.1-3.8.2.1 Work counter

*2.1-3.8.2.2 Means for facilitating staff communication

**A2.1-3.8.2.2 Means for facilitating staff communication.** This can be a nurse call system, telephone, or similar device.

2.1-3.8.2.3 Space for supplies

2.1-3.8.2.4 Accommodations for written or electronic documentation

2.1-3.8.2.5 Hand sanitation dispenser

*2.1-3.8.3 Documentation Area

Accommodations for written and/or electronic documentation shall be provided as indicated in other sections of this chapter and in the facility type chapters.

**A2.1-3.8.3 Documentation area.** Accommodations for documentation should include a writing surface and/or area with storage for an electronic device.

2.1-3.8.4 – 2.1-3.8.5 Reserved

2.1-3.8.6 Hand Scrub Facilities

2.1-3.8.6.1 At least one hand scrub position shall be located in the semi-restricted area adjacent to the entrance to each operating room and Class 3 imaging room.

2.1-3.8.6.2 One hand scrub station consisting of two scrub positions shall be permitted to serve two Class 3 imaging or operating rooms if located adjacent to the entrance of each room.

*2.1-3.8.6.3 The placement of the scrub station(s) shall not restrict the minimum required corridor width.

**A2.1-3.8.6.3 Scrub station(s) may be recessed into an alcove to reduce the likelihood of incidental splatter on adjacent personnel or equipment. The alcove depth and/or configuration should enable personnel in the scrub process to keep their hands and arms below the elbow over the sink compartment without interference from other staff and equipment/stretchers passing in adjacent circulation areas. Scrub sink dimensions (particularly depth), which vary between manufacturers, should be considered when determining the space needed to accommodate the sink and clearance necessary beyond the front lip for personnel in the scrub process to be clear of adjacent activity.

2.1-3.8.7 Hand-Washing Station

2.1-3.8.7.1 Location.

(1) Hand-washing stations shall be provided in each room where hands-on patient care is provided.

(2) For location and number requirements, see other common elements sections and the facility chapters for hand-washing station requirements for specific locations.

2.1-3.8.7.2 Design requirements. Hand-washing stations shall meet the requirements in the following sections:
2.1 Common Elements (sections 1 – 3)

(1) For hand-washing station design details, see Section 2.1-7.2.2.8 (Architectural Details—Hand-washing stations).

(2) For hand-washing station sink requirements, see Section 2.1-8.4.3.2 (Plumbing Fixtures—Hand-washing station sinks).

2.1-3.8.7.3 Additional requirements for hand-washing stations that serve multiple patient care stations

(1) At least one hand-washing station shall be provided for every four patient care stations or fewer and for each major fraction thereof.

*(2) Based on the arrangement of the patient care stations, hand-washing stations shall be evenly distributed.

A2.1-3.8.7.3 (2) Distribution of hand-washing stations. In a linear arrangement of patient care stations, the distance from the two stations farthest from the hand-washing station should be approximately equal. In a circular arrangement, the distance from all patient care stations should be approximately equal.

2.1-3.8.8 Medication Safety Zones

2.1-3.8.8.1 General

(1) Application. Where medication is prepared or dispensed, medication safety zones shall be provided as defined in this section for preparing, dispensing, storing, and administering medications.

(a) The number and location of medication safety zones shall be as determined in the medication safety risk assessment. See Section 1.2-4.5 (Medication Safety Assessment).

(b) A medication preparation room or area, self-contained medication dispensing unit, automated medication-dispensing station, or other system approved by the authority having jurisdiction (AHJ) shall be permitted to serve as a medication safety zone.

*(2) Design requirements. Medication safety zones shall meet the following physical environment requirements that promote safe medication use:

A2.1-3.8.8.1 (2) Medication safety zone design requirements. The physical environment requirements listed in Section 2.1-3.8.8.1 (2) are found in General Chapter <1066> “Physical Environments that Promote Safe Medication Use” of the U.S. Pharmacopeia-National Formulary (USP-NF).

*(a) Medication safety zones shall be located out of circulation paths.

A2.1-3.8.8.1 (2)(a) Locating medication safety zones out of circulation paths minimizes the potential for distractions and interruptions that interfere with staff concentration and attentiveness to medication therapy activities.

*(b) Workspace for medication safety zones shall be designed so that staff can access information and perform required tasks. See Section 1.2-4.5 (Medication Safety Assessment).

A2.1-3.8.8.1 (2)(b) Workspace organization
a. Workspace elements should be described in the functional program to assure medication safety zones can support effective use of medication-related information and accurate performance of tasks. Elements to consider include:

— Number of staff working in the medication safety zone
— Key tasks being performed
— Amount of space needed to support tasks being performed
— Types of products that should be clearly visible, enabled by the use of adjustable fixtures, drawer and storage design and counter height
— Designs to minimize work surface clutter

b. Space, power, and data requirements for medication-associated equipment and safety technology should be detailed in the functional program so the facility design will be able to accommodate the equipment and technology to be used in the medication safety zone.

c. Work counters shall provide space to perform the tasks described in paragraph (b).

*(d) Lighting. Task-specific lighting levels for health care settings recommended in the *U.S. Pharmacopeia-National Formulary* shall be used to design lighting.

A2.1-3.8.8.1 (2)(d) Lighting for medication safety zone work areas. Detailed lighting recommendations for medication safety zone work areas can be found in USP-NF General Chapter <1066> “Physical Environments that Promote Safe Medication Use.”

*(e) Where sharps containers are provided, they shall be placed at a height that allows users to see the top of the container.

A2.1-3.8.8.1 (2)(e) Height of sharps containers. NIOSH provides an ergonomically ideal formula for determining the height of sharps containers by establishing the eye-level height and maximum thumb tip reach of the worker population and then adding a drop angle of 15 degrees. For a standing work station, the sharps container height should be 52 to 56 inches (1.32 to 1.42 meters) above the standing surface of the user. For a seated work station, the sharps container height should be 38 to 42 inches (.97 to 1.07 meters) above the floor on which the chair rests. These height recommendations will comfortably accommodate 95 percent of adult female workers. See HHS (NIOSH) Publication No. 97-111, “Selecting, Evaluating, and Using Sharps Disposal Containers.”

*2.1-3.8.8.2 Work areas for preparing, dispensing, and administering medications*

A2.1-3.8.8.2 Security controls. Medication work areas may require physical environment components such as electronic surveillance, password-controlled access, and view panels in doors for security.

(1) Medication preparation room

(a) The medication preparation room shall contain the following:
(i) Work counter

(ii) Hand-washing station

(iii) Lockable refrigerator where drugs requiring refrigeration are used

(iv) Lockable storage for controlled drugs

(v) Sharps containers, where sharps are used

(b) Where a medication preparation room is used to store one or more self-contained medication dispensing units, the room shall be designed with space to prepare medication when the self-contained medication-dispensing unit(s) is present.

(c) Where a medication preparation room is used to compound sterile preparations, it shall meet the requirements in USP-NF General Chapter <797> “Pharmaceutical Compounding—Sterile Preparations.”

(2) Self-contained medication-dispensing units, automated medication-dispensing stations, or other systems approved by the AHJ

(a) Use of these units or stations shall be permitted in the following locations provided the unit or station can be locked to secure controlled drugs:

(i) At a nurse station

(ii) In a clean workroom

(iii) In an alcove

(b) A hand-washing station or hand sanitation dispenser shall be provided next to stationary medication-dispensing units or stations.

(c) A countertop or cart shall be provided adjacent to stationary medication-dispensing units or stations.

2.1-3.8.9 Nourishment Area or Room

Where nourishment areas or rooms are provided, they shall have the following:

2.1-3.8.9.1 Hand-washing station in or directly accessible to the nourishment room or area

2.1-3.8.9.2 Work counter

2.1-3.8.9.3 Storage

2.1-3.8.9.4 Fixtures and appliances for the beverages and/or nourishment provided in the facility

*2.1-3.8.10 Ice-Making Equipment

**A2.1-3.8.10 Biofilm growth prevention.** Consider the configuration of the supply water line and compressor exhaust to prevent the line from heating to a temperature that would promote biofilm growth. Ventilation of exhaust may be one strategy to prevent heating the supply line.
2.1-3.8.10.1 In public areas, Where ice-making equipment is designated for human consumption, it shall be of the self-dispensing type.

2.1-3.8.10.2 Where ice-making equipment is designated for treatment purposes, In areas restricted to staff only, use of storage bin-type equipment for making and dispensing ice shall be permitted. This equipment shall be located in areas restricted to staff.

2.1-3.8.11 Clean Workroom or Clean Supply Room

2.1-3.8.11.1 General. Clean workrooms and clean supply rooms shall be separate from and have no direct connection with soiled workrooms or soiled holding rooms.

2.1-3.8.11.2 Clean workroom. Where a clean workroom is provided, it shall contain the following:

1. Work counter

2. Hand-washing station

3. Storage facilities for clean and sterile supplies

2.1-3.8.11.3 Clean supply room. A room used only for storage and holding as part of a system for distribution of clean and sterile materials does not require a work counter or a hand-washing station.

*2.1-3.8.12 Soiled Workroom or Soiled Holding Room

A2.1-3.8.12 Functions for soiled workroom and soiled holding room

a. Soiled workroom. Soiled items may be handled in a soiled workroom to prepare them for subsequent cleaning, disposal, or reuse (e.g., emptying and rinsing bedpans or emesis basins, emptying or solidifying suction canisters, rinsing and gross cleaning of medical instruments). As well, this room provides temporary storage for soiled items prior to their removal from the unit.

b. Soiled holding room. This location is used for temporary storage of soiled materials and/or supplies prior to their removal from the facility.

2.1-3.8.12.1 General. Soiled workrooms or soiled holding rooms shall not have a direct connection with clean workrooms or clean supply rooms.

2.1-3.8.12.2 Soiled workroom

(1) Where a soiled workroom is provided, it shall contain the following:

(a) Hand-washing station

(b) Flushing-rim clinical service sink or equivalent flushing-rim fixture device where clinical services require bedpan-rinsing, emptying or solidifying suction canisters, or rinsing and gross cleaning of medical instruments

(c) Utility sink where clinical services do not require a flushing-rim fixture

(d) Work counter

(e) Space for separate covered containers for waste and soiled linen
(2) Where a fluid waste management system is used, the following shall be provided in the soiled workroom:

(a) Electrical and plumbing connections that meet manufacturer requirements

(b) Space for the docking station(s)

2.1-3.8.12.3 Soiled holding room. Where a soiled holding room is provided, it shall contain the following:

(1) Hand-washing station or hand sanitation dispenser

(2) Space for separate covered containers for waste and soiled linen

2.1-3.8.13 Equipment and Supply Storage

2.1-3.8.13.1 – 2.1-3.8.13.2 Reserved

2.1-3.8.13.3 Wheelchair storage and parking space. See Section 2.1-6.2.7 (Wheelchair Storage and Parking Space) for requirements.

*2.1-3.8.13.4 Emergency equipment storage

A2.1-3.8.13.4 Emergency equipment such as a cardiopulmonary resuscitation (CPR) cart(s) is often positioned in an alcove when located in a corridor.

(1) Storage shall be provided for the emergency equipment used in the facility.

(2) Each storage location shall be readily accessible and under staff control.

(3) Where a battery-powered CPR cart is stored, an electrical outlet for battery charging shall be provided.

*(4) Emergency equipment storage locations in corridors shall not encroach on the minimum required corridor width.

A2.1-3.8.13.4 (4) Emergency equipment may be positioned in an alcove located in a corridor.

*2.1-3.9 Support Areas for Staff

A2.1-3.9 Lactation room. Where a lactation room is provided for staff use, it should be readily accessible without passing through patient care or staff work areas. Sharing of a lactation room between clinical service areas should be permitted.

2.1-3.9.1 – 2.1-3.9.3 Reserved

2.1-3.9.1 2.1-6.4.1 Staff Lounge

Where a staff lounge is provided, it shall include a hand-washing station.

2.1-3.9.2 Reserved

2.1-3.9.3 2.1-6.4.2 Storage for Staff
Storage for staff personal effects (locking drawers, cabinets, or lockers) shall be readily accessible to individual work areas.

2.1-3.9.4 Staff Changing Area

2.1-3.9.4.1 Staff changing area(s) shall contain the following:

(1) Lockers
(2) Toilets
(3) Hand-washing stations
(4) Space for changing clothes, donning surgical attire
(5) Provision for separate storage for clean and soiled surgical attire

2.1-3.9.4.2 Staff changing area(s) are unrestricted areas.

2.1-3.10 Support Areas for Patients

2.1-3.10.1 Reserved

2.1-3.10.2 Patient Toilet Room(s)

2.1-3.10.2.1 Patient toilet room(s) shall be provided separate from public use toilet room(s) and located to permit access from patient care areas without passing through publicly accessible areas.

2.1-3.10.2.2 Patient toilet rooms shall be equipped with a toilet(s) and a hand-washing station(s).