1.2 Planning, Design, Construction, and Commissioning

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

*1.2-1 General

A1.2-1.1 Planning, design, and implementation process. To meet the objectives of this chapter, health care organizations should develop an interdisciplinary design process to guide facility design. The intent of an interdisciplinary design process is to improve building performance by integrating sustainable design considerations from project inception.

*1.2-1.1 Application

The provisions of this chapter shall apply to all outpatient facility projects.

*1.2-1.2 Multidisciplinary Project Team Planning and Pre-design Process

*1.2-1.2.1 Project Team

A1.2-1.2.1 Project team

a. The multidisciplinary project team should be assembled as early as possible in the design process.

b. The multidisciplinary team may include administrators, clinicians, infection preventionists, architects and other design professionals, facility managers, safety officers, security managers, information technology specialists, users of equipment, and support staff relevant to the areas affected by the project as well as those with knowledge of the organization’s functional goal for the project. Inclusion of patient advocates/consumers, A/E consultants, environmental/occupational health specialists, and construction specialists should be considered.

c. For small outpatient facility projects, the project team is likely to include fewer participants than listed in paragraph a. An individual participant may provide expertise in multiple categories. The frontline provider of the health care services and facility owner or care provider leadership (if that is someone different) may be the only person(s) in addition to the architect(s) or other design professional(s) on a very small project. The goal is to include the key stakeholders responsible for care delivery and determine if additional outside expertise is necessary (e.g., infection preventionist, ergonomist).

1.2-1.2.1.1 Multidisciplinary groups/persons (stakeholders) affected by and integral to the project and its design shall be included in throughout the project development planning and implementation process. Health care organizations that develop organizational standards for multiple facilities across the organization shall do so with stakeholder input.

1.2-1.2.2 The scope and nature of the project shall dictate the diversity of the multidisciplinary team, stakeholders to be involved on the project team.
*1.2-1.3 Environment of Care and Facility Function Considerations

**A1.2-1.3 Environment of care and facility function considerations.** Described in Section 1.2-5 (Environment of Care Requirements) are environment of care components (including key elements of the physical environment) and functional facility requirements that directly affect the experience of all people who spend time in outpatient facilities. How these components and requirements are addressed in outpatient facility design influences patient care outcomes and patient satisfaction, dignity, privacy, confidentiality, and safety as well as the incidence of medical errors, patient and staff stress, and facility operations.

In addition to the text in this chapter, which applies to all outpatient facilities, specific elements of the environment of care are described in individual chapters where the demonstrated value and necessity of such features are unique to a particular facility type.

*1.2-1.3.1 Framework for Outpatient Facility Design

**A1.2-1.3.1 Framework for outpatient facility design.** The care environment is defined as those features in a health care facility that are designed, built, and maintained to support quality health care. As patients and their families are becoming more involved during the provision of care, health care organizations need to respond to changing requirements for accommodations that support patients and their companions.

a. The health care environment should enhance the dignity of the patient through features that permit privacy and confidentiality.

b. Stress can be a major detriment to the course of a patient’s care. The facility should be designed to reduce patient, family, and staff stress wherever possible. Research and evidence-based materials are available to support these goals and should be referred to during design.

c. As technology changes, flexibility is in the best interests of quality care.

d. Health care economics continuously apply pressure to management. Therefore, every effort should be made during the design process to enhance the performance, productivity, safety, and satisfaction of staff to promote a safe environment of care.

e. Creativity should be encouraged in the design process to enhance the environment of care.

**1.2-1.3.1.1** Because the built environment has a profound effect on health, productivity, and the natural environment, outpatient facilities shall be designed within a framework that recognizes the primary mission of health care (including “first, do no harm”) and that considers the larger context of enhanced patient environment, employee effectiveness, and resource stewardship.

**1.2-1.3.1.2** Outpatient facility planning, design, construction, and commissioning activities shall include—in addition to consideration of space and operational needs—consideration of components in the safety risk assessment as well as the environment of care, life safety, and protection of occupants during construction.
1.2 PDC and Commissioning

A1.2-1.3.1.2 Facility construction, whether for freestanding buildings or expansion or renovation of existing buildings, can create conditions that are harmful to patients and staff. Thus, new outpatient buildings and renovation projects should be designed and constructed to facilitate ongoing cleanliness and mitigate infection control concerns.

1.2-2 Functional Program

1.2-2.1 General

*1.2-2.1.1 Functional Program Purpose

The primary purpose of the functional program shall be to communicate the owner’s governing body’s intent for the project to the designers of record as a basis of design at the initiation of the project.

A1.2-2.1.1 Functional program purpose

a. All projects, large and small, require a functional program to guide the design. The length and complexity of the functional program will vary greatly depending on project scope. The functional program for a small, simple project might consist of a simple sketch or a description of a few sentences.

b. The functional program can be used as a supplement to the construction documents; it is not intended to be approved by the authority having jurisdiction. However, states may require the functional program to be included with projects submitted for review.

*1.2-2.1.1.1 The functional program shall be used to determine the application of the Guidelines when developing facility projects.

A1.2-2.1.1.1 This includes application of the planning, design, construction, and commissioning requirements of Part 1 as well as specific requirements in Parts 2 and 3 of the Guidelines.

1.2-2.1.2 The facility shall retain the functional program with other design data to facilitate future alterations, additions, and program changes.

1.2-2.1.2 Functional Program Requirement

*1.2-2.1.2.1 The governing body shall be responsible for having a functional program developed, documented, and updated.

A1.2-2.1.2.1 The governing body may delegate documentation of the functional program to the architect or another consultant.

1.2-2.1.2.2 A functional program shall be developed for new construction, major renovations, and projects that change the functional use of any outpatient facility space.

(1) The functional program shall be completed as part of the project planning phase and updated, as needed, throughout the design and construction phases.
(2) Following its approval, the functional program shall serve as the basis for the project design and construction documents.

1.2-2.1.2.3 Activities such as equipment replacement, fire safety upgrades, or minor renovations that will not change the facility’s function or character shall not require a functional program.

1.2-2.1.3 Nomenclature in the Functional Program

1.2-2.1.3.1 The names for spaces and departments used in the functional program shall be consistent with those used in the Guidelines for Design and Construction of Outpatient Facilities. If acronyms are used, they shall be clearly defined.

1.2-2.1.3.2 The names and spaces indicated in the functional program also shall be consistent with those used on submitted floor plans.

1.2-2.2 Functional Program Content

The functional program for a project shall include the following:

1.2-2.2.1 Functional Program Executive Summary

An executive summary of the key elements of the functional program shall be provided and, at minimum, shall include the information outlined in Section 1.2-2.2 (Functional Program Content) in a project narrative.

1.2-2.2.2 Purpose of the Project

The functional program shall describe in detail the governing body’s overall project requirements and scope, including the services to be provided, expanded, or eliminated by the proposed project shall be described.

1.2-2.2.3 Functional Requirements

*1.2-2.2.3.1 Project components and scope. The functional program shall describe how the project components meet the governing body’s operational needs and objectives, commensurate with the scope and purpose of the project.

A1.2-2.2.3.1 The functional program should provide a comprehensive narrative consistent with the organizational goals identified during project planning and design. The length and detail of the functional program should depend on the project’s scope and the context needed to understand how to apply the Guidelines. As organizational goals and priorities shift during project development, the functional program should be updated, as needed, to be an accurate reflection of the intended product.

*(1) The services required for the completed project to function as intended shall be described in the functional program.

A1.2-2.2.3.1 (1) The following information about the services required may be included as applicable to the project scope:

a. Who will be served by the project (patients, family members, staff, etc.)
b. What activities and functions will occur in the spaces created or affected by the project

c. Where each activity or function will take place

*(2) 1.2-2.2.5.1 The clinical and support areas affected by the project shall be identified.

A1.2-2.2.3.1 (2) The following information about the affected clinical and support areas may be included as applicable to the project scope:

a. Resources (including—but not limited to—people, equipment, supplies, related process, etc.) required to support each activity or function

b. Location of each clinical or support activity or function

*1.2-2.2.3.2 2.2.6 Indirect support functions. Increased (or decreased) demands, workloads, staffing requirements, etc., imposed on support functions affected by the project shall be described.

A1.2-2.2.3.2 2.2.6 Indirect support functions. These functions may or may not reside adjacent to or in the same building or facility with the project.

1.2-2.2.3.3 2.2.7 Operational requirements. The operational requirements, which include but are not limited to the following, shall be described:

*(1) 1.2-2.2.7.1 Projected operational use for project components

A1.2-2.2.7.1 The operational use should address how each user group is engaged in each activity or function.

(2) 1.2-2.2.7.2 Relevant operational circulation patterns, including movement of staff, patients and their companions, members of the public, and materials and equipment

*(3) 1.2-2.2.7.3 Departmental operational relationships and required adjacencies

A1.2-2.2.7.3 Consider addressing facility operating hours, schedules and processes for each activity or function, and how these will affect operational relationships and adjacencies.

1.2-2.2.4 2.2.3 Project Type and Size

1.2-2.2.4.1 2.2.3.1 The type of outpatient facility(s) proposed for the project shall be identified as defined by the Guidelines.

1.2-2.2.4.2 2.2.3.2 Project size in square footage (new construction and/or renovation) and number of stories shall be provided.

1.2-2.2.5 2.2.4 Construction Type/Occupancy and Building Systems

1.2-2.2.5.1 2.2.4.1 New construction. If the proposed project is new construction that is not dependent on or attached to an existing structure, the following shall be included:

(1) A description of construction type(s) for the proposed project

(2) A description of proposed occupancy(ies) and, if applicable, existing occupancy(ies)
1.2.2.5.2 2.2.4.2 Renovation. For a project that is a renovation of, or addition to, an existing building, the following shall be included in the project narrative:

(1) A description of the existing construction type and construction type for any proposed renovations or additions

(2) A general description of existing engineering systems serving the area of the building affected by the proposed project

1.2-2.2.5 Project Components and Scope... [moved above, now 1.2-2.2.3.1]
1.2-2.2.6 Indirect Support Functions... [moved above, now 1.2-2.2.3.2]
1.2-2.2.7 Operational Requirements... [moved above, now 1.2-2.2.3.3]

*1.2-3 Space Program

A space program shall be provided that contains a list organized by functional unit that shows each room in the proposed project, indicating its size by gross floor area and clear floor area and citing relevant paragraph number(s) from this document.

A1.2-3 Project gross floor area

a. Gross floor area for the project should be aggregated by department; multiplying factors should be applied to reflect circulation and wall thicknesses within the department or functional area. This result is referred to as department gross square footage (DGSF).

b. DGSF for the project should be aggregated; multiplying factors should be applied to reflect circulation patterns, exterior wall thicknesses, engineering spaces, general storage spaces, vertical circulation, and any other areas not included within the intra-department calculations. This result is referred to as building gross square footage (BGSF) and reflects the overall size of the project.

*1.2-4 Safety Risk Assessment (SRA)

A1.2-4 SRA. The safety risk assessment is an interdisciplinary, documented assessment process used to proactively identify hazards and risks and mitigate underlying conditions of the built environment that may contribute to adverse safety events. These adverse events include infections, falls, medication errors, security breaches, and musculoskeletal or other injuries. The SRA process includes evaluation of the population at risk and the nature and scope of the project; it also takes into account the models of care, operational plans, sustainable design elements, and performance improvement initiatives of the health care organization. The SRA proposes built environment solutions to mitigate identified risks and hazards.

*1.2-4.1 General
A1.2-4.1 More information and online tools to assist in the development of a safety risk assessment can be found on the websites of the Facility Guidelines Institute and the Center for Health Design.

1.2-4.1.1 SRA Requirement

1.2-4.1.1.1 All outpatient facility projects shall be designed and constructed to facilitate the safe delivery of care.

1.2-4.1.1.2 To support this goal, a multidisciplinary team shall develop a safety risk assessment.

1.2-4.1.2 SRA Components

See Table 1.2-1 (Safety Risk Assessment Components) to determine if the following SRA components are required for a project.

1.2-4.1.2.1 Infection control risk assessment (ICRA)

1.2-4.1.2.2 Patient handling and mobility assessment (PHAMA)

1.2-4.1.2.3 Fall prevention assessment

1.2-4.1.2.4 Medication safety assessment

1.2-4.1.2.5 Behavioral health and mental health risk assessment

1.2-4.1.2.6 Security risk assessment

*1.2-4.1.3 SRA Responsibility and Scope

The safety risk assessment shall be initiated and managed by the governing body during the planning phase of the project and shall evolve with additional levels of detail as needed to support the creation of a safe environment throughout the design, construction, and commissioning phases of a project.

A1.2-4.1.3 SRA responsibility and scope for small facility projects. Risks such as infection prevention and security should be considered even for small projects, including tenant improvement projects. The safety risk assessment, which may be initiated by the governing body or the care provider, should identify the basic aspects of risk associated with the project early in the planning phase. These identified risk areas and related solutions will evolve over the course of project design, construction, and commissioning.

*1.2-4.1.4 SRA Team

The governing body of the health care organization shall appoint a multidisciplinary team to conduct the safety risk assessment.

A1.2-4.1.4 SRA team members and roles. The SRA team should coordinate all safety considerations and consolidate overlapping recommendations. See appendix table A1.2-a (Safety Risk Assessment Team Member Expertise) for a list of potential team members by SRA component type.

1.2-4.1.4.1 Members of the SRA team shall be convened as a group as needed to maintain continuity and integration of the SRA components.
1.2 PDC and Commissioning

1.2-4.1.4.2 Individual members shall be engaged to develop additional detail according to their areas of expertise.

*1.2-4.1.5 SRA Process

A1.2-4.1.5 SRA tools and methods. A range of high-priority activities to improve patient and caregiver safety outcomes should be considered during the predesign, design, and construction phases of a project.

1.2-4.1.5.1 Identify hazards and potential risks. The governing body shall provide an assessment of the potential harm to patients, caregivers, and other users for the risks listed in Table 1.2-1 (Safety Risk Assessment Components), identifying the following:

*(1) Hazards specific to the project

A1.2-4.1.5.1 (1) Project hazards

a. Hazards include physical obstacles and underlying conditions that may directly or indirectly contribute to harm to patients, staff, or other users. See appendix section A1.2-4.1.5.2 (Evaluation of underlying conditions that can cause adverse safety events) for more information.

b. Phasing of projects in occupied spaces, which may require interruption of building systems (MEP systems) services, can present hazards to the environment of care that should be considered. See NFPA 241: Standard for Safeguarding Construction, Alteration, and Demolition Operations.

(2) Historical data and/or national patient and caregiver safety trends relevant to the identified hazards

(3) Prioritization of the degree of potential harm to patients and/or caregivers from the identified hazards

*1.2-4.1.5.2 Evaluate hazards and risks. The SRA team shall evaluate underlying conditions that contribute to an unsafe environment for the components listed in Table 1.2-1 (Safety Risk Assessment Components).

A1.2-4.1.5.2 Evaluation of underlying conditions that can cause adverse safety events

a. Underlying conditions include the physical environment, organizational and social factors, and task characteristics that can be affected by the design of a space, including the following:

—Noise
—Vibration
—Visual distraction and disorganization of space
—Light type, quality, and quantity for each location
—Surface characteristics for different spaces
—Indoor air characteristics for different spaces
1.2 PDC and Commissioning

— Sources of infection
— Ergonomics
— Staff fatigue
— Space required to accommodate functions
— Standardized locations for equipment (e.g., medical gas outlets, emergency call buttons)
— Opportunities for, and barriers or disincentives to, mobilization of patients
— Impediments to movement, maneuvering, and flow
— Communication systems
— Visibility of patients
— Automation (where possible)
— Support for family involvement in outpatient care
— Multi-use areas (e.g., a clinic located within a retail grocery store)

b. The multidisciplinary project team should carefully consider how outpatient facilities are sited, particularly as venues for outpatient care become more diverse and integrated with other functions. Retail settings provide additional opportunities and challenges that should be studied during the planning phases. For example, when designing a clinic within a larger retail environment, the project team should consider how access to the location might impact patients and other users. Venues with incongruent features (e.g., a site adjacent to a tobacco products display) should be avoided.

c. For additional information, see the Center for Health Design report “Designing for Patient Safety: Developing Methods to Integrate Patient Safety Concerns in the Design Process,” which identifies 10 environmental factors as “latent conditions that can be designed to help eliminate harm.” Such “built environment latent conditions [holes and weaknesses] that adversely impact patient safety” should be identified and eliminated during the planning, design, and construction of outpatient facilities. The report can be found on the Center for Health Design website.

*1.2-4.1.6 SRA Report*

After completing the SRA process, the governing body shall provide the following information and recommendations, which shall be incorporated into the planning and design documentation:

**A1.2-4.1.6 SRA report.** Time and effort should be dedicated to patient and caregiver safety issues during the predesign phase (e.g., strategic planning, master planning, operational planning, and programming) of an outpatient facility design project. The decisions made during predesign significantly affect the design parameters going forward and the safety outcomes of the project.
1.2 PDC and Commissioning

following occupancy. The safety risk assessment should be an important part of the continuous safety improvement program in any health care organization.

1.2-4.1.6.1 Patient and caregiver safety hazards and risks identified by the safety risk assessment. See Section 1.2-4.1.5.1 (Identify hazards and potential risks).

1.2-4.1.6.2 Design features that contribute to the identified hazards and risks

1.2-4.1.6.3 Design strategies to reduce, mitigate, or eliminate identified hazards and risks

1.2-4.1.7 SRA Compliance

1.2-4.1.7.1 SRA documentation

(1) Written records shall remain an active part of the project documents for the duration of design, construction, and commissioning.

(2) The records shall include the SRA recommendations report and any documentation completed as part of the SRA process.

1.2-4.1.7.2 SRA communication

(1) The SRA team shall provide updates to the planners and designers for compliance with additional levels of detail generated during the project for all safety components listed in Table 1.2-1 (Safety Risk Assessment Components).

(2) Changes to the original design plans shall be documented, updated, and continually shared between the SRA team and the designers, planners, governing body, and contractor.

*1.2-4.2 Infection Control Risk Assessment (ICRA)

A1.2-4.2 ICRA. The infection control risk assessment is a documented process to proactively:

a. Identify and plan safe design elements, including consideration of long-range infection prevention.

b. Identify and plan for internal and external building areas and sites that will be affected during construction/renovation.

c. Identify potential risk of transmission of airborne and waterborne biological contaminants during construction and/or renovation and commissioning.

d. Develop infection control risk mitigation recommendations (ICRMRs) to be considered.

1.2-4.2.1 General

1.2-4.2.1.1 ICRA requirement. For an outpatient facility project to support safe designs, HVAC/plumbing systems, and surface and furnishing material selections, an infection control risk assessment shall be a part of integrated facility planning, design, construction, and commissioning activities and shall be incorporated into the safety risk assessment.
1.2 ICRA recommendations. Based on the results of the initial stage of the ICRA, the governing body shall provide the following recommendations for incorporation into the safety risk assessment:

(1) Design recommendations generated by the ICRA

(2) Infection control risk mitigation recommendations (ICRMRs) for construction and commissioning. See Section 1.2-4.2.3.1 (Infection control risk mitigation recommendations).

1.2-4.2.2 ICRA Considerations

At minimum, the ICRA shall address the following:

*1.2-4.2.2.1 Design elements

A1.2-4.2.2.1 Design elements. See Table 1.2-2 (Infection Control Risk Assessment Design Considerations) for cross-references to more information.

(1) Airborne infection isolation (AII) rooms

(a) The number, location, and type of airborne infection isolation (AII) and protective environment (PE) rooms shall be determined by the ICRA where these rooms are required in the facility type chapters in the Outpatient Guidelines. Where an AII room(s) is required in the facility type chapters in the Outpatient Guidelines, the number and location of these rooms shall be determined by the ICRA.

*(b) Whether an anteroom is to be provided for each AII room shall be determined by the ICRA.

A1.2-4.2.2.1 (2) Anteroom considerations

a. The following elements should be considered when completing the ICRA determinations as to whether an anteroom will be provided:

—Location and intended use of the AII room
—Facility location (e.g., a densely populated city or a city with an international airport), addressing the likelihood of receiving a patient with a known airborne transmissible disease or an emerging infectious disease with unknown transmission patterns
—Long-range infection prevention planning (e.g., pandemic response)

b. The purpose of an anteroom for an AII room is to provide:

—A buffer zone between the isolation room and the corridor to contain potential infectious particle escape due to transient airflow across the open doorway
—A space for storage and disposal of personal protective equipment (PPE)
—A space for staff to safely don and doff PPE that is separated from general traffic in the area

*(2) Special heating, ventilation, and air-conditioning (HVAC) needs required to accommodate the services (e.g., surgical suites, AII rooms, laboratories, pharmacies, areas with local exhaust systems for hazardous agents, and other special areas) performed in spaces included in or affected by the project shall be addressed in the ICRA.

A1.2-4.2.2.1 (2) Airborne contamination can result when HVAC systems are improperly designed, built, or maintained. In addition to providing comfort and minimizing exposure to chemical pollution, ventilation systems are an important
means for preventing infection. An HVAC system expert, whether an independent engineer or an employee of the governing body, should determine which of the following HVAC design considerations should be covered in the ICRA:

a. Characteristics of overall HVAC system design as well as design for specific sensitive areas, including components, capacity, filtration, air changes, pressure relationships, and directional flow

b. Ease of access for HVAC system maintenance

c. Ease of general maintenance activities and system cleaning
d. Selection of air distribution devices that allow for minimal or easy cleaning
e. Location of air intakes and exhaust outlets to prevent cross-contamination
f. Redundancy in equipment and systems
g. Plan for HVAC system outages and maintenance (both planned and unplanned)

(3) Water/plumbing systems

(a) The minimum number, location, and type of plumbed hand-washing stations, hand sanitation dispensers, and emergency first-aid equipment (e.g., eyewash stations and deluge showers) are identified in the facility chapters in the Guidelines. The need for additional fixtures shall be addressed in the ICRA.

(b) The ICRA shall include an assessment of the risk from transmissible waterborne pathogens and establish strategies to mitigate the risk.

(4) Characteristics related to infection prevention for selection of materials for surfaces and furnishings shall be addressed in the ICRA.

1.2-4.2.2.2 Construction elements. When conducting the ICRA and developing infection control risk mitigation recommendations (see Section 1.2-4.2.3) for building and site areas anticipated to be affected by construction, the following shall be addressed:

(1) The impact of disrupting essential services to patients and employees

A1.2-4.2.2.2 (1) Hazards specific to different types of essential service disruptions should be proactively determined. A plan should be developed to ensure continued provision of service in the event of both planned and unplanned disruptions.

(2) The specific hazards and protection levels for each designated area

(3) Location of patients according to their susceptibility to infection and the definition of risks to each

(4) The impact of movement of debris, traffic flow, spill cleanup, and testing and certification of installed systems

(5) Assessment of external as well as internal construction activities
(6) Location of known hazards

1.2-4.2.3 Infection Control Risk Mitigation

*1.2-4.2.3.1 Infection control risk mitigation recommendations (ICMRs). These written plans shall describe the specific methods by which transmission of airborne and waterborne biological contaminants will be avoided during construction as well as during commissioning, when HVAC and plumbing systems and equipment (e.g., ice machines, steam sterilization systems) are started/restarted.

A1.2-4.2.3.1 Responsibilities for performing risk mitigation procedures should be included in infection control risk mitigation plans to assure proper actions are taken at the appropriate time.

1.2-4.2.3.2 ICRMR planning. ICRMRs shall be prepared by the ICRA team.

1.2-4.2.3.3 ICRMR content. ICRMRs shall, at minimum, indicate how the following issues will be addressed during construction:

(1) Patient proximity to construction activities and potential need for patient relocation

(2) Standards for barriers and other protective measures required to protect adjacent areas and susceptible patients from airborne contaminants

A1.2-4.2.3.3 (2) Ventilation of the construction zone

a. Airflow into the construction zone from occupied spaces should be maintained by means of a dedicated exhaust system for the construction area.

b. Locations of exhaust discharge relative to existing fresh air intakes and filters, as well as the disconnection and sealing of existing air ducts, should be reviewed as required by the ICRA.

c. If the existing building system or a portion thereof is used to achieve this requirement, the system should be thoroughly cleaned prior to occupancy of the construction area.

d. Outpatient facility construction barriers for projects in high-risk areas should be maintained at a pressure differential of at least 0.03-inch water gauge (7.0 Pascals), with airflow from facility clean areas to construction dirty areas. Construction barriers in high-risk areas should have visual display of airflow direction. (High-risk areas include freestanding emergency facilities, outpatient surgery facilities, areas serving pediatric patients, pharmacies, post-anesthetic care units, areas serving immunocompromised patients, Class 2 and Class 3 imaging rooms, central sterile supply, airborne infection isolation rooms, cancer treatment facilities, and dental treatment areas.)

(3) Temporary provisions or phasing for construction or modification of HVAC and water supply systems

(4) Protection from demolition

(5) Training for staff, visitors, and construction personnel

*(6) The impact of potential utility outages or emergencies, including the need to protect patients during planned and unplanned utility outages and evacuation
A1.2-4.2.3.3 (6) Disaster plans for water supply and ventilation emergencies

a. The governing body should provide a written plan for what will happen in the event of a water outage. This should include location of supplies, who is responsible for what, and who is to be notified.

b. The governing body should provide a written plan for what will happen in the event of an air shutdown. This should include who is responsible for what and who is to be notified.

c. The governing body should provide a written plan for what will happen in the event of a water leak. This should include who is to be notified.

(7) The impact of movement of debris, traffic flow, cleanup, elevator use for construction materials and construction workers, and construction worker routes

(8) Provision for use of bathroom and food facilities by construction workers

*(9) Installation of clean materials (particularly ductwork, drywall, and wood/paper/fabric materials) that have not been damaged by water

A1.2-4.2.3.3 (9) Protection of building materials

a. Construction materials should be kept clean and dry, as appropriate.

b. Ductwork should be kept capped/clean during demolition and dust-generating construction.

c. Drywall installation should not proceed until exterior protection against rain damage has been installed.

*1.2-4.2.3.4 Monitoring plan and procedures

A1.2-4.2.3.4 Monitoring efforts should be determined by the governing body and may be conducted by the governing body’s infection preventionist(s), epidemiologist, construction coordinators, and/or safety staff or by independent outside consultants.

(1) The governing body shall provide monitoring plans for effective application of ICRMRs during the course of the project.

(2) Provisions for monitoring shall include:

   (a) Written procedures for emergency suspension of work

   (b) Protective measures indicating the responsibilities and limitations of each party (i.e., governing body, designer, contractor, and monitor)

*1.2-4.3 Patient Handling and Mobility Assessment (PHAMA)

A1.2-4.3 PHAMA. A patient handling and mobility assessment is an interdisciplinary, documented assessment process conducted to direct/assist the design team in incorporating appropriate patient handling and mobility equipment into the health care environment. The purpose of this equipment is to
increase or maintain patient mobility, independent functioning, and strength as well as to provide a safe environment for staff and patients during performance of high-risk patient handling tasks.

a. The PHAMA has two distinct yet interdependent phases:

Phase 1: A patient handling and mobility assessment is performed to identify appropriate patient handling and mobility equipment for each patient care area.

Phase 2: The space, structural, and other design requirements needed to accommodate patient handling and mobility equipment and to facilitate patients’ weight-bearing and physical activity are determined.

b. Information and guidance for conducting a PHAMA can be found in the FGI Beyond Fundamentals library in a white paper titled “Patient Handling and Mobility Movement Assessments,” 2nd ed., A White Paper posted under the Resources tab at www.fgiguide.com. The white paper explains the rationale for considering patient handling equipment during the design and construction process, information (including illustrations) about various types of patient-handling equipment, the business case for implementing patient handling and mobility programs, and strategies for implementing such programs.

c. Caregivers repositioning and transferring patients cannot lift more than 35 pounds (15.88 kilograms) manually without putting themselves at risk for back injuries. As a consequence, caregivers are one of the groups at highest risk for injury of any industry, and manual patient handling and moving are the primary causes. If caregivers are not equipped to perform these necessary physical tasks safely, patients may not receive adequate care and may remain inappropriately immobile.

Equipment is now available to facilitate necessary clinical work while significantly reducing the risk of caregiver and patient injury from patient handling, moving, transfer, transport, and mobilization activities. By better supporting appropriate levels of care and reducing risk of injury to caregivers, use of such equipment and related architectural accommodations will improve outcomes and reduce the overall cost of care.

d. The following definitions apply to text in Section 1.2-4.3 (Patient Handling and Mobility Assessment):

—Whenever the term “equipment” is used, it refers to patient handling and mobility equipment.

—“Fixed” equipment refers to equipment with track systems attached at some point within the room. Fixed equipment includes overhead (ceiling-mounted or wall-mounted) lifts and other lifting devices with fixed tracking. An alternative would be a demountable track that may be fully or partially disassembled and removed from the space.

—“Portable” or “mobile” equipment is floor-based equipment that moves on the floor surface, such as floor-based sling lifts and sit-to-stand lifts. These may be moved horizontally manually or with the assistance of motorized wheels.
1.2 PDC and Commissioning

When the term “portable” is used in connection with ceiling lifts, it may also refer to a lift motor and hoist that can be removed from the track system in one room and attached to the track system in another room.

1.2-4.3.1 General

1.2-4.3.1.1 PHAMA requirement

*(1) The governing body of the outpatient facility shall provide the project design team with a PHAMA that addresses the specific patient handling and mobility needs of all areas affected by a project.

**A1.2-4.3.1.1 (1) PHAMA team.** In addition to those listed in appendix table A1.2-a (Safety Risk Assessment Team Member Expertise), the frontline staff should contribute their expertise related to patient handling and mobility to development of the PHAMA. In cases in which the patient population may present specific risks (e.g., a higher-than-normal individual of size population), the design team may seek guidance from an expert (e.g., an ergonomist) to facilitate development of solutions during the preliminary phase of a project.

(2) The governing body shall incorporate the findings and recommendations of the PHAMA into the safety risk assessment.

1.2-4.3.1.2 Design recommendations

*(1) PHAMA results and recommendations shall be specific to each patient care area and any other area where patient handling and mobility occur.

**A1.2-4.3.1.2 (1) Areas to be included in PHAMA design recommendations.** Examples of areas to be covered in the PHAMA include procedure areas; diagnostic areas; pre- and post-procedure patient care areas; ambulance bays; and the routes connecting them. Because different areas serve patient populations with varying characteristics, equipment recommendations will vary also. For this reason, recommendations should be developed for each area that is part of a new construction or renovation project. The objective is to assure that equipment of the correct type, size, weight capacity, and quantity is available in each area and that sufficient storage is allocated for this equipment.

(2) The findings and recommendations of the PHAMA shall include consideration of the patient care requirements for all patients, including individuals of size.

1.2-4.3.2 Patient Handling and Mobility Elements for the Safety Risk Assessment

1.2-4.3.2.1 Phase 1: Patient handling and mobility needs assessment. Evaluation of patient handling and mobility needs shall include at minimum the following considerations:

*(1) Patient handling and mobility equipment recommendations, based on the following:

**A1.2-4.3.2.1 (1) Patient handling and mobility equipment recommendations**

a. In addition to the factors listed in the main text, recommendations for patient handling and mobility equipment are also based on the following:
—Patient dependency levels. This information is critical in determining patient handling and mobility needs. To simplify determination of dependency levels, patients are usually grouped into categories based on physical limitations (not clinical acuity). Recommended categories include total dependence/extensive assistance, partial assistance, and independent.

—Consideration of the weight and size of individuals of size. This is important to assure equipment with appropriate capacities is provided.

—Patient handling and mobility tasks for which equipment is used to minimize risk. These should include the following:

- Vertical and lateral transfers (from/to an exam table, gurney, stretcher, chair, commode, toilet, or wheelchair)
- Repositioning in chair
- Lifting appendages
- Transporting patients
- Assisting patient ambulation

b. To correctly identify all high-risk patient handling tasks and impediments or hindrances to patient mobility in an area, analyze injuries in the area for common task involvement, conduct walkthroughs, and interview and/or survey frontline staff (e.g. nursing, rehab, therapists) for their perceptions of high-risk tasks.

c. Many types of patient handling and mobility equipment are available, but only those that affect building design need be considered in a PHAMA. New equipment designs will need to be evaluated for building design impact as they become available. Presently, equipment that significantly influences design includes, but is not limited to, exam tables/stretchers/trolleys/gurneys, wheelchairs, and lateral transfer devices. Fixed patient lifts (i.e., ceiling- and wall-mounted lifts) and portable patient lifts (e.g., sit-to-stand lifts and floor-based sling lifts) are further described below, as their design impact may be significant. Other transfer devices and accessories in addition to those mentioned above (e.g., slings, transfer sheets and boards, and trapezes) influence design to the extent that storage is required.

—Sit-to-stand lifts are used to assist a patient who requires partial assistance and who possesses some weight-bearing ability. Sit-to-stand lifts assist in vertical transfers, toileting, dressing, peri-care, and ambulation.

—Floor-based sling lifts and ceiling-mounted lifts are used for patients who are completely or substantially unable to assist caregivers. Patients requiring these levels of care are often described as “dependent” or requiring “extensive assistance.” The utility of these lifts for this population includes—but is not limited to—vertical transfers, lateral transfers, repositioning in bed and chair, lifting appendages, and lifting patients from the floor. These lifts can also be
used for assistance with ambulation rehabilitation or mobilization of patients with some weight-bearing capability.

(a) Characteristics of projected patient populations
(b) Types of high-risk patient handling and mobility tasks to be performed
(c) Knowledge of specific technology to enable physical activity by patients and reduce risk for each patient handling and mobility task
(d) Architectural factors that interfere with use of patient handling equipment or impede mobility

*(2) Types of patient handling and mobility equipment to be used (e.g., manual or power-assisted fixed ceiling or wall-mounted lifts, manual or power-assisted floor-based sling or sit-to-stand lifts, electric height-adjustable tables, or a combination thereof)

**A1.2-4.3.2.1 (2)** Equipment that will be used. Patient care providers who are familiar with the characteristics of their unique patient populations should be included in the design and equipment selection process to assure appropriate equipment decisions are made.

When conducting an equipment needs assessment, any existing equipment that will be used in an area should be considered. For each area included in the PHAMA, use a log to collect information on existing equipment, the percentage of time it is used and—if this is not 100 percent—reasons for the percentage of time indicated.

*(3) Quantity of each type of patient handling and mobility equipment needed for each area under consideration

**A1.2-4.3.2.1 (3)** The dependency level of the patients should determine the quantity of lifts required.

a. The average percentage of “dependent/extensive assistance” patients should be used to determine the number and placement of fixed lift systems and/or the quantity of floor-based sling lifts.

b. Installation of fixed lift systems will reduce, but not eliminate, the need for floor-based lifts since most fixed lift systems do not provide complete coverage of patient use areas.

c. The number of patients who need partial assistance should be used to determine the number of sit-to-stand lifts needed. A ratio of one lift per 8 to 10 patients may be used.

d. Peak patient handling times may increase the quantity of lifts required.

*(4) Required weight-carrying capacities

**A1.2-4.3.2.1 (4)** Lift weight capacities range from approximately 400 pounds (181 kilograms) to expanded capacity lifts of 1,000 pounds (454 kilograms) or more. Specification of lifts with a capacity of 500–600 pounds (227–272 kilograms) will accommodate the greatest range of all patients. The lifts designated for individuals of size should support the weights for individuals of
size defined during the planning phase. See Section 1.2-6.4.1 (Projected Need for Accommodations for Care of Individuals of size).

*(5) Locations/rooms/areas where patient handling and mobility equipment will be used, with installation requirements (if fixed) and storage requirements

**A1.2-4.3.2.1 (5)** Nursing staff will be the best resource for determining which rooms should have fixed lift installations and storage locations for portable lifts. **Note:** A patient care ergonomic (PCE) evaluation is an important step in determining the patient handling and mobility technology required to implement a “minimal lift” policy. It is highly recommended that health care organizations conduct a thorough PCE evaluation, which will provide recommendations for other patient handling and mobility technology as well as programmatic issues related to safe patient handling and mobility. Information about how to conduct a PCE evaluation can be found in the FGI Beyond Fundamentals library in a white paper titled “Patient Handling and Movement Mobility Assessments,” 2nd ed., “A White Paper” posted at www.fgiguidelines.org.

**1.2-4.3.2.2 Phase 2: Design considerations.** The impact of patient handling and mobility needs on building design shall be addressed in the PHAMA, including consideration of the patient care needs of all patients, including individuals of size. These design considerations shall incorporate results from the Phase 1 assessment and shall include, at minimum, the following:

(1) Structural considerations to accommodate current and/or future use of fixed equipment that supports safe patient handling and mobility

*(2) Electrical and mechanical considerations for current and future use and/or installation of patient handling and mobility equipment and associated storage and charging areas

**A1.2-4.3.2.2 (2) Electrical and mechanical considerations**

a. *For portable lifts.* Battery-charging areas with electrical services should be provided in storage rooms for portable, floor-based lifts and other assistive devices.

b. *For fixed lifts.* Access to both electrical power and emergency control features (often suspended from the motor housing) should be provided for fixed lifts.

(3) Adequate space for provision of patient care and for unhindered maneuvering of patient handling and mobility equipment. For clearance requirements to accommodate care of individuals of size, see Section 2.1-2 (Accommodations for Care of Individuals of Size).

(4) Destination points for patient ambulation, transfers, and transport

*(5) Sizes and types of door openings through which patient handling and mobility equipment and accompanying staff must pass. See Section 2.1-2.10.2 (Special Design Elements for Spaces for Care of Individuals of Size—Door Openings) for additional requirements.

**A1.2-4.3.2.2 (5)** See appendix section A2.1-7.2.2.3 (2) (Door openings—general) for more information about door openings and patient mobility.
1.2 PDC and Commissioning

*(6) Types of floor surfaces and transitions needed to facilitate safe and effective use of patient handling and mobility equipment

A1.2-4.3.2.2 (6) Types of floor surfaces and transitions. See Section 2.1-7.2.3.1 (Flooring and wall bases) and its appendix for more information.

(7) Coordination of patient handling and mobility equipment installations with building mechanical, electrical, communication, and life safety systems

*(8) Storage space requirements and locations available or to be provided

A1.2-4.3.2.2 (8) Storage for patient handling and mobility equipment and accessories

a. Accessibility of patient-handling and mobility equipment is critical to assuring it will be used. Storage needed for the type and quantity of equipment identified during the project planning phase should be incorporated during project design.

b. Storage will be needed for patient handling and mobility equipment accessories such as lift slings, hanger bars, and trapezes as well as for other patient handling and mobility equipment. Operational considerations when determining storage space requirements include:

— Surplus slings should be stored in the same location as portable lifts.

— In storage areas, large hooks should be installed for hanging slings or shelving should be provided for storage of folded slings.

— Standard shelving should be provided for storage of an assortment of slings for lifts, extra lift hanger bars, and other patient-handling equipment, such as friction-reducing devices and air-assisted lateral transfer aids with motor(s).

— Storage alternatives: For small areas, centrally located storage may be provided. For large or small areas, storage may be provided in alcoves or storage areas interspersed throughout the unit.

(9) Impact of the installation and use of patient handling and mobility equipment on environmental characteristics of the environment of care

*(10) Impact of the installation and use of patient handling and mobility equipment on the aesthetics of the patient care space

A1.2-4.3.2.2 (10) When installing fixed-lift systems, care should be taken to minimize the visual impact of fixed tracks, slings, hanger bars, and motors on the aesthetics of the physical environment. Use of recessed tracks is suggested as well as curving the track away from the center of the patient room. Other suggestions include enclosing lift motors in decorative cabinets and concealing or masking wall-mounted rails for traveling gantry lifts with crown molding or indirect ceiling light coves.

*(11) Infection control recommendations

A1.2-4.3.2.2 (11) For effective infection control risk mitigation, consult with an infection preventionist during development of and while conducting the
PHAMA. Incorporate the facility’s infection control guidelines and manufacturer’s cleaning instructions into planning. Use of lifts in certain areas, such as a surgical suite, may have more stringent requirements.

*1.2-4.4 Fall Prevention Assessment

**A1.2-4.4 Fall prevention risk assessment.** Consideration for fall prevention and mitigation includes evaluation of the population at risk and the design features to mitigate fall and injury risk based on the nature and scope of the project. The SRA team (see Section 1.2-4.1.4) should proactively identify and plan design elements to help prevent falls and mitigate injuries associated with falls.

*1.2-4.4.1 Fall Prevention Elements of the Safety Risk Assessment

**A1.2-4.4.1 Patient fall prevention program.** A comprehensive fall prevention program includes many elements beyond those found in the physical environment. The U.S. Department of Veterans Affairs (VA) National Center for Patient Safety is an authoritative source for information, guidance, references, and algorithms to assist with patient fall prevention, including a Falls Toolkit. In addition, the Business and Institutional Furniture Manufacturers Association (BIFMA) is an industry source for standards related to furniture.

1.2-4.4.1.1 Fall-risk locations. The SRA report shall identify fall-risk locations for a new construction or renovation project.

*1.2-4.4.1.2 Design features.** The SRA team shall identify required patient fall prevention design features for the identified at-risk locations. See Section 2.1-7 (Design and Construction Requirements).

**A1.2-4.4.1.2 Design features.** Evidence for the identification of single environmental variables and their importance in patient falls is still emerging. However, a number of studies that examined multiple variables suggest an association between falls and the environmental variables listed here. (Additional detail can be found in the Center for Health Design paper “Contribution of the Designed Environment to Fall Risk in Hospitals.”)

- **Flooring.** See 2.1-7.2.3.1 (Flooring and wall bases) and their appendices for information.
- **Equipment.** See appendix section A1.2-4.3 (PHAMA) for a description of equipment to support patient handling and mobility and reduce the risk of patient falls.
- **Entrances.** Curbless patient drop-off areas and curbless walkways from parking lots reduce the risk of falls.

1.2-4.4.2 Fall Prevention Response

1.2-4.4.2.1 The design team shall incorporate required patient fall prevention design features in the project design documents.

1.2-4.4.2.2 For renovation projects, documentation shall describe the specific fall risk mitigation methods to be used in and around construction zones and shall, at minimum, address the following:
(1) Standards for barriers and other protective measures required to protect adjacent areas and susceptible patients from clutter and construction dust on flooring

(2) Protection from demolition debris on flooring

*1.2-4.5 Medication Safety Assessment

Medication safety should be evaluated and documented by the SRA team so that design can support improved medication safety by identification of medication safety zones and development of design features to mitigate risk based on the nature and scope of the project.

*1.2-4.5.1 Medication Safety Elements of the Safety Risk Assessment

**A1.2-4.5.1 Medication safety elements.** Many technologies have been developed to help reduce medication errors. These include pharmacy order review software for validating orders, technologies such as robotics and unit dose dispensing equipment that improve accuracy of medication dispensing, and delivery technologies such as QR codes and bar coding. Physical environment supports for these and other relevant technologies should be considered as part of a comprehensive approach to reduction of medication errors and adverse drug events.

**A1.2-4.5.1.1 Number and location of medication safety zones.** The governing body shall identify the number and location of medication safety zones for the project and include them in the SRA report.

**A1.2-4.5.1.2 Design features.** Medication safety zones shall meet the requirements found in Section 2.1-3.8.8 (Medication Safety Zones).

*1.2-4.5.2 Medication Safety Response

The design team shall incorporate the required medication safety design features in the project design documents.

*1.2-4.6 Behavioral and Mental Health Risk (Psychiatric Patient Injury and Suicide Prevention) Assessment

**A1.2-4.6 Behavioral and mental health risk assessment.** Risk should be determined through simultaneous consideration of the inherent danger of any single environmental features because of in the facility based on patient profile and acuity, the potential for violence and/or disorientation in this patient population, the anticipated level of staff supervision for each area, and the degree to which patients are visible.

a. The governing body should develop a detailed assessment of the level of risk for each program area in the facility where mental and behavioral health patients will be served (e.g., freestanding emergency facilities, clinics). See appendix
table A1.2-a (Safety Risk Assessment Team Member Expertise) for areas of expertise needed on the behavioral and mental health assessment team.

b. Each area should be evaluated to identify the architectural details, surfaces, and furnishing and exposed mechanical and electrical devices and components to be addressed in the risk assessment. Examples of facility areas to be included in a behavioral and mental health risk assessment include the following:

—Highest level

- Intake/interview rooms (where unknown patient acuity poses an increased risk)
- Seclusion rooms (where patient acuity poses an increased risk)
- Patient toilet rooms
- Emergency department (an area under supervision but dealing with unpredictable patients)
- Psychiatric emergency department (comprehensive psychiatric emergency program, or CPEP, an area under good supervision but dealing with unpredictable patients under initial evaluation and often under heavy medication)

—Moderate level

- Exam rooms, procedure rooms, and specialty therapy rooms (supervised with good visibility of patient)
- Counseling/consultation offices, activity rooms, and group therapy rooms (supervised with good visibility of patient)
- Activity spaces, group rooms, and treatment spaces (supervised with good visibility of patients)
- Dining areas and recreation spaces, both indoor and outdoor
- Corridors (those that are not always visible)

—Lower level

- Facility lobby areas
- Waiting rooms (with visibility of patients) and Exam rooms and private offices
- Staff and support areas (not accessible by patients)

Other information that could be considered can be found in the “Behavioral Health Design Guide,” published by Behavioral Health Facility Consulting, LLC, the Facility Guidelines Institute, and in “Patient Safety Standards, Materials
1.2 PDC and Commissioning

and Systems Guidelines,” published by the New York State Office of Mental Health.

1.2-4.6.1 Behavioral and Mental Health Elements of the Safety Risk Assessment

The SRA report shall identify areas where patients at risk of behavioral and mental health injury and suicide will be served.

1.2-4.6.2 Behavioral and Mental Health Response

1.2-4.6.2.1 The SRA team shall identify mitigating features for the identified at-risk locations.

1.2-4.6.2.2 The design of behavioral and mental health patient care settings shall address the need for a safe treatment environment for those who may present unique challenges and risks as a result of their mental condition.

(1) This patient environment shall be designed to protect the privacy, dignity, and health of patients and address the potential risks related to patient elopement and harm to self, others, and the care environment.

(2) The design of behavioral and mental health patient areas shall accommodate the need for clinical and security resources.

*1.2-4.7 Security Risk Assessment

A1.2-4.7 Security risk assessment. A security risk assessment addresses the unique security characteristics of a health care facility, including specific needs related to the protection of vulnerable patient populations, the security of sensitive areas, the application of security and safety systems, and the infrastructure required to support these needs. The assessment addresses external and internal security needs as well as security needs related to emergency management and response. Security requirements for construction, commissioning, and move-in vary according to the complexity and scope of services provided.

More detailed information regarding the guidelines in this section can be found in Security Design Guidelines for Healthcare Facilities, published by the International Association for Healthcare Security & Safety (IAHSS).

1.2-4.7.1 Project Security Plan

For new construction or renovation projects, a security plan shall be developed that addresses risks from the environment, function of the project space, and the construction process. This plan shall include the following:

1.2-4.7.1.1 A description of the impact of demolition and phasing on existing site functions and any existing protection strategies and design interventions

1.2-4.7.1.2 An assessment of the need for temporary security barriers such as fencing and security systems (e.g., intrusion detection and video surveillance systems)

1.2-4.7.1.3 A schedule for installation of security systems for completion during move-in activities to allow for protection of the facility and equipment
*1.2-4.7.2 Security Elements of the Safety Risk Assessment*

Design features shall address identified security risks specific to the patient population to be served and environmental factors related to the project scope.

**A1.2-4.7.2 Security elements of the safety risk assessment**

a. *Security considerations for project design*

—Parking and exterior spaces. Outpatient facility surroundings may include open space, parking facilities, and private roadways and may border other businesses, residential properties, or major transportation routes. Lighting design should be provided for parking and exterior spaces.

—Buildings and interior spaces. Outpatient facilities may include non-patient care areas such as academic and research space. These areas may present specific risks or security concerns. The physical design of buildings and integration of electronic security systems in the built environment are important components of the facility protection plan and the patient, visitor, and staff experience.

- Security plan. The project design should include a comprehensive security plan that indicates a layered approach to access control, including zones, control points, circulation routes, and required egress paths.
- Protected health information. The design of outpatient facilities should address all forms of confidential patient information commonly referred to as protected health information (PHI). The design should address the ways in which this information could be compromised and should apply integrated physical and electronic security systems (e.g., access control and audit features) to locations such as registration, interview, clinical, storage, and waste areas as well as in data systems.
- Utility and mechanical systems and other infrastructure. The risk assessment should address the need to secure spaces and systems that provide for system reliability and, as required, redundancy. The design of utility, mechanical, and infrastructure-related spaces in outpatient facilities should include the recognition that such spaces and the mechanical, electrical, plumbing, and information technology (IT) systems in them are critical assets for the provision of uninterrupted patient care, basic building comfort, and extraordinary emergency response capabilities.
- Biological, chemical, and radioactive materials. Areas in outpatient facilities containing highly hazardous materials are frequently regulated and should be designed accordingly. Their design should also address the unique security risks presented by highly hazardous materials (e.g., biological, chemical, and radioactive materials) that may be present in patient care areas, laboratory, hazardous waste storage, or other locations.

b. *Emergency management security considerations*. Some outpatient facilities may provide both scheduled and emergency services, serve as part of local emergency response networks, and be expected to be functional, safe, and secure
for patients, visitors, and staff while remaining prepared for natural and man-made emergencies 24 hours a day.

— The design of the facility should address the facility’s role in responding to internal and external emergencies on its own or in coordination with local emergency response or public health authorities based on assessed risks. All other regulations for emergency operations should be considered when developing the design.

— An all-hazards approach to design should be applied to help the facility prepare for, respond to, and recover from man-made events and natural disasters.

1.2-5 Environment of Care Requirements

In addition to the functional requirements of the space being designed, the following components and key elements of the physical environment shall be evaluated during project planning and design. The evaluation shall be documented.

*1.2-5.1 Delivery of Care Model Concepts

A1.2-5.1 Delivery of care model concepts. Examples of delivery of care models include patient-focused care, family-centered care, and community-centered care. Information on the patient and family-centered care model can be found at the Institute for Patient- and Family-Centered Care website. Several examples of other models of care can be found in “Innovative Care Delivery Models: Identifying New Models that Effectively Leverage Nurses,” a report funded by the Robert Wood Johnson Foundation.

1.2-5.1.1 A description of the delivery of care model shall be provided.

1.2-5.1.2 A description of the physical elements and key functional relationships necessary to support the intended delivery of care model shall also be provided.

1.2-5.2 Patients, Visitors, Physicians, and Staff Accommodation and Flow

Design criteria shall be described for the layout and design of the physical environment necessary to support operational efficiencies and facilitate ease of use by patients and their companions, members of the public, and clinicians and support staff (e.g., travel paths, waiting areas or rooms, desired amenities, and separation of users and workflow).

A1.2-5.2 Accommodation and flow

a. User accommodation. In evaluating the users of the facility, inclusive design features should be considered in the context of the intended users’ characteristics (e.g., age, body size, ability, cultural background, gender identity).

b. Layout/operational planning. Criteria for evaluation of proposed layouts during planning and design development should be consistent with the delivery of care model to facilitate review of each layout and operational plan.
1.2 PDC and Commissioning

*1.2-5.3 Building Infrastructure and Systems Design*

Design criteria for the physical environment necessary to support organizational, technological, and building systems that facilitate the delivery of care model shall be described.

A1.2-5.3 Physical relationships between services or new aggregations of services should be clearly defined and supported. Clustering of related services affects the criteria for design of the physical environment. Information technology, medical technology, and/or staff use and cross training are issues that should be addressed in relation to the environment of care components.

1.2-5.4 Physical Environment Elements

Descriptions of and/or design criteria for the following shall be provided:

*1.2-5.4.1 Light*

How the use and availability of natural light and illumination are to be considered in the design of the physical environment

A1.2-5.4.1 Light. Provisions for natural light should be considered wherever possible in the design of the physical environment. Visual benefits include sufficient light for vision and safety; non-visual benefits relate to psychological and/or biological factors.

a. Access to natural light should be provided no farther than 50 feet (15 meters) from any patient activity area, visitor space, or staff work area. To the extent possible, the source of such natural light should also provide opportunities for exterior views.

b. Access to natural light should be available without entering private spaces. Examples of such access include windows at the ends of corridors, skylights into deep areas of the building in highly traveled areas, transoms, and door sidelights.


d. Color rendering properties should be addressed in lamp selection.

e. Finish selection should address light reflectance values (LRV) in conjunction with lamp selection.

f. Indirect lighting should be considered to reduce glare.

*1.2-5.4.2 Views of and Access to Nature*

How the use and availability of views and other access to nature are to be considered in the design of the physical environment
A1.2-5.4.2 Views of and access to nature. Siting and organization of the building should respond to and prioritize unique natural views and other natural site features.

a. Ideally, the design for an outpatient facility would include direct physical access to the outdoors as well as views of nature and indoor gardens/atria. When direct access is not possible, suitable alternatives could include indoor gardens with natural light (atria) and visual access to nature, as defined by *Green Guide for Health Care* Environmental Quality Credit 8.2 and Sustainable Sites Initiative Credit 6.7.

b. Separate outdoor respite areas for medical and support staff should be provided. For practical guidelines for the percentage of space allocated for these areas, refer to LEED for Health Care and *Green Guide for Health Care* requirements as well as Sustainable Sites Initiative Credit 9.1.

c. Outpatient facilities should provide a garden or other controlled exterior space that is accessible to building occupants. Consider specifically designed therapeutic and restorative gardens for patients and/or caregivers, as appropriate. Exterior spaces should be located to accommodate staff observation. Therapeutic and restorative gardens should be designed by landscape architects with knowledge and experience specific to health care design as part of the multidisciplinary design team.

d. Opportunities for active as well as passive interaction with nature in outdoor space(s) should be provided (e.g., opportunities for exercise and play or other types of physical activity and for physical, occupational, horticultural, or other therapies).

e. Signage, other wayfinding features, and/or views of outdoor garden(s) and/or atria should be provided to encourage their use.

f. Access to both sun and shade, with trees and/or built shade structures, should be provided. Shady places are particularly important for patients who are photosensitive.

g. When access to outdoor space is not restricted, automatic door openers, flat door thresholds, and other physical connections between indoors and outdoors that facilitate easy access should be provided.

h. Use of harmful and poisonous plants should be avoided, especially in gardens for children, the developmentally disabled, and people with dementia.

*1.2-5.4.3 Wayfinding*

How clarity of access will be provided for the entire campus or facility using a wayfinding system. See Section 1.2-6.3 (Wayfinding) for more information.

A1.2-5.4.3 Wayfinding

a. Outpatient facility entry points should be clearly identified from all major exterior circulation modes (e.g., roadways, bus stops, vehicular parking).
b. Clearly visible and understandable signage, icons, universal symbols, visual landmarks (including views to the outside), and/or cues for orientation (including views to the outside) should be provided.

c. Boundaries between public and private areas should be well marked or  
   implied and clearly distinguished.

d. A system of interior “landmarks” should be developed to aid occupants in  
   cognitive understanding of destinations. To be effective, landmarks should be  
   unique and used only at decision points. Landmarks may include sealed water  
   features, major art, distinctive color, or decorative treatments. These features  
   should attempt to involve tactile, auditory, and language cues as well as visual  
   recognition. When color is used as a wayfinding device, it should support the  
   primary wayfinding system elements and be clearly distinguished from color  
   palette decisions unrelated to wayfinding.

e. Signage systems should be flexible, expandable, adaptable, and easy to  
   maintain. Signage should be consistent with other patient communications and  
   supporting print, Web, and electronic media.

*1.2-5.4.4 User Control of Environment*

How, by what means, and to what extent users of the finished project will be able to control their environment

**A1.2-5.4.4 User control of environment.** During the functional programming  
process, opportunities for individual control over as many elements of the  
environment as possible and reasonable (e.g., temperature, lighting, sound, and  
privacy) should be evaluated.

a. Lighting in patient and staff areas should allow for individual control and  
   provide variety in lighting types and levels.

b. Building systems design should address individual control over the thermal  
environment through carefully considered zoning of mechanical systems that  
permits control of heating and cooling to achieve thermal comfort for individual  
patients and for staff in staff areas.

c. Noise has been proven to be an environmental stressor for patients, families,  
   and staff; therefore, the effects of noise should be a high priority in the design of  
   the physical environment and the selection of operational systems and  
equipment.

   — Where feasible and clinically safe to do so, patients should be able to have  
   some control of their acoustic environment. Staff should be able to switch  
   medical alarms and communication equipment such as paging and nurse call  
   systems to staff communication devices and/or to an acoustically protected  
   room or area under caregiver supervision.

   — Use of personal mobile devices should be considered in place of overhead  
   paging systems.
— Patients and staff should be able to activate sound-masking technology to help mask unwanted sounds that affect the patient environment.

— Noise-canceling headsets or hearing protection devices should be available for patient use.

— In waiting areas with television, alternate listening devices should be available to offer patients a choice of quiet.

d. **Personal storage.** When length of stay is extensive, accommodations for patients’ personal belongings should be provided. Staff should have a place to secure their personal belongings.

**1.2-5.4.5 Privacy and Confidentiality**

How privacy and confidentiality for users of the finished project are to be protected

**A1.2-5.4.5 Privacy and confidentiality.** Patient privacy is a right that has been established through the Health Insurance Portability and Accountability Act (HIPAA), which is intended to ensure that privacy of patient health care information is maintained in all health care settings.

a. Public circulation and staff/patient circulation should be separated wherever possible.

b. Waiting areas for patients on stretchers or in gowns should be located in a private zone within the plan, out of view of the public circulation system.

c. Private alcoves or rooms should be provided for all communication concerning personal information relative to patient illness, care plans, and insurance and financial matters.

**1.2-5.4.6 Security**

How the safety and security of patients, staff, and visitors are to be addressed in the overall planning of the facility

**A1.2-5.4.6 Security**

a. Provision of readily accessible and visible external access points to the facility should be balanced with the ability to control and secure all access points in the event of an emergency. Factors such as adequate exterior lighting in parking lots and at entry points to the facility and appropriate reception/security services are essential to ensuring a safe environment.

b. Since the strict control of access to an outpatient facility is neither possible nor appropriate, safety within the facility should also be addressed through the design of circulation paths and functional relationships.

c. Provisions should be made for securing the personal belongings of staff, visitors, and patients.

d. The physical environment should be designed to support the overall safety and security policies and protocols of the institution.
1.2 PDC and Commissioning

e. Security monitoring, when provided, should respect patient privacy and dignity.

**1.2-5.4.7 Architectural Details, Surfaces, and Built-In Furnishings**

Characteristics and criteria for use in selecting materials and products for architectural details, surfaces, and built-in furnishings

**A1.2-5.4.7 Characteristics and criteria for selecting surface materials and products.** The effect of surface materials, colors, textures, and patterns on patient, staff, and visitor safety and on maintenance and life cycle performance should be considered in the overall planning and design of outpatient facilities.

**1.2-5.4.8 Cultural Responsiveness**

How the project addresses and/or responds to local or regional cultural considerations—the diverse background and culture of patients, staff, and visitors

**A1.2-5.4.8 Cultural responsiveness**

a. Organizational culture is defined by the history of the organization, leadership philosophy, management style, and caregivers’ dispositions. Also consider the clinical functions being served (e.g., pediatrics, geriatrics, oncology).

b. Regional culture is defined by the physical location and demographics (including age, nationality, religion, and economics) of the communities served. Cultural responsiveness to community-specific issues such as demographic density in urban, suburban, and rural communities should be considered.

c. Diversity addresses the demographics of the local population and individual users’ characteristics (e.g., age, body size, ability, cultural background, gender identity) and how these relate to the design of an inclusive environment.

**1.2-6 Planning and Design Considerations and Requirements**

**1.2-6.1 Acoustic Design**

**A1.2-6.1 Noise risk assessment.** Acoustic requirements should be assessed and documented by the project team during the early planning stages of the project so the facility design results in reduced noise and vibration and increased patient and staff safety. The noise risk assessment evaluates the building shell type, interior floor/wall/ceiling assemblies, surface finishes, and building systems (e.g., mechanical, plumbing, pneumatic, and lighting), which directly affect speech privacy, speech intelligibility, fall risks, medication errors, etc.

a. **Elements of the noise risk assessment.** These should include the following:

--- Determination of building shell construction based on noise and vibration at the site as defined in appendix section 1.2-6.1.2 (Site exterior noise)
1.2 PDC and Commissioning

— Review of interior spaces and relative noise levels to determine sound isolation requirements between spaces for speech privacy

— Assessment of locations where noise and vibration can impact safety (e.g., medication safety zones)

— Evaluation of the building systems to determine how best to control noise and vibration

— Review and identification of interior spaces based on use

— Recommendations for acoustic finishes to reduce noise and increase speech intelligibility

b. Noise and vibration design features. These should include the following:

— Sound-rated windows on facilities located near a highway or a heliport

— Floor/wall/ceiling assemblies with increased sound transmission class (STC) rating to block noise and increase privacy

— Interior acoustic finishes to reduce reverberation and increase speech intelligibility within the room

— Vibration isolation of building mechanical and plumbing systems

*1.2-6.1.1 General

The planning and design of new outpatient facilities and the retrofitting of existing outpatient facilities shall conform to the Guidelines and all applicable codes and regulations with respect to exterior environmental sound and interior sound within all occupied building spaces.

A1.2-6.1.1 Acoustic design

a. The definitions of acoustics terms used in this publication most often are based on ANSI S1.1: Acoustical Terminology. See “Sound & Vibration: Design Guidelines for Health Care Facilities,” the Acoustics Research Council white paper coordinated with the FGI Guidelines and available through the Facility Guidelines Institute website (www.fgiguidelines.org), for the glossary of acoustic terminology used in this document.

b. Limits set by codes often are expressed as maximum A-weighted sound levels in dBA. Separate limits are typically set for day and night periods, with the nighttime limit typically 5 to 10 dBA lower than the daytime limit. Daytime limits typically vary between 55 and 65 dBA.

c. Following are some acoustic design codes, regulations, and guidelines that should prove useful for outpatient facilities:

— U.S. Department of Health and Human Services regulations (including HIPAA)

— Federal Aviation Administration (FAA) guidelines for helipad design, construction, and operation
1.2 PDC and Commissioning

— Building code used by the local or state jurisdiction
— Local and state limits on environmental sound
— Occupational Safety and Health Administration (OSHA) regulations for worker noise exposure in areas where sound levels exceed 85 dBA
— Professional society design guidelines for noise (e.g., ASHRAE guidelines for mechanical system sound and vibration control)
— American National Standards Institute (ANSI) guidelines for sound in building spaces and special spaces (e.g., booths for measuring hearing threshold)
— Manufacturers’ guidelines for medical equipment that is sensitive to sound and vibration or equipment that produces sound and/or vibration

*1.2-6.1.2 Site Exterior Noise

A1.2-6.1.2 Site exterior noise:

a. Control of exterior noise. This section provides design guidance on how to address environmental noise at a facility site over which the facility may or may not have administrative or operational control. This section is meant to provide a means for screening sites to help determine which exterior wall/window assemblies are suitable to address site noise; it is not intended to be used as a means to qualify the suitability of a site with respect to environmental noise exposure.

Examples of noise sources a facility should control include the power plant, HVAC equipment, and emergency generators that are part of the outpatient facility. An on-site noise source over which the facility may have limited control is helipads. The location and operation of helipads are subject to federal regulation and other safety and environmental considerations. Examples of noise sources a facility cannot control include highways, rail lines, airports, and general urban, industrial, and public service equipment and activities.

b. Exterior noise classifications. Where shell and core work is included in the project scope, the following requirements should be met. This requirement shall not be applied to tenant improvement only projects.

— Exterior noise exposure for the project site should be classified according to the categories shown in appendix Table 1.2-3 (Categorization of Outpatient Facility Sites by Exterior Ambient Sound). A1.2-6.1.2.3 Exterior noise classifications. By means of exterior site observations or a sound-level monitoring survey and knowledge of new noise sources to be included in the design of the facility, the facility site should be classified into one of the noise exposure categories in appendix Table 1.2-3 (Categorization of Health Care Facility Site by Exterior Ambient Sound...). Further information for classifying sites according to exterior noise can be found in appendix table A1.2-b (Approximate Distance of Noise Sources for Use in Categorization of Outpatient Facility Sites by Exterior Ambient Sound).
The exterior noise classification category(ies) identified for a project site should be used to determine the degree of sound attenuation required in the building façade due to sources of exterior noise, including sources being added by the facility.

The building facade should have a sound isolation rating (which depends on the site noise classification category) that complies with minimum exterior shell composite sound transmission ratings, either OITCc or STCc, as shown in appendix Table 1.2-3 (Categorization of Outpatient Facility Sites by Exterior Ambient Sound).

- **A1.2-6.1.2.3 a.** The sound levels for noise exposure categories A through D provided in appendix Table 1.2-3 and appendix table A1.2-b should be used to evaluate required health care building envelope sound isolation and may differ from other such categorizations of community noise made elsewhere in this document.

*Category A—Minimal environmental sound.* As typified by a rural or quiet suburban neighborhood with ambient sound suitable for single-family residences, sound produced by transportation (highways, aircraft, and trains) or industrial activity may occasionally be audible but is only a minor feature of the acoustic environment.

*Category B—Moderate environmental sound.* As typified by a busy suburban neighborhood with ambient sound suitable for multifamily residences, sound produced by transportation or industrial activity is clearly audible and may at times dominate the environment but is not loud enough to interfere with normal conversation outdoors.

*Category C—Significant environmental sound.* As typified by a commercial urban location, possibly with some large apartment buildings, sound produced by transportation or industrial activity dominates the environment and often interferes with normal conversation outdoors.

*Category D—Extreme environmental sound.* As typified by a commercial urban location immediately adjacent to transportation or industrial activities, sound nearly always interferes with normal conversation outdoors.

- **b.** Environmental noise on Category B, C, and D sites generally may be evaluated using the methods given for documenting site ambient sound levels using continuous sound monitoring over a minimum one-week period in ANSI/ASA S12.9: Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: “Measurement of Long-Term, Wide-Area Sound.” This information should be used to determine detailed environmental noise control requirements for building design. Sites where ambient sound is influenced by airport operations may require additional monitoring as suggested in the ANSI standard to account for weather-related variations in aircraft sound exposure on site. In lieu of performing such additional monitoring, aircraft sound level contours available from the airport (if available) should be used to...
determine the day-night average sound level on-site produced by nearby aircraft operations. Sound-level monitoring on-site will still be needed to determine sound levels produced by other sources.

• e. Appendix Table 1.2-3 and appendix table A1.2-b present general descriptions for exterior sound exposure categories A through D, including distance from major transportation noise sources, ambient sound levels produced by other sound sources, and corresponding design goals for the sound isolation performance of the exterior building shell.

The outdoor sound levels, expressed as A-weighted day-night average sound levels, are provided in the context of exterior building shell design. Outdoor patient areas may require lower sound levels, typically not exceeding a day-night average level of 50 dB. To achieve this may require accommodations such as exterior noise barriers or location of outdoor patient areas where the building structures provide shielding from noise sources.

• d. In most cases, following the requirements in appendix Table 1.2-3 will result in interior day-night average sound levels (L_{dn}) from exterior sources that are less than or equal to 45 dBA. Actual results will vary depending on how well the sound-blocking ability of the shell at various frequencies matches the sound spectrum of the outdoor sound and other factors, such as the area of the exposed façade and sound absorption in the room.

Some rooms require lower sound levels, such as assembly spaces, clinical spaces, quiet rooms, and similar noise-sensitive rooms. These room types should be carefully evaluated to reduce the contribution of outdoor noises transmitted inside while considering the noise levels from the building systems (see Table 1.2-5: Maximum Design Criteria for Noise in Interior Spaces Caused by Building Systems). Assemblies meeting the minimum OITCc requirement will typically provide better performance when the outdoor sound is dominated by sources with strong low-frequency sound (e.g., locomotives or slow-moving heavy trucks). Assemblies meeting the minimum STCc requirement typically provide better performance when strong low-frequency sound is not present.

More detailed evaluation should be considered to identify which sound isolation rating (OITCc or STCc) is preferred to meet the exterior shell acoustic requirements and potentially provide a more cost-effective design.

*1.2.6.1.2.1 Existing exterior noise sources. Planning and design of new facilities and retrofitting of existing facilities shall include due consideration of all existing exterior noise sources that may be transmitted from outside a building to its interior through the exterior shell (exterior walls, windows, doors, roofs, ventilation openings, and other shell penetrations).

A1.2.6.1.2.1 In addition to existing exterior noise sources, future noise source development, such as the construction of highways, airports, or rail lines in the vicinity of the project, should be considered during outpatient facility design.
1.2 PDC and Commissioning

1.2.6.1.2.2 Facility noise source emissions. Planning and design shall include due consideration of sound emissions from outpatient facility noise sources that reach nearby residences and other sensitive receptors.

A1.2.6.1.2.2 Sound from exterior facility equipment can be minimized to achieve acceptable sound levels inside outpatient facility spaces and at neighboring receptors by siting noise sources and receptors to take advantage of distance, orientation, and shielding. Sound from exterior facility equipment can also be reduced by selecting quiet equipment and making use of noise control equipment such as silencers and barriers.

*1.2.6.1.2.3 Exterior noise classifications. Where shell and core work is included in the project scope, the following requirements shall be met. This requirement shall not be applied to tenant improvement-only projects. [main section and appendix moved to appendix section A1.2-6.1.2]

1. Exterior noise exposure for the project site shall be classified according to the categories shown in Table 1.2-3 (Categorization of Outpatient Facility Sites by Exterior Ambient Sound).

2. The exterior noise classification category(ies) identified for a project site shall be used to determine the degree of sound attenuation required in the building façade due to sources of exterior noise, including sources being added by the facility.

3. The building façade shall have a sound isolation rating (which depends on the site noise classification category) that complies with minimum exterior shell composite sound transmission ratings, either OITCe or STCe, as shown in Table 1.2-3 (Categorization of Outpatient Facility Sites by Exterior Ambient Sound).

A1.2.6.1.2.3 Exterior noise classifications. By means of exterior site observations or a sound level monitoring survey and knowledge of new noise sources to be included in the design of the facility, the facility site should be classified into one of the noise exposure categories in Table 1.2-3 (Categorization of Health Care Facility Site by Exterior Ambient Sound...). Further information for classifying sites according to exterior noise can be found in appendix table A1.2-b (Approximate Distance of Noise Sources for Use in Categorization of Outpatient Facility Sites by Exterior Ambient Sound).

a. The sound levels for noise exposure categories A through D provided in Table 1.2-3 and appendix table A1.2-b should be used to evaluate required health care building envelope sound isolation and may differ from other such categorizations of community noise made elsewhere in this document.

Category A—Minimal environmental sound. As typified by a rural or quiet suburban neighborhood with ambient sound suitable for single-family residences, sound produced by transportation (highways, aircraft, and trains) or industrial activity may occasionally be audible but is only a minor feature of the acoustic environment.

Category B—Moderate environmental sound. As typified by a busy suburban neighborhood with ambient sound suitable for multifamily residences, sound produced by transportation or industrial activity is clearly audible and may at times dominate the environment but is not loud enough to interfere with normal conversation outdoors.
1.2 PDC and Commissioning

Category C—Significant environmental sound. As typified by a commercial urban location, possibly with some large apartment buildings, sound produced by transportation or industrial activity dominates the environment and often interferes with normal conversation outdoors.

Category D—Extreme environmental sound. As typified by a commercial urban location immediately adjacent to transportation or industrial activities, sound nearly always interferes with normal conversation outdoors.

b. Environmental noise on Category B, C, and D sites generally may be evaluated using the methods given for documenting site ambient sound levels using continuous sound monitoring over a minimum one-week period in ANSI/ASA S12.9: Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: “Measurement of Long-Term, Wide-Area Sound.” This information should be used to determine detailed environmental noise control requirements for building design. Sites where ambient sound is influenced by airport operations may require additional monitoring as suggested in the ANSI standard to account for weather-related variations in aircraft sound exposure on site. In lieu of performing such additional monitoring, aircraft sound level contours available from the airport (if available) should be used to determine the day-night average sound level on-site produced by nearby aircraft operations. Sound level monitoring on-site will still be needed to determine sound levels produced by other sources.

c. Table 1.2-3 and appendix table A1.2-b present general descriptions for exterior sound exposure categories A through D, including distance from major transportation noise sources, ambient sound levels produced by other sound sources, and corresponding design goals for the sound isolation performance of the exterior building shell.

The outdoor sound levels, expressed as A-weighted day-night average sound levels, are provided in the context of exterior building shell design. Outdoor patient areas may require lower sound levels, typically not exceeding a day-night average level of 50 dB. To achieve this may require accommodations such as exterior noise barriers or location of outdoor patient areas where the building structures provide shielding from noise sources.

d. In most cases, following the requirements in Table 1.2-3 will result in interior day-night average sound levels ($L_{dn}$) from exterior sources that are less than or equal to 45 dBA. Actual results will vary depending on how well the sound-blocking ability of the shell at various frequencies matches the sound spectrum of the outdoor sound and other factors, such as the area of the exposed façade and sound absorption in the room.

Some rooms require lower sound levels, such as assembly spaces, clinical spaces, quiet rooms, and similar noise-sensitive rooms. These room types should be carefully evaluated to reduce the contribution of outdoor noises transmitted inside while considering the noise levels from the building systems (see Table 1.2-5: Maximum Design Criteria for Noise in Interior Spaces Caused by Building Systems). Assemblies meeting the minimum OITCc requirement will typically provide better performance when the outdoor sound is dominated by sources with strong low-frequency sound (e.g., locomotives or slow-moving heavy trucks).
Assemblies meeting the minimum STCe requirement typically provide better performance when strong low-frequency sound is not present.

More detailed evaluation should be considered to identify which sound isolation rating (OITCe or STCe) is preferred to meet the exterior shell acoustic requirements and potentially provide a more cost-effective design.

*1.2-6.1.3 Design Criteria for Acoustic Surfaces*

All normally occupied outpatient facility spaces shall incorporate floor, wall, or ceiling acoustic surfaces that achieve design room average sound absorption coefficients equal to or greater than indicated in Table 1.2-4 (Minimum Design Room Sound Absorption Coefficients).

**A1.2-6.1.3 Design criteria for acoustic surfaces**

a. *Alarm fatigue.* In 2011 the Joint Commission and the U.S. Food and Drug Administration designated “alarm fatigue” a top priority in health care facilities. FDA incident reports demonstrate that alarm fatigue can cause dangerous and potentially life-threatening behaviors, including willful deactivation of clinical alarms; increased error rates due to impaired communication; disorientation, distraction, and elevated stress that induce fatigue; and—for patients—heightened anxiety and increased sedative use. Room conditions contribute to alarm fatigue, which is caused by multiple, frequent, uncorrelated, and highly arousing noises from alarms and other sources mixing and reverberating in enclosed spaces with surfaces that are highly sound-reflective (i.e., do not absorb sound reverberation). Table 1.2-4 (Minimum Design Room Sound Absorption Coefficients) specifies the sound absorption coefficients needed to reduce the potential for alarm fatigue.

b. *Operating rooms.* The acoustic environment of operating rooms should be designed to reduce reverberation, noise buildup, and noise-related fatigue. The design room sound absorption coefficient in operating rooms should be at least 0.10.

*1.2-6.1.4 Design Criteria for Room Noise Levels*

**1.2-6.1.4.1 Room noise levels caused by HVAC and other building systems shall not exceed the maximum values shown in Table 1.2-5 (Maximum Design Criteria for Noise in Interior Spaces Caused by Building Systems).**

**A1.2-6.1.4.1 Room noise levels in operating rooms.** A sound level lower than NC/RC(N)/RNC 45 (50 dBA) in operating rooms should be considered. However, HVAC systems may result in sound levels higher than this suggested level. Thus, achieving a lower sound level in operating rooms than the requirement in Table 1.2-5 (Maximum Design Criteria for Noise in Interior Spaces Caused by Building Systems) might require extraordinary system design and construction.

1.2-6.1.4.2 Room noise levels shall be determined for the unoccupied room (i.e., without operating medical equipment).

**1.2-6.1.5 Design Criteria for Performance of Interior Wall and Floor/Ceiling Constructions**
1.2 PDC and Commissioning

1.2-6.1.5.1 Sound isolation shall be considered for all demising construction separating occupied spaces.

*1.2-6.1.5.2 The composite sound transmission class \((\text{STC}) (\text{STCc})\) rating of demising wall assemblies shall not be less than the ratings indicated in Table 1.2-6 (Design Criteria for Minimum Sound Isolation Performance Between Enclosed Rooms).

A1.2-6.1.5.2 Demising wall assemblies

a. A “demising wall assembly” is a partition that separates one occupancy or health care service from another occupancy/service or a corridor. Partitions within the same occupant space or health care service space are non-demising partitions. For example, the partition between two exam rooms is demising.

b. Appropriate steps should be taken to assure the composite \(\text{STC}\) sound isolation performance of demising wall assemblies in Table 1.2-6 (Design Criteria for Minimum Sound Isolation Performance Between Enclosed Rooms) is achieved after consideration of perimeter leaks due to lack of sealing, flanking due to continuous surfaces extending from one room to the other, sound passing through a plenum above a wall, or penetrations in the wall or ceiling. Particular attention should be given to intersection and sealing details of demising wall assemblies.

*1.2-6.1.6 Design Guidelines for Speech Privacy

A1.2-6.1.6 Speech privacy

a. Federal legislation requires that facilities protect patient information privacy. This includes speech privacy in all health care venues or wherever patient health information is discussed, either between staff, on the telephone, or during dictation.

b. Speech privacy in open-plan spaces. People working in open-plan spaces are most productive when distraction from voices, equipment, etc. is minimal. Therefore, the acoustic environment should be designed to minimize such distractions. One option for achieving speech privacy in open-plan spaces is provision of a separate room where conversations may take place in private.

*1.2-6.1.6.1 Speech privacy rating methods. Spaces shall be designed to meet speech privacy goals using one of the four speech privacy rating methods as shown in Table 1.2-7 (Design Criteria for Speech Privacy for Enclosed Rooms and Open-Plan Spaces).

A1.2-6.1.6.1 Methods for determining speech privacy. Select only one of the metrics in Table 1.2-7 (Design Criteria for Speech Privacy for Enclosed Rooms and Open-Plan Spaces) for determining speech privacy in closed- and open-plan settings. Examples of closed-plan settings are medical staff private offices, conference rooms, and examination rooms. Examples of open-plan settings are patient waiting areas, reception areas, and medical staff open (not fully enclosed) offices.

All four metrics in Table 1.2-7 define speech privacy in terms of the intelligibility of speech from the transmitted speech signal compared to the continuous background sound at a receptor position. Each of the metrics represented in the table is an accepted industry practice, and equivalence has
been demonstrated. The choice and use of the selected metric should be made by qualified, experienced professionals.

a. Criteria for the AI (Articulation Index) metric were originally defined in ANSI S3.5-1969: Methods for the Calculation of the Articulation Index, but are now defined in ASTM E1130: Standard Test Method for Objective Measurement of Speech Privacy in Open Plan Spaces Using Articulation Index. This metric has been in use since the mid-1950s and is still considered a current practice.

b. Criteria for the SII (Speech Intelligibility Index) metric are defined in ANSI/ASA S3.5: Methods for Calculation of the Speech Intelligibility Index.


d. Criteria for the PI (Privacy Index) metric for converting AI values into percentages are defined in ASTM Standard E1130-08: Standard Test Method for Objective Measurement of Speech Privacy in Open Plan Spaces Using Articulation Index.

*1.2-6.1.7 Design Criteria for Building Vibration

A1.2-6.1.7 Building vibration

a. Building vibration refers to vibration produced by building equipment and activities, not vibration produced by earthquakes.

b. Vibration levels to which occupants are exposed should not exceed those in ANSI/ASA S2.71: Guide to the Evaluation of Human Exposure to Vibration in Buildings.

c. Vibration produced by building mechanical, plumbing, and electrical equipment; footfalls; and medical equipment should be considered in the design of an outpatient facility.

1.2-6.1.7.1 General. Seismic restraint covered elsewhere in this document shall be compatible with vibration isolation methods covered in this section.

1.2-6.1.7.2 Vibration control and isolation. Vibration levels in the building shall not exceed applicable guidelines and limits outlined in this section.

(1) Mechanical, electrical, and plumbing equipment vibration

(a) All fixed building equipment that rotates or vibrates shall be considered for vibration isolation.

(b) Equipment bases, isolators, and isolator static deflections shall be selected based on the proximity of the supported equipment to vibration- and noise-sensitive areas, structural design of the facility, and type and operating point of the equipment.

(i) The recommendations in the ASHRAE Handbook—HVAC Applications shall be considered when selecting types of bases, isolators and isolator static deflections.
(ii) More stringent requirements shall be considered for equipment impacting sensitive areas.

(2) Structural vibration

(a) Footfall vibration in the building structure shall be evaluated using properly substantiated methods of analysis, including:

(i) For steel floor systems: American Institute of Steel Construction (AISC) Design Guide 11: Vibrations of Steel-Framed Structural Systems Due to Human Activity

(ii) For concrete floor systems: Concrete Reinforcing Steel Institute (CRSI) Design Guide for Vibrations of Reinforced Concrete Floor Systems

(iii) If neither document in paragraphs (i) and (ii) is applicable, use of finite element analysis (FEA) or modal superposition analysis shall be considered.

(b) The structural floor shall be designed to avoid footfall vibration levels that exceed the peak vibration velocities in Table 1.2-8 (Maximum Limits on Floor Vibration Caused by Footfalls in Outpatient Facilities).

(c) More stringent vibration criteria shall be considered for locations where medical and laboratory instrumentation sensitive to vibration is housed.

(3) Structure-borne sound

(a) Structure-borne transmitted sound shall not exceed the limits for airborne sound presented in Section 1.2-6.1.4 (Design Criteria for Room Noise Levels).

(b) Where necessary, vibration isolators shall be used to control potential sources of structure-borne sound.

*1.2-6.2 Sustainable Design

Sustainable design, construction, and maintenance practices to improve building performance shall be considered in the design and renovation of outpatient facilities.

A1.2-6.2 Sustainable design. Planning and design for new and renovated outpatient facilities may include the establishment of sustainability goals by a multidisciplinary team.

a. A growing body of knowledge is available to assist design professionals and health care organizations in understanding how buildings affect human health and the environment and how these effects can be mitigated through a variety of strategies.

b. Several codes, regulations, and green building rating systems apply to health care settings, including but not limited to:

— The International Code Council has developed the International Green Construction Code (IgCC), developed by the International Code Council, which has been adopted by numerous states and municipalities. The IgCC includes content The content for IgCC is directly from ANSI/ASHRAE/ICC/USGBC/IES 189.1: Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings, and
1.2 PDC and Commissioning

Several green building rating systems apply to health care settings, including:

- LEED Green Building Rating System. This U.S. Green Building Council has established this third party certification framework for the design of sustainable buildings. LEED® for Building Design and Construction (BD+C) includes health care.

- Green Guide for Health Care™, a voluntary self-certification metric tool that specifically addresses the health care sector.

- Green Globes assessment and rating system. This interactive green building design tool provided by the Green Building Initiative (GBI) incorporates an integrated project management approach and offers third-party certification. GBI tools are available for New Construction (NC) as well as Continual Improvement for Existing Buildings (CIEB) for health care facilities. GBI has developed ANSI/GBI 01: Green Building Assessment Protocol for Commercial Buildings to inform the development of Green Globes rating systems.

- Fitwel

- WELL Building Standard

- General Services Administration Sustainable Facilities Tool (SFTool)

- Senior Living Sustainability Guide

These green building rating systems, regulations, and codes provide criteria for advancement of high-performance, sustainable design, and health and wellness opportunities in the built environment.

These tools establish “best practice” criteria and provide planning, design, and development process guidance for site design, water and energy usage, materials, and indoor environmental quality.

c. Where an outpatient facility is in an established building, it may not be possible to meet these recommendations.

1.2-6.2.1 Components

The basic components of sustainable design to be considered shall include:


A1.2-6.2.1.1 Energy efficiency
a. *Energy efficiency goals.* Health care organizations should set energy efficiency goals while meeting the light power density and functional needs of patients and staff (e.g., application of ASHRAE 90.1; design to earn ENERGY STAR®, Green Globes, or LEED certification) and consider energy efficiency strategies that include, but are not limited to, the following examples should be considered.

— On major new projects, consider the use of energy modeling early in schematic design to assist in developing and assessing energy efficiency strategies and opportunities.

— Reduce overall energy demand. Sample strategies include using a high-efficiency building envelope; passive and low-energy sources of lighting (including daylighting); advanced lighting controls integrated with daylighting strategies; high-efficiency equipment, both as part of building mechanical and electrical systems (e.g., chillers and air handlers) and for plug loads (e.g., EnergyStar-certified copiers, computers, medical equipment, and appliances); heat recovery; and natural ventilation.

— Optimize energy efficiency. Mechanical/electrical control systems should optimize consumption to the minimum actual needs of the building. Consider using multiple modular HVAC equipment units or variable-speed drives for variable loads. Consider co-generation systems for converting natural gas to both heat (or cooling) and electricity. Select equipment with improved energy efficiency ratings.

— Reduce environmental impacts associated with combustion of fossil fuels and refrigerant selection. Consider various renewable sources of energy generation, including purchase of green power, solar and wind energy, or geothermal/ground source heat pumps.

— Design to earn ENERGY STAR rating.

— Design to meet LEED, Green Globes, or other green building rating system energy criteria.

— Design to meet International Green Construction Code (IgCC) requirements.


b. *Measurement and verification plan.* In new construction, a measurement and verification (M&V) plan should be developed and implemented. Metering that provides consistent and reliable data should be considered for the electrical and mechanical systems applicable to the scope of the project, which may include:

— Gas
  • Main gas line to the site
  • Each natural gas boiler
  • Kitchen gas

— Electricity
1.2 PDC and Commissioning

- Consumption (kWh) and demand (kW) for each source of electricity to the building
- Output from each automatic transfer switch
- Energy consumption for pump and fan for each motor with a variable frequency drive (VFD)

—Thermal energy
- All steam purchased from off-site sources, including recovered condensate
- Steam produced by each steam boiler
- Hot water produced by each hot water boiler
- Chilled water output for each water chiller

—Energy source (fuel oil, propane, etc.) for each device listed
- Each steam or hot water boiler
- Each generator used for non-emergency purposes

*1.2-6.2.1.2 Site selection and development

A1.2-6.2.1.2 Site selection and development

a. Site development considerations include the following:

—Land use
—Storm water management
—Landscape design and irrigation systems
—Habitat preservation
—Shading
—Natural ventilation
—Renewable energy use
—Effects from heat islands

—Resilience based upon geographic location, building type, and risk (flooding, weather, fire, etc.)

b. Daylighting. The orientation of buildings on the site should be evaluated to determine how to make appropriate use of daylighting based on the care population. Evaluate the net effect of planned daylighting on energy consumption and operating cost. See appendix section A1.2-6.2.1.1 (Energy efficiency) for information.

c. Site exterior noise. The location of the buildings should also be evaluated in regard to the impact of site exterior noise acoustics, and the care population. See appendix section A1.2-6.2.1.2 (Site exterior noise) 1.2-6.1 (Acoustic Design) for additional information.

(1) The site design shall be developed to minimize negative environmental impacts associated with buildings and related site development.
The orientation of buildings on the site shall be evaluated to assess how solar and wind effects can be harnessed to minimize energy consumption.

*1.2-6.2.1.3 Waste minimization. The design shall support the minimization of waste in construction and operation and allocate space for recycling activities.

A1.2-6.2.1.3 Waste minimization

a. Waste management targets and potential savings. Many states and local jurisdictions have begun to mandate various waste management targets for commercial facilities, including health care facilities. Financial incentives are available for many health care facilities. As well, many health care facilities have realized financial rewards from managing their waste streams. Therefore, health care organizations may want to consider Consideration of the space needs associated with environmentally preferable purchasing and recycling programs will help health care organizations achieve these savings, to facilitate achievement of such savings.

b. Construction waste management. A construction waste management plan in keeping with local recycling resources should be developed and implemented.

—Materials should be identified that can be recovered, reused, and/or recycled and a plan made to divert them from disposal in landfills or incinerators.

—The disposal method should be identified for each material, and whether materials will be sorted or co-mingled on-site.

1.2-6.2.1.6 Environmental impact of selected building materials. The environmental impacts associated with the life cycle of building materials should be considered.

*1.2-6.2.1.4 Potable water quality and conservation

A1.2-6.2.1.4 Potable water quality and conservation

a. Reducing water use. Potable water consumption can be reduced by:

—Selecting low-consumption plumbing fixtures and controls.

—Designing low-consumption irrigation systems.

—Using landscape design such as xeriscaping.

—Replacing items such as pumps and compressors cooled using potable water sources with equipment that uses non-potable water sources such as graywater or with non-evaporative heat rejection equipment (air-cooled or ground-sourced).

b. Medical equipment. Except for backup systems, potable water should not be used for primary once-through cooling for any medical equipment.

c. Measurement and verification plan. To provide for long-term continual measurement of potable cold water uses in the facility, a measurement and
verification plan may be developed and implemented. The following water uses (as applicable to the project) may be metered:

—Main water to site
—Special deduct meters, including those for cooling tower makeup, boiler system makeup, boiler blowdown, other hydronic loop makeup, irrigation, and emergency medical equipment cooling

d. Water measurement devices. The following should be referenced:


e. 4. Irrigation water

—Use of irrigation systems to establish landscaping when first planted should be permitted.

—Irrigation systems should be designed to use only captured rainwater, recycled wastewater, recycled gray water, or water treated and conveyed by a public agency specifically for non-potable uses for irrigation.

—Use of xeriscaping should be considered to avoid the need for irrigation.


(1) Potable water quality and conservation strategies shall be evaluated in all phases of facility development or renovation.

(2) Design for water conservation shall not adversely affect patient health, safety, or infection control.

 *(3) Plumbing and HVAC systems shall be designed to reduce the risk of waterborne pathogen infection.

**A1.2-6.2.1.4 (3) ANSI/ASHRAE Standard 188 and ASHRAE Guideline 12 should be consulted for requirements and references.**

(4) Plumbing fixtures and fittings for water reduction shall comply with Section 6.3.2.1 (Plumbing Fixtures and Fittings) in ANSI/ASHRAE/ASHE 189.3: Design, Construction, and Operation of Sustainable High-Performance Health Care Facilities.

**1.2-6.2.1.5 Indoor environmental quality**
A1.2-6.2.1.5 Indoor environmental quality. Design for a healthy and productive indoor environment should be accomplished through measures such as adequate ventilation, low- or zero-VOC (volatile organic compound) finishes and furnishings, reduced moisture entrapment, daylighting, and acoustic design measures. Such measures should not conflict with health care safety and infection control codes and standards.

See Section 8.4 (Prescriptive Path for Emissions and VOCs) in ANSI/ASHRAE/ASHE Standard 189.3: Standard for Design, Construction, and Operation of sustainable High-Performance Health Care Facilities as referenced from Section 8.4.2 (Materials) in ASHRAE 189.3


Carpeting, upholstery, paint, adhesives, and manufactured wood products may emit VOCs such as formaldehyde and benzene. Use low- or zero-VOC paints, stains, adhesives, sealants, and other construction materials, where practical.

Materials or construction systems that are permeable and can trap moisture may promote microbial growth. All permeable building materials should be protected from exposure to moisture prior to and during construction. If permeable materials are exposed to moisture, they should be dried within 72 hours or removed.

High-volume photocopiers, portable sterilizing equipment, smoke plume from electrosurgical procedures, chemicals such as those used in scope washers, and aerosolized cleaners and medications have been identified as sources of indoor air pollution in health care settings. Dedicated exhaust ventilation may be necessary for specialty areas where these pollutants may accumulate or be disbursed (e.g., housekeeping, copying rooms, sterilization areas, etc.).

(1) The impact of building design and construction on indoor environmental quality shall be addressed.

(2) Impact from both exterior and interior air-contamination sources shall be minimized.

A1.2-6.2.1.6 Environmental impact of selected building materials. The environmental impacts associated with the life cycle of building materials shall be addressed. [moved as appendix to 1.2-6.2.1.3]

*1.2-6.3 Wayfinding

A1.2-6.3 Wayfinding

a. During the functional programming process, input from frontline staff, facility managers, visitors, families, and patients should be sought regarding wayfinding. This should include evaluation of the most common and problematic scenarios to identify shortcomings and help develop design criteria to address them. Consideration should be given to the following:

—Needs of first-time users

—Stress experienced by patients and families while finding their way to unfamiliar areas in a facility
1.2 PDC and Commissioning

— Populations served (e.g., the elderly; children; and cognitively impaired, visually impaired, and other particularly vulnerable populations, including those with Alzheimer’s and dementia)

— Needs of limited English proficient (LEP) individuals, speakers of other languages, and those with limited reading ability. Where possible, use the Universal Symbols in Health Care.

— Use of unique landmarks (e.g., design elements such as color, artwork, texture, change in architecture, exterior views, plants)

— Varied presentation of the same information to accommodate different cognitive processes (e.g., those used by different individuals or by the same individuals at different points during the wayfinding process)

— Integration of the wayfinding plan with relevant security plans

b. Input from staff, visitors, families, and patients as described in Section 1.2-2 (Functional Program) should be integrated into the development of a systems approach to wayfinding. Planning for wayfinding should begin with the goal that the average visitor or staff member can easily find his or her way throughout the facility. Outside wayfinding should be considered for those walking and for those driving to the facility. If public transportation is available, directions and signage to and from transportation sites should be provided.

c. General sign recommendations:

— Exterior and interior approaches to wayfinding should be coordinated.

— Nomenclature should be consistent and understandable to the general public, and signs generally should be written at a sixth-grade level.

— Information (a destination hierarchy) should be developed to ensure the right information is presented at the right time.

— A family of signs should be developed for consistency within the wayfinding system. This should include directional and orientation signs (e.g., overhead and wall-mounted signs and maps), destination signs, room identification signs, regulatory signs, and provisions for a multitude of facility-specific policy and information signs.

— Each sign should be accurate, legible, and functional:

  • Letters should contrast with the background to conform to ADA requirements. For signs in areas that primarily house the elderly, letters should contrast with the background by a minimum of 90 percent.

  • Colors should be differentiable by those who are color-blind.

  • When used, symbols and pictographs should be recognizable to the general public and the community served. (The Universal Symbols in Health Care have been tested for usability and comprehension.)
• The number of symbols used on a single sign should be limited and indicate primary destinations only.
• Destination hierarchies should manage the number of symbols by building, zone, or floor. Users have difficulty differentiating more than 16 unique symbols in one set.
• Where health care symbols are combined with other universal symbols used in transportation or accessibility, the different sets of symbols should be clearly differentiated.

d. You are here (YAH) map recommendations:
—YAH maps should be oriented so that forward is up.
—It is preferable to use a perspective view. Where vertical navigation is required, consider illustrating the relationship between levels and which elevator cores serve which areas, especially where floors are not contiguous.
—Inset maps should be used to locate details within the overall map where appropriate.

e. Exterior signage (general)
—Directional signs should be easily viewed from the street and located and sized so that drivers can read them when traveling at the local speed limit.
—Consistency should be used in the nomenclature of buildings.
—Directions should be clear to all users.
—Signage should be within an individual’s 60-degree “cone of vision,” whether the person is walking or driving.
—Exterior directional signs should be visible at night.
—Signage should be located where it is easy to see.
—Where applicable, emergency departments should be clearly distinguished from other destinations.

f. Exterior signage (parking)
—Directions should be provided to various parking locations, where applicable.
—Directions should be provided from the parking structure to the entrance of the facility.
—Signage should clearly indicate short-term and long-term parking rates, where applicable.
—Valet parking, if provided, should be clearly marked.
—Directional signage should be provided for automobile and pedestrian traffic.
—Floor numbers or sections should be marked clearly.

g. Interior signage (entrance and exit)

—A well-designed and located set of interior signs and clearly labeled directional maps should be located near the entrance. Symbols used on directional signage should be used in orientation maps for consistency and to assist users in finding primary destinations.

—Signage should clearly identify all publicly accessible functional areas of the facility.

—Where symbols are used, a single symbol should be used to represent a single primary destination.

—There should be adequate signs to direct people out of the facility back to parking and public transportation.

h. Interior wayfinding (room numbering)

—Room numbering should be consistent from floor to floor and area to area.

—The numbering system should be simple and continuous.

—Design of the numbering system should be flexible to allow for future expansion and renovation.

—Room numbering should consider the need for sequential strategies for public wayfinding that may be different from operational and maintenance numbering.

—Signs should differentiate between those spaces used by patients/visitors and those used by staff.

i. Interior wayfinding (sign placement)

—Signs providing directions should be placed at major decision points, including the following:

  • Major intersections
  • Major destinations
  • Changes in buildings and/or patient care areas

—If there are no major decision points, reassurance signs should be placed approximately every 250 feet (76 meters).

j. Interior wayfinding (signage maintenance). Fabrication should be in a manner that allows messages to be changed.

*1.2-6.3.1 An organized approach to wayfinding about the facility shall be provided.

A1.2-6.3.1 An organized approach to wayfinding should include the following:
a. An integrated system that coordinates elements such as visible and legible signs and numbers

b. Verbal directions, paper information, and electronic information

1.2-6.3.2 Signage shall be consistent with all state, local, and federal regulations.

*1.2-6.4 Accommodations for Care of Individuals of Size

A1.2-6.4 Design considerations for accommodations for care of individuals of size

a. The individual’s weight, the distribution of the individual’s weight throughout the body, and the individual’s height are involved in identifying a patient who requires additional assistance, expanded-capacity equipment, and larger space for patient care, moving, handling, and mobilization. Such patients are not necessarily receiving bariatric care; therefore, the term “individual of size” is often used. The most commonly accepted method for clinically identifying individuals of size is the body mass index (BMI).

b. Creating health care environments that can accommodate individuals of size requires attention to issues that significantly affect design, such as the nature of the clinical area, current codes, and local regulations. In addition to the requirements in the Guidelines, useful information is provided in the Joint Commission monograph “Improving Patient and Worker Safety: Opportunities for Synergy, Collaboration, and Innovation.”

Note: See the glossary for a definition of “individual of size.”

1.2-6.4.1 Projected Need for Accommodations for Care of Individuals of Size

The need for accommodations for care of individuals of size shall be defined in the planning phase and shall include the following:

*1.2-6.4.1.1 Projected weight capacities for individuals of size in the population to be served

A1.2-6.4.1.1 Projecting the weight capacities of individuals of size to be served. Projected weight capacities for the population of individuals of size are necessary to make appropriate and accurate design decisions. The data and methods described here can be used to project weight capacities for individuals of size.

For new construction, CDC obesity prevalence data and future projections for a specific geographic area may be used to drive estimates for the accommodations—number of rooms; ceiling lift weight capacities; amount and size of expanded-capacity furniture/equipment; additional space in examination/treatment and other rooms—needed for patients who weigh more than 300 pounds (136 kilograms). However, when planning renovations to existing buildings or designing replacement facilities, historical facility data should also be used to forecast the accommodations needed for individuals of size. Data should be obtained by clinical area as opposed to gathering facility-wide data. Estimates will be more accurate if at least one year’s worth of data is used to obtain average figures.
For organizations without historical facility information, CDC prevalence and future projections are helpful. This information can be found on these CDC websites: www.cdc.gov/obesity/data/prevalence-maps.html and http://nccd.cdc.gov/NPAO_DTM.

*1.2-6.4.1.2 Projected number of spaces required to accommodate individuals of size

A1.2-6.4.1.2 Projecting the number of spaces required to accommodate individuals of size. When forecasting the number of clinical areas needed to accommodate individuals of size, organizations should consider the following information:

a. Average number of patients heavier than 300 pounds (136 kilograms) served in a specific clinical area each week

b. CDC obesity prevalence future projections by geographic area

*1.2-6.4.1.3 Projected number of expanded-capacity lifts required

A1.2-6.4.1.3 Projecting the number of expanded-capacity lifts required. Expanded-capacity ceiling- or wall-mounted lifts are the preferred method used to move individuals of size and should be installed in rooms with the extra space and maneuvering areas needed for these patients. Alternative technology that provides the same support as expanded-capacity ceiling-, wall-, or floor-mounted lifts (including mobile floor and gantry lifts) can be used to meet the requirements in this section.

Each facility may have a different weight threshold for expanded-capacity lifts, but the suggested expanded-capacity threshold is at least 600 pounds (272 kilograms).

The projected number of expanded-capacity lifts needed is based on the projected weight capacities for individuals of size in the population to be served (see Section 1.2-6.4.1.1) and the projected number of spaces required to accommodate these patients (see Section 1.2-6.4.1.2). When determining the number of expanded-capacity lifts per clinical area, the following data should be considered:

a. Average number of patients heavier than 600 pounds (272 kilograms) (or facility threshold) served in a specific clinical area each week

b. CDC obesity prevalence future projections by geographic area

*1.2-6.4.2 Design Response for Accommodations for Individuals of size

A1.2-6.4.2 Design response for accommodations for individuals of size

a. Accommodations for individuals of size and the equipment needed to care for them require more operational space and more storage space than a traditional patient care environment. The need for increased square footage will be determined by the space needed for caregiver assistance and equipment to accommodate individuals of size, both mobile (e.g., gurneys, lounge chairs, wheelchairs, patient lifts) and fixed (e.g., large bore MRI/CT equipment, larger surgical tables and exam tables).
Another primary space driver is the staffing-per-patient ratio and associated maneuverability needed in environments where individuals of size are served. In most instances, additional caregivers are recommended for patient handling.

b. Other design issues to consider when planning to accommodate individuals of size include ingress/egress to primary treatment and service areas. The rooms and/or destinations at the ends of these traverses also need special consideration to accommodate individuals of size:

—Surgical suites. The design should address issues that relate to patient transfer, lifting and holding for an extended period, proper and comfortable positioning, and the most efficient positioning for the implementation of surgical processes.

—Imaging suites. Many of the same issues found in a surgical environment, especially patient transfer and positioning, are also present in the imaging environment. It should be noted that much of the equipment associated with imaging is not designed for individuals of size. Careful evaluation to ensure selection of appropriate imaging equipment needs to be exercised.

—Exam rooms. Exam rooms should be programmed and sized to accommodate the individual of size and the associated care team.

—Waiting rooms or areas. Appropriately sized elements with capacity adequate for individuals of size should be interspersed with more traditional furnishings to avoid confining individuals of size to specific areas of the waiting environment.

—Additional staff/patient interaction areas. These areas include cashier/registration, patient assessment, physical rehabilitation, and family interaction areas.

1.2-6.4.2.1 The projected maximum weight of individuals of size who will require accommodations shall determine the design requirements for sinks, toilets, grab bars, casework, and lifts in areas where individuals of size will receive care.

1.2-6.4.2.2 Those areas of the facility designated for accommodations for individuals of size, and the associated path of egress to reach these areas, shall be designed with appropriate support and clearances.

*1.2-6.5 Emergency Preparedness and Management*

During project planning and design, the following shall be considered:

**A1.2-6.5 Design to support emergency preparedness and management**

a. Wind- and earthquake-resistant design for new buildings

—Facilities should be designed to meet the requirements of ASCE/SEI 7: Minimum Design Loads for Buildings and Other Structures or building codes with substantially equivalent requirements. Particular attention should be paid to seismic considerations in areas where the classification of a building would fall into seismic design categories C, D, E, or F as described in ASCE/SEI 7.
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—Seismic construction inspection. The governing body should complete the testing described in Section 11A.2 and the special inspection during construction of the seismic systems described in Section 11A.1.3 of ASCE/SEI 7.

—Roof considerations

• Roof coverings and mechanical equipment should be securely fastened or ballasted to the supporting roof construction and provide weather protection for the building at the roof. If ballast is used, it should be designed so as not to become a projectile.

• In addition to the wind force design and construction requirements specified, particular attention should be given to the design of roofing, entryways, glazing, and flashing to minimize uplift, impact damage, and other damage that could seriously impair building function.

b. Flood protection

—In accordance with Executive Order 11988 (Floodplain Management), possible flood effects should be considered when selecting and developing the site.

—Insofar as possible, new facilities should not be located on designated floodplains.

—Where locating a facility on a floodplain is unavoidable, consult the U.S. Army Corps of Engineers’ regional office for the latest applicable regulations pertaining to required flood insurance and protection measures.

—Helipads should be located a minimum of 3 feet (91.44 centimeters) above the 100-year-flood elevation on campuses constructed on designated floodplains. A path of travel above 100-year-flood elevation should be provided between health care facilities and the helipad to facilitate evacuation.

c. Wildfire protection

—Where locating a facility in a wildfire risk area is unavoidable:

• Forest fuel reduction within approximately 500 feet (152 meters) of property boundary should be considered.

• The facility should be hardened against heat, embers, and ash in accordance with NFPA 114: Standard for Reducing Structure Ignition Hazards from Wildland Fire (2013) and/or the International Wildland-Urban Interface Core (2012).

*1.2-6.5.1 The likelihood a facility will experience events that go beyond the facility’s normal operations

A1.2-6.5.1 Emergency preparedness assessment. The likelihood of a facility experiencing events that go beyond normal operations should be assessed and detailed in an annual emergency preparedness assessment. These events could include natural disasters; utility failures; acts or threats of human violence;
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biological, nuclear, or chemical exposures; surge capacity; infectious disease epidemics or pandemics; evacuation; or mass casualties.

a. *Infrastructure assessment.* The assessment should consider performance of structural and critical nonstructural building systems during an adverse event and the likelihood of loss of externally supplied power, gas, water, and communications from such a disaster.

b. *Facility planning.* Ideally, the emergency preparedness assessment results will be used to implement practices and plans that will help the health care organization prevent, mitigate, and expediently recover from an event. Facility master planning should consider mitigation measures required to address conditions that may be hazardous to patients and staff and conditions that may compromise the ability of the health care organization to fulfill its planned post-emergency medical response.

Resiliency requires a plan to absorb and recover from adverse events by preparing, preventing, protecting, mitigating, and responding. The plan should outline a health care facility’s ability to:

— Adapt to changing conditions
— Recover from disruptions
— Resist probable deliberate attacks
— Improve technical and organizational capabilities
— Focus on reducing damage and disruptions to public health and safety

*1.2-6.5.2* Space needs in the event of an emergency for operations to:

A1.2-6.5.2 *Space needs in an emergency.* The location of the facility and the type of event in the community may require a health care facility to act as a shelter or support other health care system needs; if so, this must be considered in planning.

a. Space where patients, staff, and visitors can be safe in an emergency should be identified.

b. Provision of space for resources needed to respond in an emergency, such as medical supplies, materials, pharmaceuticals, communications equipment, transportation, food, water, utilities, and waste storage should be considered during project planning and design. Some of these resources could be accommodated through mutual aid agreements between the health care organization and other local providers or vendors. Such storage capacity or plans should be sufficient for at least four continuous days of operation.

1.2-6.5.2.1 Protect facility occupants during the event.

*1.2-6.5.2.2* Continue providing services.

A1.2-6.5.2.2 *Design for continued building system operation.* For facilities that have been designated by a recognized federal, state, regional, or local
mandate to remain operational in the aftermath of a disaster, special designs are required to protect systems and essential building services such as power, water, medical gas systems and, in certain areas, air conditioning. In addition, special consideration must be given to the likelihood of temporary loss of externally supplied power, gas, water, and communications.

*1.2-6.6 Design Criteria for Inclusive Environments*

Provision of inclusive design features shall be considered in the planning and design of patient care areas and staff spaces.

**A1.2-6.6 Inclusive Environments**

a. An inclusive environment can be accessed, understood, and used to the greatest extent possible by all people regardless of age, size, ability, or disability. Use of a universal design process supports the planning and design of inclusive environments by evaluating items such as walking distances, use of color, value contrast, lighting, wayfinding, and selection of finishes.

b. Recommendations for universal design may include the following:

--- Use of features that provide ease of access and direction (wayfinding) that are integrated into the design but do not stigmatize any user of the built environment

--- Incorporation of accessibility features for accessing amenities and services

--- Identification of built environment supports for the care population that promote mobility, safety, and ease of use, including but not limited to:

- Placement of grab bars and handrails
- Use of contrast between vertical and horizontal planes versus using high contrasting patterns in the same plane
- Provision of storage areas for mobility assistive devices

c. For more information, see the following resources:

--- Institute of Human Centered Design

--- Center for Inclusive Design and Environmental Access (IDeA) at the University of Buffalo School of Architecture and Planning

**1.2-7 Renovation**

*1.2-7.1 Phasing*

Projects involving renovation of existing buildings shall include phasing to minimize disruption of existing patient services.
A1.2-7.1 Phasing plans. Phasing is essential to maintenance of a safe environment in patient care areas during construction. Design documents for complex renovation projects should include progressive phasing plans. These documents should clearly indicate and delineate new work and existing conditions for each individual phase as the project progresses. The interim impact to existing or proposed clinical services; building services; patient, staff, and public circulation; and all required infection control and interim life safety measures should be indicated for each phase.

1.2-7.1.1 Phasing Provisions

Phasing provisions shall include:

1.2-7.1.1.1 Clean-to-dirty airflow
1.2-7.1.1.2 Emergency procedures
1.2-7.1.1.3 Criteria for interruption of protection
1.2-7.1.1.4 Construction of roof surfaces
1.2-7.1.1.5 Written notification of interruptions
1.2-7.1.1.6 Communication authority

1.2-7.1.2 Noise and Vibration

Phasing plans shall include considerations of noise and vibration control during construction activities.

1.2-7.2 Isolation of Construction Areas

During construction, renovation areas shall be isolated from occupied areas based on the ICRA; see Section 1.2-4.2 (Infection Control Risk Assessment).

1.2-7.3 Maintenance of Air Quality and Utilities

Existing air quality requirements and utility requirements for occupied areas shall be maintained during any renovation or construction.

*1.2-7.4 Existing Conditions

Existing conditions and operations shall be documented prior to initiation of renovation and new construction projects. This shall include documentation of existing mechanical/electrical/structural capacities and quantities.

1.2-7.4 Existing conditions. Documentation of existing conditions should cover the following:

a. Subsurface conditions (e.g., soil testing reports, soil type identification, known water table information, active/abandoned utility locations)

b. Foundation and superstructure information, including the ability of the structure and equipment (elevator) to handle the movement of heavy and/or large loads from one location to another
c. Types of fire suppression, detection, and alarm systems, including whether the building is fully sprinklered.

d. Communications systems (including telephone, nurse call, overhead paging, telemetry, dictation, electronic imaging systems).

e. Plumbing systems (e.g., domestic water, treated water, wastewater, medical gases/vacuum systems).

f. Existing airflow of affected areas.

g. Main electrical service and electrical service affected by construction, including rating and actual load/peak and feeder sizes as applicable, and power factor.

h. Emergency power system, including rating and actual load/peak and feeder sizes, as applicable, for life safety, emergency/critical, and equipment branches.

*1.2-8 Commissioning*

A1.2-8 Commissioning. Commissioning is a quality process used to achieve, validate, and document that facilities and component infrastructure systems are planned, constructed, installed, tested, and capable of being operated and maintained in conformity with the design intent to meet the owner’s project requirements (OPR).

a. Health facility commissioning. Many organizations, including NEBB, BCA, and ASHE, have published commissioning manuals, guidelines, standards, and handbooks. The ASHE Health Facility Commissioning Guidelines is structured to foster a successful transition from planning, design, and construction to high-performance operations (i.e., operations that are code-compliant, safe, and energy-efficient and that support positive clinical outcomes and high patient and visitor satisfaction).

The ASHE commissioning process includes the following unique features:

— Establishment of a project energy efficiency goal

— Involvement of health care facility operations and maintenance staff in the design review process

— Development of a utility management plan (UMP) during the design process instead of during the postoccupancy period

— Comprehensive training of the operations and maintenance staff, including pre-testing to assess training needs and post-testing to ensure competency

— Testing of fire and smoke dampers prior to occupancy

— Measurement and verification of actual energy performance as compared to the energy efficiency goal.
b. Total building commissioning (TBC)

—Objective. TBC is a process whereby the governing body (i.e., the owner) is assured that all building systems and components (not just the HVAC system) will function according to design intent, specifications, equipment manufacturers’ data sheets, and operational criteria. Because all building systems are integrated and validated during commissioning, the owner can expect the commissioning process to improve occupant comfort, energy savings, environmental conditions, system and equipment function, building operations and maintenance, and building occupants’ productivity.

—Feedback. The TBC process should include a feedback mechanism that can be incorporated into the owner’s postoccupancy evaluation process to enhance future facility designs.

—Acceptance building testing. Facility acceptance criteria should be based on the commissioning requirements specified in the contract documents. These criteria specify the tests, training, and reporting the owner must complete to validate that each building system complies with the performance standards of the basis of design before final acceptance of the facility.

—Systems and components included in TBC. Key systems and components that should be tested and validated, at minimum, during the TBC process include design and operations of the HVAC, plumbing, electrical, emergency power, fire protection/suppression, telecommunications, nurse call, intrusion and other alarm device, and medical gas systems as well as specialty equipment.

• Air balancing, pressure relationships, and exhaust criteria for mechanical systems, including local exhaust ventilation, should be clearly described and tested to create an environment of care that provides for infection control and occupant safety.
• Areas requiring emergency power should be specified and tested.
• Special plumbing systems should be certified to support the chemicals scheduled for use in them.
• Water lines, taps, showers, and ice machines to which service has been disrupted or stagnant should be flushed before use by building occupants.

c. Areas to be included in commissioning. While all areas of an outpatient facility are included in the commissioning process, areas of particular concern are surgical services; isolation rooms, including those used for airborne infection/pathogens; and pharmacies and other areas containing hazardous substances.

1.2-8.1 Commissioning Requirements

On projects involving installation of new or modification to existing physical environment elements critical to patient care and safety or facility energy use, at minimum the following systems shall be commissioned:

1.2-8.1.1 HVAC

1.2-8.1.2 Automatic temperature control
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1.2-8.1.3 Domestic hot water

1.2-8.1.4 Fire alarm and fire protection systems (integration with other systems)

1.2-8.1.5 Essential electrical power systems

1.2-8.1.6 Security systems

1.2-8.2 Commissioning Activities

At minimum, the following commissioning activities shall be undertaken:

1.2-8.2.1 Development of the Owner’s Project Requirements (OPR)

The governing body (i.e., the owner) shall develop the OPR.

*1.2-8.2.1.1 The OPR shall identify the building systems and elements to be commissioned as part of the project scope.

A1.2-8.2.1.1 In addition to the minimum systems listed in Section 1.2-8.1 (Commissioning Requirements), consideration should be given to commissioning the following systems:

a. Building envelope
b. Lighting controls and levels
c. Communication systems
d. Normal power systems
e. Plumbing systems
f. Acoustic measures

1.2-8.2.1.2 The OPR shall define the parameters required to meet the owner’s expectations, including the following:

(1) Performance
(2) Operations
(3) Maintenance
(4) Longevity
(5) Energy efficiency

1.2-8.2.2 Preparation of the Basis of Design (BOD)

In response to the OPR, the design team shall prepare a BOD narrative describing the design intent and systems to be commissioned. The BOD narrative shall include, at minimum, the following elements:

1.2-8.2.2.1 Description of the systems, components, and methods used to meet the OPR

1.2-8.2.2.2 Diversity and safety factors used in sizing
1.2-8.2.2.3 Classes of systems and components planned (e.g., duct class, clean room class, etc.)

1.2-8.2.2.4 Levels of redundancy planned

1.2-8.2.2.5 Occupant density anticipated

1.2-8.2.2.6 Limitations and restrictions of systems and assemblies assumed

1.2-8.2.2.7 Indoor and outdoor conditions assumed (e.g., space temperature, relative humidity, lighting power density, glazing fraction, U-value and shading coefficient, wall and ceiling R-values, ventilation and infiltration rates, etc.)

1.2-8.2.2.8 Description of emergency operation intended

1.2-8.2.3 Preparation of Commissioning Plan, Commissioning Specifications, and Construction Checklists

1.2-8.2.3.1 Commissioning plan. This document shall establish the scope, structure, and schedule of the commissioning activities and address how the commissioning process will verify that the OPR and the BOD are achieved.

1.2-8.2.3.2 Commissioning specifications. These specifications shall establish requirements for physical environment elements to be included in the project scope and identify responsibilities related to commissioning.

*1.2-8.2.3.3 Construction checklists. These documents shall establish inspections and individual component tests that will be used to verify proper functioning of physical environment elements that have been installed or modified.

A1.2-8.2.3.3 Construction checklists. The commissioning agent provides subcontractors with a list of items to inspect and elementary component tests to conduct to verify proper installation of equipment. Items on construction checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., checking belt tension, oil levels, labels affixed, gauges in place, sensors calibrated, etc.). However, some construction checklist items entail simple testing of the function of a component, a piece of equipment, or system (e.g., measuring the voltage imbalance of a three-phase pump motor in a chiller system). Construction checklists augment and are combined with the manufacturer’s start-up checklist. Even without a commissioning process, contractors typically perform some, if not all, of the construction checklist items on their own. The commissioning agent only requires that the procedures be documented in writing and does not necessarily witness much of the construction checklist testing, except for testing of larger or more critical pieces or when desired by the owner.

*1.2-8.2.4 Performance of Functional/Operational Tests

Tests of the dynamic function and operation of the physical environment elements under full operation shall be performed. Elements shall be tested in various modes and run through all sequences of operation.

A1.2-8.2.4 Functional/operational tests. Functional testing assesses the dynamic function and operation of equipment and systems (rather than components) under full operation using manual (direct observation) or
monitoring methods. (For example, the chiller pump is tested interactively with the chiller functions to determine if the pump ramps up and down to maintain the differential pressure setpoint.) Systems are tested in various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied conditions, varying outside air temperatures, fire alarm activation, power failure, etc. The systems are run through all the control system’s sequences of operation, and the responses of components are verified to ensure they match what the sequences state.

Traditional air or water testing and balancing (TAB) is not functional testing. The primary purpose of TAB is to set up the system flows and pressures as specified. Functional testing, on the other hand, is used to verify the performance of that which has already been set up.

The commissioning agent develops the functional test procedures in a sequential written form, then coordinates, oversees, and documents the actual testing, which is usually performed by the installing contractor or vendor. Functional tests are performed after items on the construction checklists and startup procedures are complete.

1.2-8.2.5 Preparation of the Commissioning Report

A commissioning report shall be prepared and presented to the owner to formally document the following:

1.2-8.2.5.1 Performance of the physical environment elements
1.2-8.2.5.2 Performance issues identified
1.2-8.2.5.3 Mitigation or resolution of performance issues
1.2-8.2.5.4 Maintenance staff training to achieve operational sustainability
1.2-8.2.5.5 Compliance with the OPR and the BOD

*1.2-8.3 Commissioning Agent

Commissioning shall be led by any of the following as determined by the governing body:

1.2-8.3.1 An independent commissioning agent with health care facility experience and expertise
1.2-8.3.2 The design engineer
1.2-8.3.3 Another agent—a qualified individual capable of performing commissioning

**A1.2-8.3 Commissioning agent.** An independent commissioning agent with health care experience compensated directly by the governing body and not affiliated or associated with either the design team or the contractor should lead the commissioning process. Use of an independent commissioning agent ensures the commissioning agent is a focused owner advocate who can objectively complete the commissioning tasks without any real or perceived conflict of interest. Also, use of an independent commissioning agent is encouraged by LEED criteria and required to earn the LEED point for enhanced commissioning.
1.2-9 Record Drawings and Manuals

1.2-9.1 Drawings

1.2-9.1.1 Record Drawings

Upon occupancy of the building or a portion thereof, the owner shall be provided with a complete set of record documents that shows construction, fixed equipment, and mechanical, electrical, plumbing, and structural systems and reflects known deviations from the construction documents.

1.2-9.1.2 Life Safety Overlay

Drawings shall include a life safety plan that reflects NFPA 101 requirements for each floor.

1.2-9.2 Equipment Information

1.2-9.2.1 Upon completion of the contract, the owner shall be furnished with the following for each piece of equipment installed as part of the project:

1.2-9.2.1.1 A complete set of manufacturers’ operations, maintenance, and preventive maintenance instructions

1.2-9.2.1.2 Parts list

1.2-9.2.1.3 Model number and a description

1.2-9.2.2 Operating staff shall be provided with instructions on how to properly operate installed systems and equipment.

*1.2-9.3 Design Data

A1.2-9.3 Future uses for design data. The design data listed will be used to facilitate future alterations, additions, and changes, including energy audits and retrofits for energy conservation.

The owner shall receive a complete set of design data for the facility, including the following:

1.2-9.3.1 Structural design loadings

1.2-9.3.2 Summary of heat loss assumption and calculations

1.2-9.3.3 Estimated water consumption

1.2-9.3.4 Medical gas outlet list

1.2-9.3.5 List of applicable codes

1.2-9.3.6 Electric power requirements of installed equipment