Chapter 1.2 – Planning, Design, Construction and Commissioning

Index

1.2-1General

*1.2-1.1 Application

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

> **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.

*1.2-1.2 Multidisciplinary Project Team

Multidisciplinary groups/persons (stakeholders) affected by and integral to the design shall be included in the project planning and implementation process.

> **A1.2-1.2 Project team.** The multidisciplinary project team should be assembled as early as possible in the design process. Inclusion of patient advocates/consumers, A/E consultants, and construction specialists should be considered.

1.2-1.2.1 At minimum, the multidisciplinary team shall include administrators, clinicians, infection preventionists, architects and other design professionals, facility managers, safety officers, security managers, 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.

1.2-1.2.2 The scope and nature of the project shall dictate others involved.

*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 1.2-4 (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 health care facilities. How these components and requirements are addressed in health care 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 health care 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 Health Care Facility Design

A1.2-1.3.1 Framework for health care facility design. The care environment is constituted by those features in a built health care facility that are created, structured, and maintained to support quality health care. As patients and their families have become more involved in the course of care, health care organizations need to respond to the changing requirements for accommodations.

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. As health care economics apply pressure to management, every effort should be made in health care facility designs to enhance the performance, productivity, and satisfaction of the 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, health care 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 Facility construction, whether for freestanding buildings, expansion, or renovation of existing buildings, can create conditions that are harmful to patients and staff. Thus, new health care buildings and renovations need to be designed and constructed to facilitate ongoing cleanliness and mitigate infection control concerns. For these reasons, health care 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 life safety and protection of occupants during construction.

1.2-2 Functional Program

1.2-2.1 General

1.2-2.1.1 Functional Program Requirement

1.2-2.1.1.1 A functional program shall be developed for new construction, major renovations, and projects that change the functional use of any facility space.

1.2-2.1.1.2 The governing body shall be responsible for developing, documenting, and updating the functional program.

1.2-2.1.1.3 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.

1.2-2.1.2 Functional Program Purpose

1.2-2.1.2.1 The functional program shall be used to determine the application of the *Guidelines* when developing facility projects.

(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.

1.2-2.1.2.2 The facility shall retain the functional program with other design data to facilitate future alterations, additions, and program changes.

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 Hospitals and Outpatient Facilities*. If acronyms are used, they shall be defined clearly.

1.2-2.1.3.2 The names and spaces indicated in the functional program shall also 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. Services to be provided, expanded, or eliminated by the proposed project shall be described.

1.2-2.2.3 Project Type and Size

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

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

1.2-2.2.4 Construction Type/Occupancy and Building Systems

1.2-2.2.4.1 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)

1.2-2.2.4.2 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

1.2-2.2.5.1 The department(s) affected by the project shall be identified.

1.2-2.2.5.2 The services required for the completed project to function as intended shall be described.

***1.2-2.2.6Indirect Support Functions**

Increased (or decreased) demands, workloads, staffing requirements, etc., imposed on support functions affected by the project shall be described.

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

1.2-2.2.7 Operational Requirements

The operational requirements, which include but are not limited to the following, shall be described:

1.2-2.2.7.1 Projected operational use and demand loading for affected departments and/or project components

1.2-2.2.7.2 Relevant operational circulation patterns, including staff, family/visitor, and materials and equipment movement

1.2-2.2.7.3 Departmental operational relationships and required adjacencies

*__1.2-2.2.8 Architectural Space Requirements__

The functional program shall contain a list organized by department or other appropriate 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.

A1.2-2.2.8 Project gross floor area

a. Gross floor area for the project should be aggregated by department, and 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, and multiplying factors should be applied to reflect inter-department circulation, 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.

*1.2-3 Safety Risk Assessment

A1.2-3 Safety risk assessment (SRA). The SRA is a multidisciplinary, documented assessment process intended to proactively identify hazards and risks and mitigate underlying conditions of the built environment that can contribute to adverse safety events. These adverse events include infections, falls, medication errors, immobility-related outcomes, 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 potential risks and hazards.

[Safety Risk Assessment]

*1.2-3.1 General

A1.2-3.1 For more information on the development of a safety risk assessment and online tools, visit the Resources section of the Facility Guidelines Institute website.

1.2-3.1.1 SRA Requirement

1.2-3.1.1.1 All health care facility projects shall be designed and constructed to facilitate the safe delivery of care.

1.2-3.1.1.2 To support this goal, an interdisciplinary team shall develop a safety risk assessment.

1.2-3.1.2 SRA Components

The SRA components identified in Table 1.2-1 (Safety Risk Assessment Components) shall be required.

1.2-3.1.3 SRA Responsibility and Scope

1.2-3.1.3.1 The safety risk assessment shall be initiated and managed by the governing body during the planning phase of the project and shall continue to 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.

1.2-3.1.4 SRA Team

1.2-3.1.4.1 Composition. The safety risk assessment shall be conducted by an interdisciplinary team appointed by the governing body.

*1.2-3.1.4.2 Team members and roles

A1.2-3.1.4.2 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) Members of the SRA team shall be convened as a group as needed to maintain continuity and integration of the SRA components.

(2) Individual members shall be engaged to develop additional detail according to their areas of expertise.

*1.2-3.1.5 SRA Process

A1.2-3.1.5SRA 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.

1.2-3.1.5.1 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

> **A1.2-3.1.5.1 (1)** Hazards include physical obstacles and underlying conditions that may directly or indirectly contribute to harm to patients, staff, or other users. See appendix section A1.2-3.1.5.2 [below] (Evaluation of underlying conditions that can cause adverse safety events) for more information.

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

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

***1.2-3.1.5.2 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).

> **A1.2-3.1.5.2 Evaluation of underlying conditions that can cause adverse safety events.** 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:
>
> a. Noise
>
> b. Vibration
>
> c. Visual distraction and disorganization of space
>
> d. Light type, quality, and quantity for each location
>
> e .Characteristics of surfaces for different spaces
>
> f. Indoor air characteristics for different spaces
>
> g. Sources of infection
>
> h. Ergonomics
>
> i. Staff fatigue
>
> j. Space required to accommodate functions
>
> k. Standardized locations for equipment (e.g., medical gas outlets on patient room headwalls, emergency call buttons)
>
> l. Opportunities for, and barriers or disincentives to, mobilization of patients

m. Impediments to movement, maneuvering, and flow

n. Communication systems

o. Visibility of patients

p. Automation (where possible)

q. Support for family involvement in patient care

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 health care facilities. The report can be found at www.healthdesign.org/sites/default/files/chd416_ahrqreport_final.pdf.

*__1.2-3.1.6 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:

A1.2-3.1.6 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 a health care facility design project. The decisions made during predesign significantly affect the design parameters going forward and the safety outcomes of the project following occupancy. The safety risk assessment effort should be an important part of the continuous safety improvement program in any health care organization.

1.2-3.1.6.1 Patient and caregiver safety hazards and risks identified by the safety risk assessment. See Section 1.2-3.1.5.1 [above] (Identify hazards and potential risks).

1.2-3.1.6.2 Design features that contribute to the identified hazards and risks

1.2-3.1.6.3 Design strategies to reduce, mitigate, or eliminate identified hazards and risks

1.2-3.1.7 SRA Compliance

1.2-3.1.7.1 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.

1.2-3.1.7.2 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.

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*1.2-3.2 Infection Control Risk Assessment (ICRA)

A1.2-3.2 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.

1.2-3.2.1 General

1.2-3.2.1.1 ICRA requirement. For a health care 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.

1.2-3.2.1.2 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). See Section 1.2-3.2.3.1 [below] (Infection control risk mitigation recommendations).

1.2-3.2.2 ICRA Considerations

At minimum, the ICRA shall address the following:

1.2-3.2.2.1 Design elements. See Table 1.2-2 (Infection Control Risk Assessment Design Considerations) for cross-references to more information.

(1) 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 Part 2 (Hospitals) and Part 3 (Outpatient Facilities).

*(2) Special heating, ventilation, and air-conditioning (HVAC) needs required to accommodate the services (e.g., surgical suites, AII/PE 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.

> **A1.2-3.2.2.1 (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 chapters in Part 2 (Hospitals) and Part 3 (Outpatient Facilities). 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.

A1.2-3.2.2.1 (4) See appendix sections A2.1-7.2.3 (Characteristics and criteria for selecting surface and furnishing materials and products) and A2.1-7.2.4-a (Characteristics and criteria for selecting furnishing materials and products) for information on characteristics and criteria for selecting surface and furnishing materials for hospitals.

1.2-3.2.2.2 Construction elements. When conducting the ICRA and developing the infection control risk mitigation requirements 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

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

A1.2-3.2.2.2 (2) 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.

(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

1.2-3.2.3 Infection Control Risk Mitigation

***1.2-3.2.3.1 Infection control risk mitigation recommendations (ICRMRs).** 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.

A1.2-3.2.3.1 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.

1.2-3.2.3.2 ICRMR planning.ICRMRs shall be prepared by the ICRA team.

1.2-3.2.3.3 ICRMR content.ICRMRs shall, at minimum, address how the following issues will be addressed during construction:

(1) Patient placement and relocation

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

A1.2-3.2.3.3 (2) Ventilation of the construction zone

a. Airflow into the construction zone from occupied spaces should be maintained by means of a dedicated ventilation/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. Hospital 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 hospital clean areas to construction dirty areas. Construction barriers in high-risk areas should have visual display of airflow direction. (High-risk areas include critical care units, emergency departments, labor and delivery facilities, newborn nurseries, outpatient surgery facilities, areas serving pediatric patients, pharmacies, surgical units, post-anesthetic care units, areas serving immunocompromised patients, burn units, cardiac catheterization labs, central sterile supply, airborne infection isolation rooms, protective environment rooms, oncology units, operating rooms, and cesarean delivery rooms.)

(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

A1.2-3.2.3.3 (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.

A1.2-3.2.3.3 (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.

***1.2-3.2.3.4 Monitoring plan and procedures**

A1.2-3.2.3.4 Monitoring efforts will 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 ICRMRsduring 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 (governing body, designer, contractor, and monitor)

*1.2-3.3 Patient Handling and Movement Assessment (PHAMA)

A1.2-3.3 Patient handling and movement assessment (PHAMA)

a. A PHAMA is a multidisciplinary, documented assessment process conducted to direct/assist the design team in incorporating appropriate patient handling and movement 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. See Section 1.2-3.7 (Patient Immobility) for more details on the impact of equipment on patient mobility.)

The PHAMA has two distinct yet interdependent phases:

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

Phase 2: Design requirements, including space, structural, and other design considerations are determined to accommodate incorporation of patient handling and movement equipment and to facilitate weight-bearing and physical activity of patients.

b. Information and guidance for conducting a PHAMA can be found in the white paper titled "Patient Handling and Movement Assessment: A White Paper," prepared by the 2010 Health Guidelines Revision Committee Specialty Subgroup on Patient Movement and posted at www.fgiguidelines.org. The white paper also explains the rationale for considering patient handling equipment during the health care design and construction process; information (including illustrations) about various types of patient-handling equipment, the business case for implementing patient handling and movement programs, and strategies for implementing such programs.

c. Caregivers repositioning and transferring patients cannot lift more than 35 pounds 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 safely equipped to perform these necessary physical tasks, patients may not receive adequate care and may remain inappropriately immobile. Increasing evidence shows that early and frequent patient mobilization and movement is vital to the health of patients and is integral to good quality care. See Section 1.2-3.7 (Patient Immobility) for more details about immobility prevention.

Equipment is now available to facilitate necessary clinical work while significantly reducing the risk of injury to caregivers and patients from patient handling, moving, transfer, transport, and mobilization activities. Equipment is also available to provide a viable support alternative to bedstay; see appendix sections A1.2-3.3.2.2 (8) (Storage for patient-handling and movement equipment and accessories) and A2.1-2.2.2 (Space considerations for patient mobility) for more details about accommodations needed for equipment used to improve patient mobility. 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 1.2-3.3 (Patient Handling and Movement Assessment):

—Whenever the term "equipment" is used, it refers to patient handling and movement 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. 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.

1.2-3.3.1 General

1.2-3.3.1.1 PHAMA requirement

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

A1.2-3.3.1.1 (1) PHAMA team. In addition to those listed in Table A1.2-a (Safety Risk Assessment Team Member Expertise), the unit/area nurse manager/supervisor, physical therapy/rehabilitation staff, and those with expertise in risk management should contribute their expertise related to patient handling, movement, and mobility to development of the PHAMA.

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

1.2-3.3.1.2 Design recommendations

*(1) PHAMA results and recommendations shall be specific to each clinical unit, procedure area, diagnostic area, and any other area where patient handling and movement occur.

A1.2-3.3.1.2 (1) Areas to be included in PHAMA design recommendations. Examples of areas to be covered in the PHAMA include clinical units, along with associated toileting, bathing, and showering areas; procedure areas; diagnostic areas; surgery suite intake and recovery units; the morgue; ambulance bays; dining and recreation areas; and the routes connecting them. Because different areas serve patient populations with varying characteristics, equipment recommendations will also vary. For this reason, recommendations should be developed for each unit or other 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 both bariatric and non-bariatric patient care requirements.

1.2-3.3.2 Patient Handling and Movement Elements for the Safety Risk Assessment

1.2-3.3.2.1 Phase 1: Patient handling and movement needs assessment. Evaluation of patient handling and movement needs shall include at minimum the following considerations:

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

A1.2-3.3.2.1 (1) Patient handling, movement, and mobility equipment recommendations

a. In addition to the factors listed in the main text, recommendations for patient handling, movement, and mobility equipment are also based on the following:

—Patient dependency levels. This information is critical in determining patient handling and movement 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 obese/bariatric patient weight and size. This is important to assure equipment with appropriate capacities is provided.

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

- Vertical transfers (from/to a bed, chair, commode, toilet, or wheelchair)
- Lateral transfers (from/to a bed, stretcher, gurney, or trolley)
- Positioning/repositioning in bed (side to side, up to the head of the bed, raise or lower head or feet)
- Repositioning in chair
- Showering/bathing
- Lifting appendages
- Transporting patients
- Assisting patient ambulation
- Weighing patients on bed scales

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

c. Many types of patient handling and movement 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, bathing/shower chairs, beds/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

A1.2-3.3.2.1 (1)(a) See appendix section A2.1-2.2.2 (Space considerations for patient mobility) for information about patient mobility considerations.

(b) Types of high-risk patient handling and movement tasks to be performed and accommodated

(c) Knowledge of specific technology to enable physical activity by patients and reduce risk for each patient handling and movement task

(d) Architectural factors that interfere with use of patient handling equipment or impede mobility

*(2) Types of patient handling and movement equipment to be used (manual or power-assisted fixed ceiling or wall-mounted lifts, manual or power-assisted portable/floor-mounted lifts, electric height-adjustable beds, or a combination thereof)

A1.2-3.3.2.1 (2) Equipment that will be used. Direct 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 on the unit should be factored in. 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 actually used.

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

A1.2-3.3.2.1 (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 full-body sling lifts.

b. When only floor-based lifts are used, one lift per 8 to 10 patients is a typical planning ratio. When fixed lift systems are used, the location and configuration of track systems will determine potential coverage options. For example, if 70 percent of patients are dependent or require extensive assistance and there are 30 patients on the unit, fixed lift coverage will be needed for 21 patients (70 percent of 30). If the patient rooms are private, 21 rooms will need fixed lifts. If the patient rooms are semi-private, 10 to 11 rooms will need fixed lifts.

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

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

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

*(4) Required weight-carrying capacities

A1.2-3.3.2.1 (4) Lift weight capacities range from approximately 400 lbs. (182 kg) to bariatric expanded capacity lifts of 1,000 lbs. (454 kg) or more. Specification of lifts with a capacity of 500–600 lb. (227–273 kg) will accommodate the greatest range of all patients. If bariatric admissions warrant, a minimum of one fixed, ceiling-mounted expanded capacity/bariatric lift per unit should be included, in addition to lower weight capacity lifts. The lifts designated for bariatric patients should support the weights for bariatric patients defined during the planning phase. See Section 1.2-5.4 (Bariatric-Specific Design Considerations).

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

A1.2-3.3.2.1 (5) Nursing unit staff will be the best resource for determining which rooms on a unit 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 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 technology as well as programmatic issues related to safe patient handling. Information about how

to conduct a PCE evaluation can be found in "Patient Handling and Movement Assessment: A White Paper" at www.fgiguidelines.org.

1.2-3.3.2.2 Phase 2: Design considerations. The impact of patient handling and movement needs on building design shall be addressed in the PHAMA, including consideration of both bariatric and non-bariatric patient care needs. 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 patient handling and movement

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

A1.2-3.3.2.2 (2) Electrical and mechanical considerations. Battery-charging areas with electrical services should be provided in storage rooms for portable, floor-based lifts and other assistive devices. Access to both electrical power and control services should be provided for fixed lifts.

*(3) Adequate space for provision of patient care and for unhindered maneuvering of patient handling and movement equipment

A1.2-3.3.2.2 (3) Space for use of patient handling and movement equipment. See appendix section A2.1-2.2.2 (Space considerations for patient mobility) for mobility clearance suggestions.

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

A1.2-3.3.2.2 (4) Consider various destinations for patient transport using patient-handling equipment (i.e., locations to and from which patient movement is to be accomplished, such as within the patient room—bed, chair, commode, etc.—and into the associated toilet room). Also consider patient destinations to foster patient ambulation and mobility. Such considerations will aid in selecting appropriate equipment and designing the room and door openings to accommodate portable equipment and related track systems and the patient and caregivers using it.

*(5) Sizes and types of door openings through which patient handling and movement equipment and accompanying staff must pass

A1.2-3.3.2.2 (5) See appendix section A2.1-7.2.2.3 (2)(a) (Door openings) for information about door openings and patient mobility.

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

A1.2-3.3.2.2 (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 movement equipment installations with building mechanical, electrical, communication, and life safety systems

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

A1.2-3.3.2.2 (8) Storage for patient-handling and movement equipment and accessories

a. Accessibility of patient-handling 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 equipment accessories such as lift slings, hanger bars, and trapezes as well as for other patient-handling equipment.

—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.

—Slings assigned to a specific patient should be stored in the patient room (e.g., on a hook on the outside of the patient's closet, at the bedside, or somewhere near the entry door) to provide instant accessibility and ensure compliance.

—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: (1) For small units, a centrally located storage area can be provided, and (2) for large or small units, storage can be provided in alcoves or storage areas interspersed throughout the unit.

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

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

A1.2-3.3.2.2 (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 risk mitigation requirements

A1.2-3.3.2.2 (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.

*1.2-3.4 Patient Fall Prevention

A1.2-3.4 Fall prevention risk assessment. Consideration for fall prevention and mitigation includes evaluation of the patient 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 1.2-3.1.4) should proactively identify and plan design elements to help prevent falls and mitigate injuries associated with falls.

*1.2-3.4.1 Fall Prevention Elements of the Safety Risk Assessment

A1.2-3.4.1 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 (http://www.patientsafety.va.gov/CogAids/FallPrevention/index.html#page=page-8). In addition, the Business and Institutional Furniture Manufacturers Association (BIFMA) is an industry source for standards related to furniture (http://www.bifma.org/standards/index.html).

1.2-3.4.1.1 Fall-risk locations. The SRA report shall identify fall-risk locations for a new construction or renovation project.

***1.2-3.4.1.2 Design features.** The SRA team shall identify required patient fall prevention design features for the identified at-risk locations. See sections 2.1-7 (Common Elements for Hospitals: Design and Construction Requirements) and 3.1-7 (Common Elements for Outpatient Facilities: Design and Construction Requirements).

A1.2-3.4.1.2 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 following environmental variables:

a. Patient room

—Family zones in patient rooms. This type of room has been shown to contribute to fewer patient falls.

—Space on the opening side of the patient toilet room door. Provision of an 18-inch space on the opening side of the patient toilet room door makes it

possible to open the door without stepping backward; this arrangement has been shown to facilitate movement of patients using IV poles and walkers and other assistive devices.

—Handrails on walls leading to the patient toilet room

—Lighting levels, including night-lighting

—Elimination of room clutter that narrows the path for safe patient movement

—Elimination of trip hazards such as ottomans and furniture legs

b. Ceiling-mounted lift

—Lifts leading from the patient bed into the patient toilet room

—Lifts in the patient unit corridor to assist with ambulation

c. Patient toilet room

—Location of the patient toilet room by the headwall rather than across the room

—Private toilet room accessed by only one patient

—Toilet location in the patient toilet room

—Location and number of toilet grab bars

d. Flooring. See sections 2.1-7.2.3.1 (Flooring and wall bases) and 3.1-7.2.3.1 (Flooring and wall bases) and their appendices for information.

e. Noise attenuation. Noise has been found to contribute to falls, especially noise generated from overhead paging and alarms.

f. Location of nurse station. Decentralized nurse stations may increase the opportunity to view and assist patients.

g. Furniture. See Section 2.1-7.2.4.2 (Built-in furnishings) for information.

h. Equipment. See appendix section A1.2-3.3 (Patient Handling and Movement Assessment) for a description of equipment to support patient handling and movement and reduce the risk of patient falls.

i. Technology (e.g., bed alarms)

Additional detail can be found in the Center for Health Design paper "Contribution of the Designed Environment to Fall Risk in Hospitals."

1.2-3.4.2 Fall Prevention Response

1.2-3.4.2.1 The design team shall incorporate required patient fall prevention design features in the project design documents.

1.2-3.4.2.2 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

*1.2-3.5 Medication Safety

A1.2-3.5 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.

***1.2-3.5.1 Medication Safety Elements of the Safety Risk Assessment**

A1.2-3.5.1 Medication safety elements. Many technologies have been developed to help reduce medication errors. This includes pharmacy order review software for validating orders, technologies such as robotics and unit dose dispensing equipment to improve accuracy of medication dispensing, and delivery technologies such as 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.

***1.2-3.5.1.1 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.

A1.2-3.5.1.1 A medication safety zone, as defined in the *U.S. Pharmacopeia-National Formulary* (USP–NF), is a critical area where medications are prescribed, orders are entered into a computer or transcribed onto paper documents, or medications are prepared or administered. Also see the glossary at the front of this document.

1.2-3.5.1.2 Design features. Medication safety zones shall meet the requirements found in Section 2.1-2.6.6 (Medication Safety Zones) or Section 3.1-3.6.6 (Medication Safety Zones).

1.2-3.5.2 Medication Safety Response

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

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*1.2-3.6 Behavioral and Mental Health (Psychiatric Patient Injury and Suicide Prevention)

A1.2-3.6 Behavioral and mental health risk assessment. Risk should be determined through simultaneous consideration of the inherent danger of any individual environmental feature because of patient profile and acuity, the anticipated level of staff supervision for each area, and space visibility and supervision.

a. The governing body should develop a detailed assessment of the level of risk for each program area where mental health patients will be served (e.g., emergency department, nursing units). 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 furnishings and exposed mechanical and electrical devices and components to be addressed in the risk assessment. Examples of areas to be included in a mental health risk assessment include the following:

—Highest level

- Seclusion rooms (where patient acuity poses an increase risk)
- Patient bedrooms and toilet rooms (areas where patients spend long periods of time out of direct supervision of the staff)
- 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

- Activity spaces, group rooms, and treatment spaces (supervised with good visibility)
- Dining rooms and recreation spaces, both indoor and outdoor
- Corridors (always visible)

—Lower level

- Exam rooms, private offices, and conciliation rooms (always supervised)
- Staff and support areas (not accessible by patients)

Other information that could be considered can be found in the "Design Guide for the Built Environment of Behavioral Health Facilities," published by the Facility Guidelines Institute.

1.2-3.6.1 Behavioral and Mental Health Elements of the Safety Risk Assessment

The SRA report shall identify areas that will serve patients at risk of mental health injury and suicide.

1.2-3.6.2Behavioral and Mental Health Response

1.2-3.6.2.1 The SRA team shall identify mitigating features for the identified at-risk locations.

1.2-3.6.2.2 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, to others, and to the environment.

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

*1.2-3.7 Patient Immobility

Patient immobility risk in patient care areas shall be assessed to identify design factors that discourage patient mobility and determine how to mitigate their contribution to sedentary patient treatment and behavior.

A1.2-3.7 Patient immobility risk assessment. The purpose of assessing risk for patient immobility is to decrease the risk of hospital-acquired disabilities caused by lack of mobility.

a. Patient immobility (a decrease in the time a patient spends out of bed and moving) causes loss of muscle strength and harmful changes in the heart and blood vessels as well as increasing chances of delirium, pressure ulcers, venous thromboembolism, falls, and functional decline. Functional decline (the loss of ability to perform activities that ensure independence (e.g., getting to the toilet) leads to increased lengths of hospitalization and readmission.

b. Design of the health care physical environment can influence whether a person remains inappropriately immobile and can be used to encourage and enable patients to remain active. It can also support caregiver efforts to keep patients mobile and support rehabilitation efforts. Design considerations for prevention of immobility include the following:

—Identification of patient care areas in the scope of the project that serve inpatient populations at risk for immobility

—Identification of conditions that foster immobility or work together to keep patient in bed

—Identification of furniture and equipment that supports weight-bearing patient mobility and assessment of the space needed for its use and storage

—Specification of project environmental design features that facilitate patient mobility

*1.2-3.8 Security Risks

A1.2-3.8 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 Health Care Facilities*, published by the International Association for Healthcare Security and Safety (IAHSS).

*1.2-3.8.1 Project Security Plan

A security plan shall be developed for a new construction or renovation project that addresses risks specific to the environment and function of the project space as well as risks associated with the construction process. This plan shall include the following:

A1.2-3.8.1 The security risks should be assessed by a qualified health care security professional as part of the SRA team.

1.2-3.8.1.1 A description of the impact of demolition and phasing on existing site functions and any existing protection strategies and design interventions

1.2-3.8.1.2 An assessment of the need for temporary security barriers such as fencing and security systems, including intrusion detection and video surveillance systems

1.2-3.8.1.3 A schedule for installation of security systems for completion during early move-in activities to allow for protection of the facility and equipment

1.2-3.8.2 Security Elements of the Safety Risk Assessment

*__1.2-3.8.2.1 Design features.__ Design features shall address identified security risks specific to the patient demographics and environmental factors related to the project scope.

A1.2-3.8.2.1 Design features to address security

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

b. Buildings and interior spaces. Health care facilities have patient care areas (inpatient and/or outpatient) and 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 health care 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 health care 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 health care 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, laboratory, hazardous waste storage, or other locations.

*__1.2-3.8.2.2 Emergency management security considerations__

A1.2-3.8.2.2 Security for emergency management. Health care facilities frequently provide both scheduled and emergency services, serve as part of local emergency response networks, and are 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.

a. 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.

b. 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.

1.2-4 Environment of Care Requirements

The functional requirements for the space being designed and the relationships between the following environment of care components and key elements of the physical environment shall be addressed during project planning, design, and construction.

*1.2-4.1 Delivery of Care Model Concepts

A1.2-4.1 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 of Patient- and Family-Centered Care website at www.ipfcc.org. 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.

1.2-4.1.1 A description of the delivery of care model shall be provided.

1.2-4.1.2 A description of the physical elements and key functional relationships necessary to support the intended delivery of care model shall also be provided.

1.2-4.2 Patients, Visitors, Physicians, and Staff Accommodation and Flow

Design criteria for the following shall be described:

1.2-4.2.1 The physical environment necessary to accommodate facility users and administration of the delivery of care model

***1.2-4.2.2** The physical environment (including travel paths, desired amenities, and separation of users and workflow) necessary to create operational efficiencies and facilitate ease of use by patients, families, visitors, staff, and physicians

A1.2-4.2.2 Layout/operational planning. Criteria for evaluation of the layouts should be consistent with the delivery of care model to facilitate review of each optional layout and operational plan.

*__1.2-4.3 Building Infrastructure and Systems Design Criteria__

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

A1.2-4.3 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 utilization and cross training are issues that should be addressed.

1.2-4.4 Physical Environment Elements

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

*__1.2-4.4.1 Light__

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

A1.2-4.4.1 Light. Provision of natural light should be considered wherever possible in the design of the physical environment.

a. Access to natural light should be provided no farther than 50 feet 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. Siting and organization of the building should respond to and prioritize unique natural views and other natural site features.

c. Access to natural light should be available without entering private spaces (i.e., staff should not have to enter a patient room to have access to natural light). 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. Artificial lighting strategies. The Illuminating Engineering Society (IES) has developed two publications that apply to health care facilities. ANSI/IES RP-29: *Recommended Practices for Lighting for Hospitals and Health Care Facilities* addresses lighting for the general population and special lighting for medical procedures. ANSI/IES RP-28: *Recommended Practices forLighting and the Visual Environment for Senior Living* addresses the special lighting needs of older adults.

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

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

g. Indirect lighting should be considered to reduce glare.

*__1.2-4.4.2 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

A1.2-4.4.2 Views of and access to nature

a. Ideally, the design for a health care 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. Hospitals 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 interdisciplinary design team.

d. Cultural responsiveness to community-specific issues such as demographic density in urban, suburban and rural communities should be considered. Also consider the clinical function being served (e.g., pediatrics, geriatrics, oncology, obstetrics).

e. 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).

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

g. 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.

h. 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.

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

*__1.2-4.4.3 Wayfinding__

How clarity of access will be provided for the entire campus or facility using a wayfinding system

A1.2-4.4.3 Wayfinding

a. Entry points to all hospitals and outpatient facilities 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 at major decision points in the building. 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 not related 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.

*__1.2-4.4.4 User Control of Environment__

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

A1.2-4.4.4 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.

—Patients should have control at bedside of over-bed, ceiling, and/or wall sconce lighting.

—Patients should have control of varied lighting in patient bathrooms.

—Staff should have control of varying lighting levels in corridors outside patient rooms, at caregiver substations, and at central caregiver stations to ensure that patient sleep is not disturbed by general lighting not under the control of patients/visitors.

—In single-bed rooms, it is preferable for patients to be able to control access to natural light from the bedside.

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 a negative 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. Noisy equipment and systems should be controllable at bedside whenever possible and appropriate. 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.

*1.2-4.4.5 Privacy and Confidentiality

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

A1.2-4.4.5 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.

d. In facilities with multi-bed rooms, family consultation rooms, grieving rooms, and/or private alcoves in addition to family lounges should be provided to permit patients and families to communicate privately.

e. In multi-bed rooms or other areas where privacy cannot be ensured, patients and/or staff should have smart technology (e.g., notebook, keyboard-TV screen) available as an alternative to verbal communication.

*1.2-4.4.6 Security

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

A1.2-4.4.6 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 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 a health care 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.

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

*1.2-4.4.7 Surfaces for 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

A1.2-4.4.7 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 health care facilities. See appendix sections A2.1-7.2.3 (Characteristics and criteria for selecting surface and furnishing materials and products) and A2.1-7.2.4-a (Characteristics and criteria for selecting furnishing materials and products) for details on selecting surface materials for hospitals.

*1.2-4.4.8 Cultural Responsiveness

How the project addresses and/or responds to local or regional cultural considerations

A1.2-4.4.8 Cultural responsiveness

a. Organizational culture is defined by the history of the organization, leadership philosophy, management style, and caregivers' dispositions.

b. Regional culture is defined by the physical location and demographics (including age, nationality, religion, and economics) of the communities served.