1.2 Environment of Care

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

1 General Considerations

The goal of the Environment of Care chapter is to identify overall environment of care components (including key elements of the physical environment) and functional requirements that directly affect the experience of all people involved in the health care delivery system. These components and requirements influence patient outcomes and satisfaction, dignity, privacy, confidentiality, and safety, and the incidence of medical errors, patient and staff stress, and facility operations. (While the environment of care is the focus of this chapter, it is also an element in individual chapters where the demonstrated value and necessity of such features are unique to individual requirements.)

1.1 Applicability

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

*1.2 Framework for Health Facility Design

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.

2 Functional Program

2.1 Requirements

The health care provider shall supply for each project a functional program for the facility that describes the purpose of the project, environment of care components (including key elements of the physical environment), functional requirements, and other basic information related to fulfillment of the institution's objectives, including but not limited to the projected demand or utilization, staffing patterns, departmental relationships, and space requirements. Projects that only involve equipment replacement, fire safety upgrades, or minor renovations do not require a functional program.

2.1.1 Required Services

A description of those services necessary for the complete operation of the facility shall be provided in the functional program.

2.1.2 Environment of Care Components

The relationships between the following environment of care components (including key elements of the physical environment) and the functional requirements shall be addressed in the functional program:

***2.1.2.1** Delivery of care model (concepts)

(1) The delivery of care model shall be defined in the functional program.

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A1.2 Framework for Health Facility Design

The care environment is constituted by those features in a built health care entity 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, facilities 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, design should make every effort to enhance the performance, productivity, and satisfaction of the staff in order to promote a safe environment of care.

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

A2.1.2.1 Delivery of care model (concepts)

Examples of delivery of care models include patient-focused care, family-centered care, and community-centered care.

(2) The functional program shall support the delivery of care model to allow the design of the physical environment to respond appropriately.

2.1.2.2 Facility and service users (people). The physical environment shall support the facility and service users in their effort to administer the delivery of care model.

***2.1.2.3** Systems design. The physical environment shall support organizational, technological, and building systems designed for the intended delivery of care model.

***2.1.2.4** Layout/operational planning. The layout and design of the physical environment shall enhance operational efficiencies and the satisfaction of patients or residents, families, and staff.

2.1.2.5 Physical environment. The physical environment shall be designed to support the intended delivery of care model and address the key elements listed below:

*(1) Light and views. Use and availability of natural light, illumination, and views shall be considered in the design of the physical environment.

*(2) Clarity of access (wayfinding). Clarity of access shall be addressed in the overall planning of the facility, individual departments, and clinical areas.

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A2.1.2.3 Systems design
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.

A2.1.2.4 Layout/operational planning
Criteria for evaluation of the layouts should be consistent with the delivery of care model to allow each optional layout and operational plan to be reviewed appropriately.

A2.1.2.5 (1) Light and views
Natural light, views of nature, and access to the outdoors should be considered in the design of the physical environment wherever possible.

a. Siting and organization of the building should respond to and prioritize unique natural views and other natural site features.

b. Access to natural light should be achieved without going into private spaces (i.e., staff should not have to enter a patient/resident room to have access to natural light). Examples include windows at the ends of corridors, skylights into deep areas of the building in highly trafficked areas, transoms, and door sidelights.

c. In residential health care occupancies, dining areas, lounges, and activity areas should be designed to include natural light.

d. Hospitals and long-term care 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 a component of the functional program, as appropriate.

e. Artificial lighting strategies. The Illuminating Engineering Society of North America (IESNA) has developed two publications that apply to health care facilities; both are American National Standards Institute (ANSI) standards. ANSI/IESNA RP-29, Lighting for Hospitals and Health Care Facilities addresses lighting for the general population and special lighting for medical procedures. ANSI/IESNA RP-28, Lighting and the Visual Environment for Senior Living addresses the special lighting needs of older adults.

f. Lamp selection should address color rendering properties.

A2.1.2.5 (2) Clarity of access (wayfinding)
a. Entry points to the medical facility should be clearly defined from all major exterior circulation modes (roadways, bus stops, vehicular parking).

b. Clearly visible and understandable signage and visual landmarks for orientation should be provided.

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

d. A system of interior "landmarks" should be developed to aid occupants in cognitive understanding of destinations. These may include 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.

e. Signage systems should be flexible, expandable, adaptable, and easy to maintain.

*(3) Control of environment. Patient/resident/staff ability to control their environment shall be addressed in the overall planning of the facility consistent with the functional program.

*(4) Privacy and confidentiality. The level of patient or resident privacy and confidentiality shall be addressed in the overall planning of the facility consistent with the functional program.

*(5) Safety and security. The safety and security of patients or residents, staff, and visitors shall be addressed in the overall planning of the facility consistent with the functional program.

*(6) Finishes. The effect of materials, colors, textures, and patterns on patients or residents, staff, and visitors shall be considered in the overall planning and design of the facility. Maintenance and performance shall be considered when selecting these items.

*(7) Cultural responsiveness. The culture of patients or residents, staff, and visitors shall be considered in the overall planning of the facility.

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A2.1.2.5 (3) Control of environment

a. Every effort should be made to allow individual control over as many elements of the environment as possible and reasonable, including but not limited to temperature, lighting, sound, and privacy.

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

c. Building design should address individual control over the thermal environment through carefully considered zoning of mechanical systems.

d. Noise has been proven to be a negative environmental stressor for patients, families, and staff. Noise should be minimized by the design of the physical environment and the selection of operational systems and equipment.

A2.1.2.5 (4) Privacy and confidentiality

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.

A2.1.2.5 (5) Safety and security

a. Attention should be given to balancing readily accessible and visible external access points to the facility 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 medical facility is neither possible nor appropriate, safety within the facility should also be addressed through the design of circulation paths and functional relationships. Provisions for securing the personal belongings of staff, visitors, and patients or residents should be addressed.

c. The physical environment should be designed to support the overall safety and security policies and protocols of the institution. Safety and security monitoring, when provided, should respect patient privacy and dignity.

A2.1.2.5 (6) Finishes

a. In any design project, the selection of a color palette should be based upon many factors, including the building population, anticipated behavior in the space, time of encounter, and level of stress. The color palette selected should be suitable and appropriate for the specific environment, taking into account the specific activities conducted in that environment.

b. Finishes and color palettes should respond to the geographic location of the health care facility, taking into account climate and light, regional responses to color, and the cultural characteristics of the community served.

A2.1.2.5 (7) Cultural responsiveness

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

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

*(8) Water features. Where provided, open water features shall be equipped to safely manage water quality to protect occupants from infectious or irritating aerosols.

***2.1.2.6** Design process and implementation. Groups (stakeholders) affected by and integral to the design shall be included in the planning and implementation process.

2.1.3 Functional Requirements

The facility shall incorporate the following information into the functional program commensurate with the scope and purpose of the project.

2.1.3.1 The size and function of each space and any other design feature

(1) Include the projected occupant load, numbers and types of staff, patients, residents, visitors, and vendors.

(2) Describe the types and projected numbers of procedures for treatment areas.

2.1.3.2 Equipment requirements

(1) Describe building service equipment.

(2) Describe fixed and movable equipment.

2.1.3.3 Circulation patterns

(1) Describe the circulation patterns for staff, patients or residents, and the public.

(2) Describe the circulation patterns for equipment and clean and soiled materials.

(3) Where circulation patterns are a function of asepsis control requirements, note these features.

2.1.3.4 Consideration of potential future expansion that may be needed to accommodate increased demand

2.2 Nomenclature

2.2.1 Use the same names for spaces and departments as used in these Guidelines. If acronyms are used, they shall be clearly defined.

2.2.2 The names and spaces indicated in the functional program shall be consistent with the submitted floor plans.

2.3 Use

2.3.1 Following approval, the functional program shall be made available for use in the development of project design and construction documents.

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

*3 Sustainable Design

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

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A2.1.2.5 (8) Water features

Fountains and other open decorative water features may represent a reservoir for opportunistic human pathogens; thus, they are not recommended for installation within any enclosed spaces in health care environments.

a. If a water feature is provided, the design should limit human contact with the water and/or allow for the application of water disinfection systems. Materials used to fabricate the water feature should be resistant to chemical corrosion. Water features should be designed and constructed to minimize water droplet production. Exhaust ventilation should be provided directly above the water feature.

b. If aquariums are used, they should be enclosed to prevent patient or visitor contact with the water. Aquariums are not subject to exhaust ventilation recommendations.

A2.1.2.6 Design process and implementation

An interdisciplinary design team should be assembled as early as possible in the design process. The design team should include but not be limited to administrators, clinicians, infection control specialists, safety officers, support staff, patient advocates/consumers, A/E consultants, and construction specialists. (Also see Section 1.5–A1.3.)

3.1 Components

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

*3.1.1 Site Selection and Development

Design to minimize negative environmental impacts associated with buildings and related site development.

*3.1.2 Waste Minimization

Design to support the minimization of waste in construction and operation.

*3.1.3 Water Quality and Conservation

3.1.3.1 Evaluate potable water quality and conservation in all phases of facility development or renovation.

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

*3.1.4. Energy Conservation

Proper planning and selection of mechanical and electrical systems, as well as efficient utilization of space and climatic characteristics, can significantly reduce overall energy demand and consumption.

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A3 Sustainable Design

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.

The U.S. Green Building Council's LEED® Green Building Rating System (www.usgbc.org) has established a third-party certification framework for the design of sustainable buildings; the Green Guide for Health Care™ (www.gghc.org) is a voluntary self-certification metric tool that specifically addresses the health care sector. An increasing number of states and municipalities have individual high performance guidelines or standards. These tools establish "best practice" criteria for site design, water and energy usage, materials, and indoor environmental quality.

To meet these objectives, 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 design considerations from project inception.

A3.1.1 Site Selection and Development

Site development considerations include land use, storm water management, habitat preservation, landscape design and irrigation systems, and effects from heat islands.

A3.1.2 Waste Minimization

A 1998 memorandum of understanding between the Environmental Protection Agency (EPA) and the American Hospital Association (AHA) targeted a 33 percent reduction in solid waste by 2005, 50 percent by 2010. As hospitals develop environmentally perferable purchasing standards and implement significant recycling programs to achieve this goal, facilities should consider the space needs associated with these activities.

A3.1.3 Water Quality and Conservation

Potable water consumption reductions may be achieved through the use of low consumption fixtures and controls, landscape design (xeriscaping) and irrigation systems, and replacement of potable water sources for items such as water-cooled pumps and compressors, with non-potable sources or non-evaporative heat rejection equipment (air cooled or ground source).

A3.1.4 Energy Conservation

Health care facilities should consider energy conservation strategies that include but are not limited to the following examples:

1. On major new projects, consider the use of computer modeling to assist in developing and assessing energy conservation strategies and opportunities.

2. Reduce overall energy demand. Examples of strategies include high-efficiency building envelope; low-energy sources of lighting (including use of daylighting); advanced lighting controls; use of high-efficiency equipment, both as part of building mechanical/electrical systems (chillers, air handlers) and for plug loads (EnergyStar copiers, computers, medical equipment).

3. Optimize energy efficiency. Mechanical/electrical control systems should optimize consumption to the minimum actual needs of the building. Consider co-generation systems for converting natural gas to both heat (or cooling) and electricity. Select equipment with improved energy efficiency ratings.

4. 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.

3.1.4.1 Energy conservation shall be considered in all phases of facility development or renovation. Architectural elements that reduce energy consumption shall be considered as part of facility design.

3.1.4.2 The quality of the health care facility environment must be supportive of the occupants and function served. Therefore, design for energy conservation shall not adversely affect patient health, safety, or accepted personal comfort levels.

*3.1.5. Indoor Air Quality

3.1.5.1 The impact of building design and construction on indoor air quality shall be addressed.

3.1.5.2 Impact from both exterior and interior air-contamination sources shall be minimized.

3.1.6. Environmental Impact of Selected Building Materials

The environmental impacts associated with the life cycle of building materials shall be addressed.

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A3.1.5 Indoor Air Quality

Carpeting, upholstery, paint, adhesives, and manufactured wood products may emit volatile organic compounds (VOCs), including formaldehyde and benzene. Substitute low or zero VOC paints, stains, adhesives, sealants, and other construction materials, where practical, for building products that emit formaldehyde and other known carcinogens and irritants.

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

High-volume photocopiers, portable sterilizing equipment, and aerosolized medications have been identified as important sources of indoor air pollution in health care settings. Dedicated exhaust ventilation may be necessary for specialty areas such as housekeeping, copying rooms, sterilization areas, etc., in which such chemical use occurs.