

***2. ENVIRONMENT OF CARE**

In this edition appendix material appears in the main body of the document; however, it remains advisory only.

~~2.1 Energy and Other Resource Conservation~~

~~The importance of energy conservation shall be considered in all phases of facility development or renovation. Proper planning and selection of mechanical and electrical systems, as well as efficient utilization of space and climatic characteristics, can significantly reduce overall energy consumption. The quality of the health care facility environment must, however, be supportive of the occupants and functions served. Design for energy conservation shall not adversely affect patient health, safety, or accepted personal comfort levels. New and innovative systems that accommodate these considerations while preserving cost effectiveness are encouraged. Architectural elements that reduce energy consumption shall be considered part of facilities design.~~

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~~For access to research on the effects of the built environment on health outcomes and related information, contact the Center for Health Design at 3470 Mt. Diablo Boulevard, Suite A-150, Lafayette, CA 94549; (925) 299-3631, or view the Center's Web site at www.healthdesign.org.~~

2.1 General

The built environment has a profound impact on health, productivity, and our 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 considers the larger context of enhanced patient environment, employee effectiveness, and resource stewardship.

The goal of the Environment of Care chapter is to identify overall components and specific key elements that directly affect the experience in the health care delivery system. These components and key elements influence patient outcomes and satisfaction, dignity, privacy, confidentiality, safety, medical errors, stress, and impact operations.

While the environment of care is the focus of this chapter, it is also an element of individual chapters where the demonstrated value and necessity of such features are identified and unique to individual requirements.

2.1.A. Functional Program

The health care provider shall supply for each project a functional program for the facility that describes the purpose of the project, the projected demand or utilization, staffing patterns, departmental relationships, space requirements, environment of care components, key elements, and other basic information related to fulfillment of the institution's objectives.

The functional program shall include a description of those services necessary for the complete operation of the facility.

The program shall address the size and function of each space and any other design feature. Include the projected occupant load, numbers and type of staff, patients, residents, visitors and vendors. In treatment areas, describe the types and projected numbers of procedures.

Describe the circulation patterns for staff, patients or residents, and the public. Describe also the circulation patterns for equipment and clean and soiled materials. Address equipment requirements; describe building service equipment and fixed and moveable equipment. Where circulation patterns are a function of asepsis control requirements, note these features.

The program shall use the same names for spaces and departments as used in the Guidelines. If acronyms are used, they shall be clearly defined.

The functional program shall address potential future expansion that may be needed to accommodate increased demand.

The approved functional program shall be made available for use in the development of project design and construction documents.

The functional program shall be retained by the facility with other design data to facilitate future alterations, additions, and program changes.

2.2 Components of the Functional Program

The following environment of care components and key elements shall be included in the functional program:

***2.2.A. Delivery of Care Model (Concepts)**

The delivery of care model shall be defined in the functional program. The functional program shall support the delivery of care model to allow the design of the physical environment to respond appropriately.

***2.2.B. 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.

***2.2.C. Systems**

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

***2.2.D. Layouts/Operational Planning**

The design of the physical environment shall enhance patient/family and staff satisfaction and operational efficiencies

2.2.E. Physical Environment

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

*2.2.E1. Light and views. Use and availability of natural light, illumination, and views shall be considered in the design of the physical environment.

*2.2.E2. Clarity of access (wayfinding). Clarity of access shall be addressed in the overall planning of the facility, individual departments, and clinical areas.

*2.2.E3. 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.

*2.2.E4. Privacy/confidentiality. Patient/resident level of privacy/confidentiality shall be addressed in the overall planning of the facility consistent with the functional program.

*2.2.E5. Safety/security. Patient/resident/staff/visitor safety and security shall be addressed in the overall planning of the facility consistent with the functional program.

*2.2.E6. Finishes. The effect on patients/residents/staff/visitors of materials, colors, textures, and patterns shall be considered in the overall planning and design of the facility. Maintenance and performance shall be considered when selecting these items.

*2.2.E7. Cultural responsiveness. The culture of patients/residents/staff/visitors shall be considered in the overall planning of the facility.

*2.2.E8. Water features. Where provided, open water features shall be equipped to safely treat water and protect occupants from infectious or irritating aerosols.

***2.2.F. Design Process and Implementation**

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

***2.3 Sustainable Design**

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

***2.3.A. Components**

The basic components of sustainable design are:

*2.3.A1. Site selection and development. Design to minimize negative environmental impacts associated with buildings and related site development.

2.3.A2 Waste minimization. Design to support the minimization of waste in construction and operation.

2.3.A3 Water quality and conservation. Evaluate potable water quality and conservation in all phases of facility development or renovation. Design for water conservation shall not adversely affect patient health, safety, or infection control.

2.3.A4 Energy conservation. Consider energy conservation in all phases of facility development or renovation. 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. The quality of the health care facility environment must, however, be supportive of the occupants and function served. Design for energy conservation shall not adversely affect patient health, safety, or accepted personal comfort levels. Architectural elements that reduce energy consumption shall be considered part of facilities design.

2.3.A5. Indoor air quality. The impact of building design and construction on indoor air quality shall be addressed. Minimize impact from both exterior and interior air-contamination sources.

2.3.A6. Impact of selected building materials. Address the environmental impacts associated with the life cycle of building materials.

*2.3.B. Waste Reduction

*2.3.C. Water Conservation

*2.3.D. Energy Conservation

*2.3.E. Indoor Air Quality

*2.3.F. Impact of Selected Building Materials

A2.2.A Delivery of Care Model (Concepts)

Examples of delivery of care models include Patient Focused Care, Family Centered Care, Community Centered Care.

A2.2.B. Facility and Service Users (People)

A2.2.C. Systems

Physical relationships between services or new aggregation 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.

A2.2.D. Layouts/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.

A2.2.E1. Light and views. The quality of artificial and natural light, as well as an awareness of the exterior environment, can all have an impact on clinical outcomes, staff productivity, and the level of stress.

a. Maximize natural light, views, and access to the outdoors, as appropriate.

(1) 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.

(2) Hospitals and long term care facilities should provide a garden or other controlled exterior space, accessible to building occupants.

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

b. Artificial lighting strategies. The Illuminating Engineering Society of North America (IESNA) recommends solutions in health facilities. Details can be found in IESNA RP-29-95, Recommended Practice: Lighting for Hospitals and Health Care Facilities. Lamp selection should address color rendering properties.

A.2.2.E2. 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.

A2.2.E3. 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, 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.

A2.2.E4. Privacy/confidentiality

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

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

A2.2.E5. 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/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.

A2.2.E6. 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.

A2.2.E7. Cultural responsiveness

a. Organizational culture is defined by the history of the organization, leadership philosophy, management style, and care givers disposition.

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

A2.2.E8. Water features. Open decorative water features such as fountains may represent a reservoir for opportunistic human pathogens; thus they are not recommended for installation within any enclosed spaces of health care environments. The design should limit contact with the water by enclosing the water feature. The basin should be designed to be resistant to chemical corrosion with minimal droplet production. Exhaust ventilation should be provided directly above the water feature.

A2.2.F. 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, safety officers, support staff, patient advocates/consumers, A/E consultants, and construction specialists.

A2.3 Sustainable Design

A growing body of knowledge is available to assist design professionals and health care organizations in understanding how buildings affect human health, how they affect the environment, and how these effects can be mitigated through a variety of strategies. Sustainable design and development tools such as the U.S. Green Building Council's LEED Green Building Rating System and Green Guidelines for Health Care Construction have established a strong framework for design of sustainable buildings. These rating systems 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 integrated design process to guide facility design. The intent of an integrated design process is to improve building performance by integrating design elements from project inception.

A2.3A Site Development Impacts

Site development impacts encompass land use, storm water management, habitat preservation, landscape design and irrigation systems, and heat island impacts.

A2.3B Waste Reduction

A 1998 memorandum of understanding between the EPA and the AHA targeted a 33 percent reduction in solid waste by 2005, 50 percent by 2010. As hospitals develop environmental preferable purchasing standards and implement significant recycling programs to achieve this goal, facilities should consider the space needs associated with these activities.

A2.3C Water 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).

A2.3.D. Energy Conservation

Health care facilities should consider strategies including but not limited to the following examples. On major new projects, consider the use of computer modeling to assist in developing and assessing energy conservation strategies and opportunities.

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).

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.

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

A2.3.E Indoor Air Quality

Carpeting, upholstery, “wet” building products, 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, and phase out building products containing formaldehyde and other known carcinogens and irritants.

Specify permeable wall covering, mold-resistant drywall, and other materials to prevent trapping moisture and promoting bacteria growth.

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

A2.3.F Impact of Selected Building Materials

Increase use of recycled content and recyclable materials in buildings, which have a known destination at the end of their useful life other than landfills.

Building materials and products can impact the global environment. CFCs and persistent bioaccumulative toxics (PBTs) are examples of chemicals that have been the target of international, national, and local environmental elimination initiatives. Reduce or eliminate the use of building materials that generate or utilize PBTs in their life cycle where cost effective alternatives that meet or exceed required performance standards are available. Chemicals commonly addressed in PBT elimination policies that have direct links with building materials include cadmium, lead, mercury, dioxins, and PCBs (polychlorinated biphenyls), either used as an additive in building materials or unavoidably produced and released into the environment during the life cycle of the material.