GUIDELINES FOR
CONSTRUCTION
AND EQUIPMENT OF

1992-93 HOSPITAL AND MEDICAL FACILITIES

■ The American Institute of Architects Committee on Architecture for Health with assistance from the U.S. Department of Health and Human Services

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PREFACE

This is the latest in a 45-year series of guidelines to aid in the design and construction of hospital and medical facilities.

The original *General Standards* appeared in the *Federal Register* on February 14, 1947, as part of the implementing regulations for the Hill-Burton program. The standards were revised from time to time as needed. In 1973, the document was retitled *Minimum Requirements of Construction and Equipment for Hospital and Medical Facilities* to emphasize that the requirements were generally minimum, rather than recommendations of ideal, standards.

Sections 603(b) and 1620(2) of the Public Health Service Act require the secretary of the Department of Health and Human Services (HHS) to prescribe by regulation general standards of construction, renovation, and equipment for projects assisted under Title VI and Title XVI, respectively, of the act. Since Title VI and Title XVI grant and loan authorities have expired, there is no need to retain the standards in regulation.

In 1984, HHS removed from regulation the requirements relating to minimum standards of construction, renovation, and equipment of hospitals and other medical facilities, as cited in the *Minimum Requirements*, DHEW Publication No. (HRA) 81-14500. To reflect the nonregulatory status, the title was changed to *Guidelines for Construction and Equipment of Hospital and Medical Facilities*.

It is emphasized that projects with respect to which applications were approved or grants awarded under Titles VI and XVI, but for which full project reimbursement has not yet been made, may be subject to continuing compliance with the *Guidelines* as incorporated by reference in the Code of Federal Regulations, Title 42, Parts 53 and 124, at the time of the initial approval.

The *Guidelines* will be used by HHS to assess Department of Housing and Urban Development Section 242 applications for hospital mortgage insurance and the Indian Health Service construction projects. The *Guidelines* may also be used by other entities, such as state licensure agencies. For this reason, regulatory language was retained. The 1992–93 edition of the *Guidelines* follows these principles. Explanatory and guide material is included in appendices A and B, neither of which is mandatory.

The Health Care Financing Administration, within the Department of Health and Human Services, is supporting the efforts of the 1992–93 *Guidelines* both financially and with support staff. HCFA has the responsibility for the reimbursement and operation of the Medicare and Medicaid Programs. Hospital construction and costs are directly related to the charge of HCFA's mission. Although HCFA is not adopting the *Guidelines* as regulations, the agency does concur with the construction recommendations.

This edition of the *Guidelines* reflects the work of advisory groups from private, state, and federal sectors, representing expertise in design, operation, and construction of health facilities. Advisory group members reviewed the 1987 edition of the *Guidelines* line by line, revising details as necessary to accommodate current health care procedures and to provide a desirable environment for patient care at a reasonable facility cost.

As in the past, the *Guidelines* standards are performance oriented for desired results. Prescriptive measurements, where given, have been carefully considered relative to generally recognized standards and do not require detail specification. For example, experience has shown that it would be extremely difficult to design a patient bedroom smaller than the size suggested and have space for functions and procedures that are normally expected.

Authorities adopting the *Guidelines* standards should encourage design innovations and grant exceptions where the intent of the standards is met. These standards assume that appropriate architectural and engineering practice and compliance with applicable codes will be observed as part of normal professional service and require no separate detailed instructions.

In some facility areas or sections, it may be desirable to exceed the *Guidelines* standards for optimum function. For example, door widths for inpatient hospital rooms are noted as 3 feet 8 inches, which satisfies most applicable codes, to permit passage of patient beds. However, wider widths of 3 feet 10 inches or even 4 feet may be desirable to reduce damage to doors and frames where frequent movement of beds and large equipment may occur. The decision to exceed the standards should be made by the individuals involved.

As in previous editions, details of plan preparation, specifications, engineering procedures, etc., are omitted. These may appear in other technical manuals. Instances where details are mentioned are for emphasis only.

This publication supersedes DHHS Publication No. (HRS-M-HF) 84-1, DHEW Publication No. (HRA) 79-14500, DHEW Publication No. (HRA) 76-4000, and the 1987 edition of the *Guidelines*.

Inquiries or questions on the *Guidelines* may be addressed to the following groups:

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Washington, D.C. 20006

Health Resources and Services Administration
Bureau of Maternal and Child Health and Resources Development
Division of Assistance and Recovery
5600 Fishers Lane, Room 11A-19
Rockville, Maryland 20857

Office of Engineering Services
PHS Region II
26 Federal Plaza
New York, New York 10267

MAJOR ADDITIONS AND REVISIONS

The general format and technical content follow the previous document, *Guidelines for Construction and Equipment of Hospital and Medical Facilities*, 1987 edition. An Appendix A was added to separate minimum standards from explanatory or educational material, so that this document may be adopted as requirements by authorities having jurisdiction or used as a basic guide for other standards. An asterisk (*) before a paragraph number indicates that explanatory or educational material related to this paragraph is found in Appendix A. Changes from the 1987 *Guidelines* are marked in this edition with beginning (▼) and ending (▲) arrows.

Many changes, too numerous to mention, were made to correct errors, clarify intent, and generally update the standards. Listed below, however, are major additions and revisions made in conformance with current, minimum needs and state-of-the-art medical and design procedures:

1. There are five entirely new sections: Section 7.3.E, Newborn Intensive Care Units; Section 9.7, Freestanding Birth Center; Section 9.8, Freestanding Outpatient Diagnostic and Treatment Facility; Section 11, Psychiatric Hospital; and Section 12, Mobile, Transportable, and Relocatable Units. These sections establish minimum standards for the designated type of facility. Additional guide material may be found in Appendix A.
2. Section 1.2. The title "Modernization" was changed to "Renovation." The section states that all new work shall comply, insofar as practicable, with these Guidelines and with appropriate parts of the Life Safety Code, NFPA 101, covering Health Care Occupancies.
3. Section 1.3, Design Standards for the Disabled, was changed to state that all public, private, and public service hospitals must comply with the Americans with Disabilities Act (ADA) and that United States government facilities must comply with the Uniform Federal Accessibility Standards (UFAS).
4. Section 7.2.A, Patient Rooms, was changed to permit a maximum of two patients per room and to require a minimum of 100 square feet per bed in multibed rooms and 120 square feet in single rooms in all new construction. Renovation projects may continue to use four-patient bedrooms, if they are existing, and to use 80 square feet per bed in multibed rooms and 100 square feet in singles.
5. Sections 7.2.C and 7.2.D have replaced the old requirements for Isolation Rooms with Infectious Isolation Rooms and Protective Isolation Rooms.
6. Section 7.3, Intensive Care, was changed to Critical Care, and the required area increased to 150 sq. ft. per bed in new construction. Renovation projects may use the old requirement of 120 sq. ft. in single rooms and 100 sq. ft. per bed in multibed critical care units.
7. Section 7.5, Pediatric and Adolescent Unit, maximum occupancy was reduced to four patients per room and the minimum size increased to 100 sq. ft. per bed in multibed rooms and 120 sq. ft. in single rooms in new construction. In renovation projects, the old requirements of 80 sq. ft. per bed in multibed rooms and 100 sq. ft. in single rooms are approvable.
8. Section 7.7.A, Surgery, increased the minimum areas of surgical procedure rooms in new construction as follows:
   - General operating rooms from 360 sq. ft. to 400 sq. ft.
   - Orthopedic operating rooms from 360 sq. ft. to 600 sq. ft.
   - Cardiovascular and neurological operating rooms from 400 sq. ft. to 600 sq. ft.
   - Surgical cystoscopy from 250 sq. ft. to 350 sq. ft.
   - Renovation projects may continue to use the old minimum area requirements.
9. Section 7.7.B, Recovery Room, was changed to Post-Anesthetic Care Unit, and a new minimum area requirement of 80 sq. ft. per bed was added.
10. Section 7.8, Obstetrical Facilities. Postpartum bedrooms have been moved to this section. The maximum number of patients per room and minimum area per bed requirements for all patient rooms in new construction apply as do the renovation exceptions. The minimum area per labor bed was increased from 100 sq. ft. per bed to 120 sq. ft. per bed. Renovation projects may use the old requirement.

    The minimum area for LDR and LDRP facilities was increased from 200 sq. ft. to 250 sq. ft. in new construction. Renovation projects may continue to use 200 sq. ft.

11. Section 7.9.8, Definitive Emergency Care. The minimum size of the trauma/cardiac rooms was increased from 240 sq. ft. to 250 sq. ft. in new construction. In renovation projects, the old figure is approvable. Two new added requirements are for at least one infectious isolation room and one holding/seclusion room in each emergency department.

12. Table 2 (previously table 3). The format was changed to have categories grouped under headings, but the table is otherwise essentially unchanged. Table 5 has been revamped to eliminate the need for a key and is cross-referenced to the appropriate section containing basic requirements for the room or service.

13. Section 8 has been retitled Nursing Facilities and is now a complete section on its own, including Table 6, ventilation; Table 7, filter efficiencies; Table 8, hot water use; and Table 10, illuminance.

ACKNOWLEDGMENTS

The Committee on Architecture for Health (CAH) of the American Institute of Architects (AIA) was privileged to convene and work with an interdisciplinary committee to revise the *Guidelines for Construction and Equipment of Hospital and Medical Facilities*. This is the second revision cycle for which the CAH/AIA has been honored to serve in this capacity. They played a major role in the preparation of this edition.

These revised *Guidelines* are the result of many hours of concentrated work by dedicated professionals concerned with the health care industry from private practice, professional organizations, and state and federal agencies. More than 2,000 proposals for change and comments on proposed changes were received and processed by the CAH at three meetings held in Washington D.C., Chicago, and San Diego. Approximately 50 members attended each meeting and gave serious and full consideration to all written comments and proposals. The AIA wishes to express its sincere gratitude to all who sent comments and to those organizations whose representatives served on the Guidelines Revision Committee.

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1. INTRODUCTION

1.1 General

1.1.A.
This document contains information intended as model standards for constructing and equipping new medical facility projects. For brevity and convenience these standards are presented in "code language." Use of words such as *shall* is mandatory only where applied by an adopting authority having jurisdiction. Insofar as practical, these standards relate to desired performance or results or both. Details of construction and engineering are assumed to be part of good design practice and
▼ local building regulations. Design and construction shall conform to the requirements of these Guidelines. Requirements set forth in these Guidelines shall be considered as minimum. For aspects of design and construction not included in these Guidelines, local governing building codes shall apply. Where there is no local governing building code, the prevailing model code used within the geographic area is hereby specified for all requirements not otherwise specified in these Guidelines. (See Section 1.4 for wind and seismic local requirements.)

Where ASCE 7-92 is referenced, similar provisions in the model building code are considered substantially
▲ equivalent.

1.1.B.
This document covers health facilities common to communities in this country. Facilities with unique services will require special consideration. However, sections herein may be applicable for parts of any facility and may be used where appropriate.

▼ **1.1.C.**
The model standards are not intended to restrict innovations and improvements in design or construction techniques. Accordingly, authorities adopting these standards as codes may approve plans and specifications which contain deviations if it is determined that the respective intent or objective has been met. Final implementation may be subject to requirements of the authority having jurisdiction.

1.1.D.
Some projects may be subject to the regulations of several different programs, including those of state, local, and federal authorities. While every effort has been made for coordination, individual project requirements should be verified, as appropriate. Should requirements be conflicting or contradictory, the authority having pri-
▲ mary responsibility for resolution should be consulted.

1.1.E.
The Health Care Financing Administration, which is responsible for Medicare and Medicaid reimbursement, has adopted the National Fire Protection Association 101 Life Safety Code (NFPA 101). Facilities participating in Medicare and Medicaid programs shall comply with that code.

1.1.F.
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, and other basic information relating to fulfillment of the institution's objectives. This program may include a description of each function or service; the operational space required for each function; the quantity of staff or other occupants of the various spaces; the numbers, types, and areas (in net square feet) of all spaces; the special design features; the systems of operation; and the interrelationships of various functions and spaces. The functional program should include a description of those services necessary for the complete operation of the facility. Those services available elsewhere in the institution or community need not be duplicated in the facility. The functional program should also address the potential future expansion of essential services which 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.

1.2 Renovation

1.2.A.
Where renovation or replacement work is done within an existing facility, all new work or additions, or both, shall comply, insofar as practical, with applicable sections of these Guidelines and with appropriate parts of NFPA 101, covering New Health Care Occupancies. Where major structural elements make total compliance impractical or impossible, exceptions should be consid-
▼ ered. This does not guarantee that an exception will be granted, but does attempt to minimize restrictions on those improvements where total compliance would not substantially improve safety, but would create an unreasonable hardship. These standards should not be construed as prohibiting a single phase of improvement.

(For example, a facility may plan to replace a flammable ceiling with noncombustible material but lacks
▲ funds to do other corrective work.) However, they are not intended as an encouragement to ignore deficiencies when resources are available to correct life-threatening problems. (See Section 1.4.A.)

1.2.B.
When construction is complete, the facility shall satisfy functional requirements for the appropriate classification (general hospital, skilled nursing facility, etc.) in an environment that will provide acceptable care and safety to all occupants.

1.2.C.
In renovation projects and those making additions to existing facilities, only that portion of the total facility affected by the project shall comply with applicable sections of the Guidelines and with appropriate parts of NFPA 101 covering New Health Care Occupancies.

1.2.D.
Those existing portions of the facility which are not included in the renovation but which are essential to the functioning of the complete facility, as well as existing building areas that receive less than substantial amounts of new work shall, at a minimum, comply with that section of NFPA 101 for Existing Health Care Occupancies.

1.2.E.
Conversion to other appropriate use or replacement should be considered when cost prohibits compliance with acceptable standards.

1.2.F.
When a building is converted from one occupancy to another, it shall comply with the new occupancy requirements. For purpose of life safety, a conversion from a hospital to a nursing home or vice versa is not considered a change in occupancy.

1.2.G.
When parts of an existing facility essential to continued overall facility operation cannot comply with particular standards, those standards may be temporarily or permanently waived if patient care and safety are not jeopardized.

1.2.H.
Renovations, including new additions, shall not diminish the safety level that existed prior to the start of the work; however, safety in excess of that required for new facilities is not required to be retained.

1.2.I.
Nothing in these Guidelines shall be construed as restrictive to a facility that chooses to do work or alterations as part of a phased long-range safety improvement plan. It is emphasized that all hazards to life and safety and all areas of noncompliance with applicable codes and regulations, should be corrected as soon as possible in accordance with a plan of correction.

1.3 Design Standards for the Disabled

▼ In July of 1990, President Bush signed into law the Americans with Disabilities Act (ADA). This new law extends comprehensive civil rights protection to individuals with disabilities. Under Titles II and III of the ADA, public, private, and public service hospitals and other health care facilities will need to comply with the *Accessibility Guidelines for Buildings and Facilities* (ADAAG) for alterations and new construction. United States government facilities are exempt from the ADA as they must comply with the *Uniform Federal Accessibility Standards* (UFAS), which was effective August 7, 1984.

Also available for use in providing quality design for the disabled is the American National Standards Institute (ANSI) A117.1 *American National Standard for Accessible and Usable Buildings and Facilities.*

State and local standards for accessibility and usability may be more stringent than ADA, UFAS, or ANSI A117.1. Designers and owners, therefore, must assume responsibility for verification of all applicable requirements.

*1.4 Provisions for Disasters

In locations where there is a history of hurricanes, tornadoes, flooding, earthquakes, or other regional disasters, planning and design shall consider the need to protect the life safety of all health care facility occupants and the potential need for continuing services following such a disaster.

1.4.A. Wind and Earthquake Resistant Design for New Buildings
Facilities shall be designed to meet the requirements of the building codes specified in Section 1.1.A., provided these requirements are substantially equivalent to ASCE 7-92. Design shall meet the requirements of ASCE 7-92 Section 9.1.4.2, "Seismic Hazards Exposure Groups."

The following model codes and provisions are essentially equivalent to the ASCE 7-92 requirements:

1988 NEHRP Provisions
1991 ICBO Uniform Building Code
1992 Supplement to the BOCA National Building Code
1992 Amendments to the SBCC Standard Building Code

1.4.A1. For those facilities that must remain operational after a disaster, special design is needed to protect essential building services such as power, medical gas systems, and, in certain areas, air conditioning. In addition, consideration must be given to the likelihood of temporary loss of externally supplied power, gas, water, and communications.

1.4.A2. The owner shall provide special inspection during construction of seismic systems described in Section A.9.1.6.2 and testing in Section A.9.1.6.3 of ASCE 7-92.

1.4.A3. Roof coverings shall be securely fastened or ballasted to the supporting roof construction and shall provide weather protection for the building at the roof. Roof covering shall be applied on clean and dry decks in accordance with the manufacturer's instructions, these Guidelines, and related references. In addition to the wind force design and construction requirements specified, particular attention shall be given to roofing, glazing, and flashing details to minimize uplift and other damage that might allow entry of water that could seriously impair functioning of the building.

1.4.B.
Flood Protection, Executive Order No. 11296, was issued to minimize financial loss from flood damage to facilities constructed with federal assistance. In accordance with that order, possible flood effects shall be considered when selecting and developing the site. Insofar as possible, new facilities shall *not* be located on designated flood plains. Where this is unavoidable, consult the Corps of Engineers regional office for the latest applicable regulations pertaining to flood insur-
▲ ance and protection measures that may be required.

1.4.C.
Should normal operations be disrupted, the facility shall provide adequate storage capacity for, or a functional program contingency plan to obtain, the following supplies: food, sterile supplies, pharmacy supplies, linen, and water for sanitation. Such storage capacity or plans shall be sufficient for at least four continuous days of operation.

1.5 Codes and Standards

1.5.A.
Every health facility shall provide and maintain a safe environment for patients, personnel, and the public.

1.5.B.
References made in these Guidelines to appropriate model codes and standards do not, generally, duplicate wording of the referenced codes.

NFPA's standards, especially the NFPA 101, are the basic codes of reference; but other codes and/or standards may be included as part of these standards. In the absence of state or local requirements, the project shall also comply with approved nationally recognized building codes except as modified in the latest edition of the NFPA 101, and/or herein.

▼ Design standards for insuring accessibility for the handicapped may be based upon either ADA or UFAS, in accordance with the local authority having jurisdiction.
▲ Federally assisted construction shall comply with UFAS.

Referenced code material is contained in the issue current at the time of this publication. The latest revision of code material is usually a clarification of intent and/or general improvement in safety concepts and may be used as an explanatory document for earlier code editions. Questions of applicability should be addressed as the need occurs.

1.5.C. Equivalency
Insofar as practical, these model standards have been established to obtain a desired performance result. Prescriptive limitations, when given, such as exact minimum dimensions or quantities, describe a condition that is commonly recognized as a practical standard for normal operation. For example, reference to a room area is for patient, equipment, and staff activities; this avoids the need for complex descriptions of procedures for appropriate functional planning.

In all cases where specific limits are described, equivalent solutions will be acceptable if the authority having jurisdiction approves them as meeting the intent of these standards. *Nothing in this document shall be construed as restricting innovations that provide an equivalent level of performance with these standards in a manner other than that which is prescribed by this document, provided that no other safety element or system is compromised in order to establish equivalency.*

▼ National Fire Protection Association (NFPA) document 101M is a technical standard for evaluating equivalency to certain Life Safety Code 101 requirements. The Fire Safety Evaluation System (FSES) has become widely recognized as a method for establishing a safety level equivalent to the Life Safety Code. It may be useful for evaluating *existing* facilities that will be affected by renovation. For purposes of these Guidelines, the FSES
▲ is not intended to be used for *new* construction.

1.5.D. English/Metric Measurements
Metric standards of measurement are the norm for most international commerce and are being used increasingly in health facilities in the United States. Where measurements are a part of this document, English units are given as the basic standards with metric units in parenthesis.

1.5.E. List of Referenced Codes and Standards

Codes and standards which have been referenced in whole or in part in the various sections of this document are listed below. Names and addresses of originators are also included for information. The issues available at the time of publication are used. Later issues will normally be acceptable where requirements for function and safety are not reduced; however, editions of different dates may have portions renumbered or retitled. Care must be taken to insure that appropriate sections are used.

▼ American National Standards Institute. Standard A17.1 (ANSI A17.1), *American National Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Stairs.*

American Society of Civil Engineers. ASCE 9-72, formerly ANSI A58.1, *Minimum Design Loads for* ▲ *Buildings and Other Structures.*

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). *Handbook of Fundamentals.*

American Society of Heating, Refrigerating, and Air-Conditioning Engineers. Standard 52-76 (ASHRAE 52-76), *Method of Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter.*

▶ Americans with Disabilities Act (ADA)

Building Officials and Codes Administrators International, Inc. *The BOCA Basic Building Code.*

Building Officials and Codes Administrators International, Inc. *The BOCA Basic Plumbing Code.*

Code of Federal Regulations. Title 10, parts 20 and 35, *Handling of Nuclear Materials.*

Code of Federal Regulations. Title 29, part 1910, *Employee Safety and Health.*

▼ College of American Pathologists. *Medical Laboratory* ▲ *Design Manual.*

Compressed Gas Association (CGA). *Standards for Medical-Surgical Vacuum Systems in Hospitals.*

DOP Penetration Test Method. MIL STD no. 282, *Filter Units, Protective Clothing, Gas-Masking Components and Related Products: Performance Test Methods.*

General Services Administration, Department of Defense, Department of Housing and Urban Development, U.S. Postal Service. *Uniform Federal Accessibility Standard* (UFAS).

Health Education and Welfare. HEW publication no. (FDA)78-2081 (available through GPO), *Food Service Sanitation Manual.*

Hydronics Institute. *Boiler Ratings: I-B-R, Cast Iron,* and *SBI Steel Boilers.*

Illuminating Engineering Society of North America. IESNA publication CP29, *Lighting for Health Facilities.*

International Conference of Building Officials (ICBO). *Uniform Building Code.*

National Association of Plumbing-Heating-Cooling Contractors (PHCC). *National Standard Plumbing Code.*

▼ National Bureau of Standards Interagency Report. NBSIR 81-2195, *Draft Seismic Standards for Federal Buildings Prepared by Interagency Committee on Seismic Safety in Construction* (available from NTIS as ▲ no. PB81-163842).

National Council on Radiation Protection (NCRP). *Medical X-ray and Gamma Ray Protection for Energies up to 10 MeV Equipment Design and Use.*

▼ National Council on Radiation Protection (NCRP). *Medical X-ray and Gamma Ray Protection for Energies up to 10 MeV Structural Shielding Design and* ▲ *Evaluation.*

National Council on Radiation Protection (NCRP). *Radiation Protection Design Guidelines for 0.1pi29100, MeV Particle Accelerator Facilities.*

National Fire Protection Association. NFPA 20. *Centrifugal Fire Pumps.*

NFPA 70. *National Electrical Code.*

NFPA 72. *Standard for the Installation, Maintenance, and Use of Protective Signaling Systems.*

NFPA 72E. *Standard for Automatic Fire Detectors.*

NFPA 80. *Standard for Fire Doors and Windows.*

NFPA 82. *Standard on Incinerators, Waste and Linen Handling Systems and Equipment.*

NFPA 90A. *Standard for the Installation of Air Conditioning and Ventilating Systems.*

NFPA 96. *Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.*

▶ NFPA 99. *Standard for Health Care Facilities.*

NFPA 101. *Life Safety Code.*

NFPA 110. *Emergency and Standby Power Systems.*

NFPA 253. *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.*

NFPA 255. *Standard Method of Test of Surface Burning Characteristics of Building Materials.*

NFPA 258. *Standard Research Test Method for Determining the Smoke Generation of Solid Materials.*

NFPA 701. *Standard Method of Fire Tests for Flame-Resistant Textiles and Films.*

NFPA 801. *Recommended Fire Protection Practice for Facilities Handling Radioactive Materials.*

Southern Building Code Congress International, Inc. *Standard Building Code.*

Underwriter's Laboratories, Inc. Publication no.181.

▼ U.S. EPA. *Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions—International.* EPA/600/6-90/003.

U.S. EPA. *The Risk Assessment Guidelines of 1986.*
▲ EPA/600/8-87/045.

1.5.F. Availability of Codes and Standards

The codes and standards that are government publications can be ordered from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, D.C. 20402.

Copies of nongovernment publications can be obtained at the addresses listed below.

Air Conditioning and Refrigeration Institute
1501 Wilson Boulevard
Arlington, Va. 22209

American National Standards Institute
1430 Broadway
New York, N.Y. 10018

American Society of Civil Engineers
345 East 47th Street
New York, N.Y. 10017

American Society of Heating, Refrigerating, and Air-Conditioning Engineers
1741 Tullie Circle, NE
Atlanta, Ga. 30329

American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, Pa. 19103

Architectural and Transportation Barriers Compliance Board (ATBCB)
Office of Technical Services
330 C Street, SW
Washington, D.C. 20202

Building Officials and Code Administrators, Inc.
4051 West Flossmoor Road
Country Club Hills, Ill. 60477

Compressed Gas Association
1235 Jefferson Davis Highway
Arlington, Va. 22202

Hydronics Institute
35 Russo Place
Berkeley Heights, N.J. 07922

Illuminating Engineering Society of North America (IESNA)
IES Publication Sales
345 East 47th Street
New York, N.Y. 10017

International Conference of Building Officials
5360 South Workman Mill Road
Whittier, Calif. 90601

National Association of Plumbing-Heating-Cooling Contractors
Box 6808
180 South Washington Street
Falls Church, Va. 22046

National Council on Radiation Protection and Measurement
7910 Woodmont Avenue, Suite 1016
Bethesda, Md. 20814

National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, Mass. 02269-9101

National Technical Information System (NTIS)
5285 Port Royal Road
Springfield, Va. 22161

Naval Publications and Form Center
5801 Tabor Avenue
Philadelphia, Pa. 19120
(for DOP Penetration Test Method)

Southern Building Code Congress International, Inc.
900 Montclair Road
Birmingham, Ala. 35213

Underwriters Laboratories, Inc.
333 Pfingsten Road
Northbrook, Ill. 60062

▼ U.S. Department of Justice
▲ Americans with Disabilities Act

2. ENERGY CONSERVATION

2.1 General

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 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 which accommodate these considerations while preserving cost effectiveness are encouraged. A discussion of energy conservation considerations is included as Appendix B.

3. SITE

3.1 Location

3.1.A. Access
The site of any medical facility shall be convenient both to the community and to service vehicles, including fire protection apparatus, etc.

3.1.B. Availability of Transportation
Facilities should be located so that they are convenient to public transportation where available.

3.1.C. Security
Health facilities shall have security measures for patients, personnel, and the public consistent with the conditions and risks inherent in the location of the facility. These measures shall include a program designed to protect human and capital resources.

3.1.D. Availability of Utilities
Facilities shall be located to provide reliable utilities (water, gas, sewer, electricity). The water supply shall have the capacity to provide normal usage plus fire-fighting requirements. The electricity shall be of stable voltage and frequency.

3.2 Facility Site Design

3.2.A. Roads
▼ Paved roads shall be provided within the property for access to all entrances and to loading and unloading docks (for delivery trucks). Hospitals with an organized emergency service shall have the emergency access well marked to facilitate entry from the public roads or streets serving the site. Other vehicular or pedestrian traffic should not conflict with access to the emergency station. In addition, access to emergency services shall be located to incur minimal damage from floods and other natural disasters. Paved walkways shall be provided for pedestrian traffic. ▲

3.2.B. Parking
Parking shall be made available for patients, personnel, and the public, as described in the individual sections for specific facility types.

3.3 Environmental Pollution Control

▼ **3.3.A. Environmental Pollution**

The design, construction, renovation, expansion, equipment, and operation of hospitals and medical facilities are all subject to provisions of several federal environmental pollution control laws and associated agency regulations. Moreover, many states have enacted substantially equivalent or more stringent statutes and regulations, thereby implementing national priorities under local jurisdiction while additionally incorporating local priorities (e.g., air quality related to incinerators and gas sterilizers; underground storage tanks; hazardous materials and wastes storage, handling, and disposal; storm water control; medical waste storage and disposal; and asbestos in building materials).

The principal federal environmental statutes under which hospitals and medical facilities may be regulated include, most notably, the following:

- National Environmental Policy Act (NEPA)
- Resource Conservation and Recovery Act (RCRA)
- Superfund Amendments and Reauthorization Act (SARA)
- Clean Air Act (CAA)
- Safe Drinking Water Act (SDWA)
- Occupational Safety and Health Act (OSHA)
- Medical Waste Tracking Act (MWTA).

Consult the appropriate U.S. Department of Health and Human Services (HHS) and U.S. Environmental Protection Agency (EPA) regional offices and any other federal, state, or local authorities having jurisdiction for the latest applicable state and local regulations pertaining to environmental pollution that may affect the design, construction, or operation of the facility, including the management of industrial chemicals, pharmaceuticals, radionuclides, and wastes thereof, as well as trash, noise, and traffic (including air traffic).

Hospital and medical facilities regulated under federal, state, and local environmental pollution laws may be required to support permit applications with appropriate documentation of proposed impacts and mitigations. Such documentation is typically reported in an Environmental Impact Statement (EIS) with respect to potential impacts on the environment and in a Health Risk Assessment (HRA) with respect to potential impacts upon public health. The HRA may constitute a part or appendix of the EIS. The scope of the EIS and HRA is typically determined via consultation with appropriate regulatory agency personnel and, if required, via a "scoping" meeting at which members of the interested public are invited to express their particular concerns.

Once the EIS and/or HRA scope is established, a *Protocol* document shall be prepared for agency approval. The *Protocol* shall describe the scope and procedures to be used to conduct the assessment(s). The EIS and/or HRA shall then be prepared in accordance with a final *Protocol* approved by the appropriate agency or agencies. Approval is most likely to be obtained in a timely manner and with minimum revisions if standard methods are initially proposed for use in the EIS and/or HRA. Standard methods suitable for specific assessment tasks are set forth in particular EPA documents.

3.3.B. Equipment

Equipment should minimize the release of chlorofluorocarbons (CFCs) and any potentially toxic substances that may be used in their place. For example, the design of air conditioning systems should specify CFC alternatives and recovery systems as may be practicable. ▲

4. EQUIPMENT

4.1 General

▼ **4.1.A.**
An equipment list showing all items of equipment necessary to operate the facility shall be included in the contract documents. This list will assist in the overall coordination of the acquisition, installation, and relocation of equipment. The equipment list should include the classifications identified in Section 4.2 below and whether the items are new, existing to be relocated, owner provided, or not-in-contract.

4.1.B.
The drawings shall indicate provisions for the installation of equipment that requires dedicated building services, or special structures, or that illustrate a major function of the space. Adjustments shall be made to the construction documents when final selections are made.

4.1.C.
Space for accessing and servicing fixed and building service equipment shall be provided.

4.1.D.
Some equipment may not be included in the construction contract but may require coordination during construction. Such equipment shall be shown in the construction documents as owner-provided or not-in-contract for purposes of coordination.

4.2 Classification

Equipment will vary to suit individual construction projects and therefore will require careful planning. Equipment to be used in projects shall be classified as building service equipment, fixed equipment, or movable equipment.

4.2.A. Building Service Equipment
Building service equipment shall include such items as heating, air conditioning, ventilation, humidification, filtration, chillers, electrical power distribution, emergency power generation, energy management systems, conveying systems, and other equipment with a primary function of building service.

4.2.B. Fixed Equipment (Medical and Nonmedical)

4.2.B1. Fixed equipment includes items that are permanently affixed to the building or permanently connected to a service distribution system that is designed and installed for the specific use of the equipment. Fixed equipment may require special structural designs, electromechanical requirements, or other considerations.

a. Fixed medical equipment includes, but is not limited to, such items as fume hoods, sterilizers, communication systems, built-in casework, imaging equipment, radiotherapy equipment, lithotripters, hydrotherapy tanks, audiometry testing chambers, and lights.

b. Fixed nonmedical equipment includes, but is not limited to, items such as walk-in refrigerators, kitchen cooking equipment, serving lines, conveyors, mainframe computers, laundry, and similar equipment.

4.2.C. Movable Equipment (Medical and Nonmedical)

***4.2.C1.** Movable equipment includes items that require floor space or electrical connections but are portable, such as wheeled items, portable items, office-type furnishings, and monitoring equipment.

a. Movable medical equipment includes, but is not limited to, portable X-ray, electroencephalogram (EEG), electrocardiogram (EKG), treadmill and exercise equipment, pulmonary function equipment, operating tables, laboratory centrifuges, examination and treatment tables, and similar equipment.

b. Movable nonmedical equipment includes, but is not limited to, personal computer stations, patient room furnishings, food service trucks, and other portable equipment.

*4.3 Major Technical Equipment

Major technical equipment is specialized equipment (medical or nonmedical) that is customarily installed by the manufacturer or vendor. Since major technical equipment may require special structural designs, electromechanical requirements, or other considerations, close coordination between owner, building designer, installer, construction contractors, and others is required.

4.4 Equipment Shown on Drawings

Equipment which is not included in the construction contract but which requires mechanical or electrical service connections or construction modifications shall, insofar as practical, be identified on the design development documents to provide coordination with the architectural, mechanical, and electrical phases of construction.

4.5 Electronic Equipment

Special consideration shall be given to protecting computerized equipment such as multiphasic laboratory testing units, as well as computers, from power surges and spikes that might damage the equipment or programs. Consideration shall also be given to the addition of a constant power source where loss of data input ▲ might compromise patient care.

5. CONSTRUCTION

5.1 Construction Phasing

Projects involving alterations and/or additions to existing buildings should be programmed and phased to minimize disruptions of retained, existing functions. Access, exits, and fire protection shall be so maintained that the occupants' safety will not be jeopardized during construction.

5.2 Nonconforming Conditions

▼ It is not always financially feasible to renovate the entire existing structure in accordance with these Guidelines. In such cases, authorities having jurisdiction may grant approval to renovate portions of the structure if facility operation and patient safety in the renovated areas are not jeopardized by the existing features of sections retained without complete corrective ▲ measures.