CHAPTER 38

AN OVERVIEW OF HEALTH CARE FACILITIES PLANNING

John Michael Currie
SmithGroup, Inc., Washington, D.C.

38.1 INTRODUCTION

38.1.1 Health Care Facilities Planning

The basic process of planning and design is made up of several sequential steps. Each step builds on the information created and the decisions made in the preceding one. The process is often not linear. Many alternative ideas are tested and the results combined. This chapter concentrates on the work leading up to commencement of the construction activity on site. This chapter also assumes that the process of planning for and including medical technology and equipment is an intrinsic part of designing a health facility in a responsible manner. Separate consultants can help in this process, provided they are brought into the project from the beginning. As the work progresses, the opportunity to positively influence its direction with valuable input on medical technology consideration diminishes.

The business of health care facility design is all about the future. We cannot plan well simply to correct today’s facility shortcomings. In dealing with the future of health care, the future of technology is critical.

38.1.2 Historical Overview

“The building or buildings should be simple in style and designed to make a pleasing impression upon the patients…. Hospital planning demands the same careful thought that is the foundation of any modern successful business enterprise…. The hospital planner must seek to eliminate here all lost motion or unnecessary work.”

EDWARD F. STEVENS, The American Hospital of the Twentieth Century
In a few simple statements, made in 1918, architect Edward F. Stevens has captured ideas that are still central today in hospital planning. While Stevens could not anticipate the enormous growth in medical knowledge, technique, and technology that would come to bear in the fullness of the twentieth century, his words have covered four important goals of hospital facility planning today:

- Simplicity of design
- Focus on the patient
- Understanding of function
- Design to support medical activities

Early hospital architectural designs, the Greek Asklepieion and the Roman Valetudinarium, were forms adapted from buildings already in use. The Asklepieion (Fig. 38.1) was simply a stoa or business arcade put to medical use. The Valetudinarium (Fig. 38.2) was a military barracks building modified for the sick. These plans are derived from other uses, and the planner had few opportunities to introduce design for the specific needs of the medical staff.

Early Christian monasticism and the constant flow of travelers and pilgrims brought the first hospices into being. The Hospice of Turmanin (A.D. 475) in Syria received all travelers, sick or well,
in the convent building, with nursing care provided for those in need. This building contains an early example of the open ward with deep porticos on all four sides.

The famous Monastery of St. Gall in Switzerland (A.D. 820) had more specific portions of the overall plan devoted to medical care and medical staff. Its plan clearly shows separate facilities for bloodletting, physician housing, infirmary, kitchens, bathing facilities for the sick, and medicinal herb garden.

Many other important European monastic centers cared for patients throughout the Middle Ages. Notable among these are the Great St. Bernard Hospital (A.D. 960) in Switzerland and Cluny (A.D. 1050) in France (Fig. 38.3).

The era of the hospital began in the twelfth century when the sick were to be housed in separate buildings designed for medical care. Examples include St. Bartholomew’s Hospital (London, A.D. 1123) and St. Thomas’ Hospital (London, A.D. 1200). Both hospitals are in service today, having been refounded in the mid-1500s due to the dissolution of the monasteries in England in A.D. 1536.

Early general hospitals were established throughout Europe during the sixteenth and seventeenth centuries. The pavilion plan was developed in the mid-nineteenth century. This concept was supported by the writings of Florence Nightingale (Notes on Hospitals, 1859). These hospitals, arranged into an interconnected series of small patient care buildings, were designed to help control infection, provide separation of various types of patients, and promote natural light and ventilation.

Three main causes influenced the development of specialist hospitals:

1. A growing patient population excluded from general hospitals, such as pregnant women, children, people suffering from contagious disease, and patients requiring a long length of stay.
FIGURE 38.4 Plan of Liverpool Lying-In Hospital (1880s).

FIGURE 38.5 Plan of Anderson Hospital (London, 1889).
2. Emerging medical and nursing specialties
3. Individual entrepreneurs founding their own hospitals and clinics to promote their private practices

Maternity or lying-in hospitals were among the earliest of specialty hospitals. The Liverpool Lying-In Hospital (Fig. 38.4) was separated from the Hospital for Women to help control infection, again supported by Nightingale’s recommendations. One can see from the plan of this building that the architect has created separation between nursing and support functions.

Looking at the plan of the Anderson Hospital in London (1889) (Fig. 38.5), the ward area is seen as a circular room supporting ease of nursing and good visualization of patients but not much privacy for those in bed.

The work of John Shaw Billings, M.D., at Johns Hopkins Hospital in the late 1870s and 1880s is shown in Fig. 38.6. Collaborating with the architect, Billings proposed plans that took into account the control of infection, growth and flexibility, separation, natural light, and ventilation. Billings clearly saw that whatever design was built, continuing scientific advantages would necessitate change:

... no matter what plan is adopted ... it will appear that it can be improved and a certain amount of funds should be reserved for that purpose. The general principles which I have tried to state ... are in accordance with the present condition of our knowledge of the subject, but that knowledge is imperfect, and

---

FIGURE 38.6 John Shaw Billings plan for Johns Hopkins Hospital (Baltimore, 1870s).
too much of the teaching of books on the subject of hospital construction is theoretical only [J. S. Billings, M.D., 1875].

Dr. Billings was right, and today we continue to follow his advice when developing facility plans for health care facilities.

38.2 HEALTH CARE FACILITIES PLANNING AND DESIGN

Health care facilities planning is a unique area of endeavor. The unique character of this work comes from the fact that the patient and family are silent users of the space represented by all the members of the planning and design team. This responsibility to uphold the future well-being of these patients gives the process an added dimension.

It is useful to discuss this process by describing it in phases. These phases or steps are given different names by various groups, but the activities are common to all projects. The American Institute of Architects, as an industry standard, is the source for terms describing the various phases of planning and design through construction and occupancy. In this chapter I will confine my discussion to the work leading up to construction activities.

The health facility planning and design phases are

- Programming
- Schematic design
- Design development
- Construction documents

Each succeeding phase builds on the preceding one as decisions are made and the design solution is refined. In order for this process to produce a good result, all participants should be completely clear in their understanding of the decisions to be made. This is a process of interaction and challenge. All ideas to improve the design solution and all relevant facts must be openly and honestly sought out, discussed, and evaluated.

38.2.1 Programming

Programming is the first major phase of work that the project team undertakes. Programming has several important purposes:

1. Input from health care facility users is gathered in this phase. By preparing a thorough program, each element of the department can be described in detail.
2. Communication with and guidance from the entire team are recorded to be used and refined throughout the process of creating the new facility.
3. Adherence to budget, criteria, and other project parameters can be checked and controlled as space is calculated and functional relationships recorded.
4. An orientation to the future is ensured by including new technology considerations and avoiding reliance on the solutions of the past.

Programs are prepared for the use of the team by health facility architects, by consultants who specialize in this area, or by experienced health care users. Regardless of the authorship source, it is imperative that the programmer be a full member of the planning team who stays with the work of creating the project. The program will be refined as the project goes forward, and continuity is
important when programming decisions are reconsidered in the light of developing design solutions. Programs consider each space, each department, and each system to be included. Programs describe (1) the activity to be carried out in each space, (2) the people to be accommodated, (3) the technical and support equipment to be included, (4) the furniture and furnishings to be supplied, (5) the physical environment (and environmental controls), (6) critical relationships within and among spaces, (7) the size and makeup of each department, (8) relationships among departments, and (9) the size and makeup of the entire project.

A thoroughly prepared program contains the following components:

- Space listings and area tabulations
- Diagrams
- Room data sheets
- Equipment and furniture
- Technical data sheets on critical equipment systems
- Written functional statements

Space listings and area tabulations are the heart of the program. A number of forms are possible. Commonly, these listings are organized into functional groupings, and then quantities are added. These space listings (Fig. 38.7) must be established using some mutually agreed on forecast of future workload. This can take the form of procedures, visits, or operating room minutes. It is essential that the need for space be directly linked to and driven by a disciplined forecast of future activity.

The areas shown are net, i.e., exclusive of walls, doors, structure, and sometimes cabinetry. The areas need to be based on serious discussions among the users plus attention paid to codes and standards that apply to the project. The areas shown need to include full consideration to equipment and other technology that will operate within these rooms. Allowances for departmental gross area must be included to provide appropriate circulation, walls, doors, cabinetry, mechanical and electrical

![Space Program Draft](image-url)
systems, etc. The remarks column within the space listing spread sheet can contain cues for designers and planners to read further or to refer to functional diagrams included in other sections of the program document.

The inclusion of *room and department diagrams* increases the usefulness of the program document. The facility planning and design process is highly dependent on graphics, drawings, and other visual items and is conducted largely by professionals who use graphics to record and communicate ideas.

Not every space is so demanding that a diagram such as that in Fig. 38.8 is required, but it is clear that words and numbers alone would not completely explain the complexities of the operating room.

Department organization and critical relationships between spaces can be illustrated simply by an adjacency matrix diagram, as shown in Fig. 38.9. This information provides critical guidance for the design team.

*Room data sheets* are extremely valuable vehicles for carefully recording information about each space. An example, shown in Fig. 38.10, demonstrates the range of facility information that can be shown for the designers and engineers working on the project.

Space programs are concerned with describing rooms/spaces that contain technical equipment. *Equipment and furniture lists* are important to guide designers and to create a complete picture of the project budget. A preliminary list such as shown in Fig. 38.11 can be modified as design and
knowledge progress on the project. Including this type of information is an important notice to designers that equipment/systems must not be added in later (or forgotten entirely).

If understanding a particular equipment item is critical to the successful layout of the room or must be considered in developing engineering systems then a technical data sheet can be added to this part of the program document. It is unlikely that a specific choice of equipment will be made in final form at the programming stage of a project, but including the technical data sheet as an example will ensure that appropriate space, floor loading, HVAC, and other provisions are made. Manufacturer-supplied material can be used and marked as “Preliminary—subject to change.”

Each programmed department should be described in writing by including a written functional statement. Department health care staff are well equipped to supply this information, which should include

- An overall summary of the department
- Staffing
- Hours of operation
- Workload history and forecasts
- Description of activities, procedures, etc.
- Any unique planning considerations

FIGURE 38.9 Sample adjacency matrix.
### HEALTH CARE FACILITY ROOM DATA SHEET

**PROJECT NAME**

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Prepared By</th>
</tr>
</thead>
</table>

**DEPARTMENT**

**ROOM NAME**

**ROOM NUMBER**

**GENERAL**

<table>
<thead>
<tr>
<th>Net Area</th>
<th>Occupant Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling Height</td>
<td>Door Size and Type</td>
</tr>
<tr>
<td>Room Function</td>
<td></td>
</tr>
</tbody>
</table>

**ROOM FINISHES**

<table>
<thead>
<tr>
<th>Floor</th>
<th>Walls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>Ceiling</td>
</tr>
</tbody>
</table>

Finish Notes

**ROOM ACOUSTICS**

<table>
<thead>
<tr>
<th>Level of Speech Privacy</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall/Ceiling Performance</td>
<td>Other</td>
</tr>
</tbody>
</table>

Acoustics Notes

**MECHANICAL REQUIREMENTS**

<table>
<thead>
<tr>
<th>Air Changes/Hour</th>
<th>Pressure Relationships</th>
<th>Filtration</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>O/A Required</td>
<td>Exhaust Requirements</td>
<td>Temperature Control</td>
<td>Other</td>
</tr>
<tr>
<td>Equipment Connections</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mechanical Notes

**ELECTRICAL and TELECOMMUNICATIONS REQUIREMENTS**

<table>
<thead>
<tr>
<th>Duplex Outlets</th>
<th>Special Outlets</th>
<th>Special Cabling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Illumination</td>
<td>Special Lighting</td>
<td>Telecom and Data Outlets</td>
</tr>
<tr>
<td>Equipment Connections</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

Electrical Notes

**PLUMBING AND PIPED SYSTEMS**

<table>
<thead>
<tr>
<th>HW</th>
<th>CW</th>
<th>Direct Drain</th>
<th>Special Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor Drain</td>
<td>Gas Outlets</td>
<td>Equipment Connections</td>
<td></td>
</tr>
</tbody>
</table>

Plumbing and Piped Systems Notes

**EQUIPMENT NOTES**

---

**FIGURE 38.10** Sample room data sheet.
38.2.2 Design Phases

**Schematic Design Phase.** The American Institute of Architects’ *Handbook of Professional Practice* describes the schematic design phase of a project as having the following purpose:

Schematic Design establishes the general scope, conceptual design, scale, and relationships among the components of the project. The primary objective is to arrive at a clearly defined, feasible concept and to present it in a form that achieves understanding and acceptance. The secondary objectives are to clarify the project program, explore the most promising alternative design solutions, and provide a reasonable basis for analyzing the cost of the project.

Schematic design often begins with the creation of *block diagrams* that address the overall relationships between and among the various departments of the project. Block diagrams (Fig. 38.12) are drawn to a relative scale and show each floor of the project. Major entrances to the building are established for each type of traffic. Circulation routes are studied on each floor to carefully separate traffic. Vertical circulation (stairs, elevations, service lifts, etc.) is planned.

At this very early stage of design, provisions for the communications and data technology must be considered and included within the block diagrams. Allowances for information technology (IT) equipment and cabling pathways within the building must be shown with sufficient accuracy that technology professionals can judge their adequacy. This is not a planning element that can be added in at a later stage of design.
Block diagrams should be drawn using a planning grid that will reflect a structural grid system. This will facilitate planning in later stages and avoid conflicts between desired floor plan arrangements and the structural system.

Block diagrams will also be considered in section showing vertical relationships (Fig. 38.13) from one floor to the next. The building height will be defined in this phase, and issues of floor-to-floor height can be decided. Departments that have high levels of engineered systems can be located to give maximum volume in the overhead spaces, allowing easy routing of ducted and piped systems without conflict.

Once all alternative block diagrams have been thoroughly considered and reviewed with hospital personnel, a single direction can be established for more detailed schematic design. Alternative layouts for each department are studied using drawings called bubble diagrams.

Figure 38.14 shows a typical bubble diagram. Normally, several alternative arrangements are studied using diagrams such as these. Bubble diagrams can help the team study by showing:

- Room-to-room relationships
- Circulation of staff and patients
- The basic size and shape of key spaces
- Provisions for critical support spaces
- Engineering and technology requirements

The success of the planning at this level depends in part on the completeness of the program documents prepared in the programming phase. Program material will guide the team as it studies and evaluates alternative layouts. Bubble diagrams are drawn to scale and also follow the planning grid. The selected diagram layout will be developed in more detail as single-line schematic drawings.

Figure 38.15 shows a typical single-line plan. Note that many details are left out, such as door swings and furniture and equipment placement. These important considerations will be relatively easy to add as plans are refined if they have been well described in the program and if those program data are kept in mind as the plan work progresses.
Schematic plans are often difficult to fully interpret, and so three-dimensional (3D) sketches are quite useful in judging the success of the plan in meeting the objectives set out in the program. Figure 38.16 shows a 3D sketch drawn with a computer graphics program that very clearly demonstrates the various elements of the plan. Physical models also can be employed to illustrate elements of the schematic plan, but their usefulness is somewhat limited by the comparative lack of detail available.

During schematic design, it is also useful to prepare documents called outline specifications. Outline specifications describe the various construction contract elements in words citing industry standards, methods, and levels of quality. These documents provide an opportunity to clearly spell out each part of the construction, and they form an important part of the basis for estimating the cost.
of the project. The program-based equipment listings can be carried forward to be included within the outline specifications so that adequate consideration of the cost of equipment is made a part of the job. Further, these specifications should include clear technical provisions for

- Special piping systems
- Special wiring/cabling systems
- Information technology support
- Communications systems
- Critical environmental controls
- Other fixed items such as casework

Schematic design documents must be submitted together for a formal approval by all the user groups and to be accepted as the basis for moving ahead into the next phase of design.

**Design Development Phase.** Design development is the project phase in which the design is refined and coordinated among all the disciplines involved on the team. The schematic design work carried out in the preceding phase is brought forward, and detailed information is added. Each element of the project is worked out at a larger scale, and changes are incorporated as the team members see more detail and can arrive at additional decisions.

**FIGURE 38.17** Sample design development drawing.
Design development begins with plans and sections drawn at increased scale so that users can see the functional and technical details of each space. As information is added, each room in the project should be assigned a unique identification number. This allows the team to track the refinement of the design of each room. Room data sheets prepared during programming can now be brought forward and keyed to these unique numbers. Similarly, equipment lists and technical data sheets are also keyed to the room numbering system. Each room or space will then have a data file that architects and engineers can use for design. Users will use the data file for monitoring the progress of the design and measuring the success of the design of each space in meeting functional and technical needs.

Design development floor plans, such as that shown in Fig. 38.17, contain the details that were not shown in schematic design. These include:

- Wall thickness and special wall construction, including shielding or structural support
- Code-required construction for control of smoke spread, fire stopping, etc.
- Doors
- Fixed elements such as plumbing fixtures, cabinetry, etc.
- Equipment placement
- Furniture placement
- Building structure and engineering spaces

Design development also should include drawings that illustrate all wall and ceiling surfaces. Elevation drawings of wall surfaces such as shown in Fig. 38.18 will illustrate the placement of electrical, piping, communication, and data outlets to scale, giving mounting heights above the floor and clearances for convenient use by hospital staff. These elevation drawings also show equipment (fixed and movable) to be attached or connected to ensure that the equipment will function and that adequate clearance is provided for service access.

Reflected ceiling plans are useful in controlling the design of the ceiling plane. Figure 38.19 shows that each element (lighting, HVAC, fire-protection sprinkler heads, special systems, and ceiling-mounted equipment) can be installed and operate properly.
During design development, additional information and detail are created. These are interior finish materials selection and casework and workstation design.

Each space or room will have materials assigned by the design team to be reviewed by users. One method of managing this new information is with a finish schedule. Much of these data can come directly from the room data sheets created during programming. This information will now need to be updated and refined. The finish schedule will eventually become an important component of the construction process. The design and placement of casework, workstations, shelving, and other cabinetry are an important part of design development. Each user must be satisfied that the patient care and other work processes to be supported by these items are thoroughly understood by the designers. Each element must be carefully considered. Computers, displays, benchtop equipment, and other critical elements must be drawn to scale and included in the design. It is quite common to build full-sized mockups or models of these workstations so that users can try out the new design before it is built. Workstations should be tested for user comfort, success in accommodating equipment, visual access to patients, etc.

There is no satisfactory substitute for a full-size mockup in discovering and correcting flaws in the design. The same can be said for critical full-room mockups as well. These have been used to excellent results in developing designs of rooms that contain critical new technology features.

Design development also addresses the full coordination of all the design disciplines involved in producing a complete architectural and engineering design for the project. Each department, each space, and all physical elements of the project are brought up to a similar level of design refinement. All systems (HVAC, structural, site/civil) and all specialty areas must be carefully designed and coordinated to avoid conflict. Design development leans heavily on the work done during programming and schematic design.

Design development documents must be published for user and hospital approval. Prior to this approval being obtained as notice to proceed into final working drawings, a cost estimate based on the design development package must be prepared. This is a critical juncture of the project effort, and the completeness of the work done to this point will help to avoid serious problems later in the project.

38.2.3 Construction Documents Phase (Working Drawings)

Most design issues will have been answered during the preceding phases of work. The construction documents phase is principally concerned with the creation of drawings and written instructions to be used by the various building trades in constructing the project. These documents become part of the contract between the owner and the builder. They have important legal consequences. They must be clear, accurate, and free from ambiguity.

The construction documents consist of three basic elements:

1. Specifications (written about in earlier sections)
2. Drawings
3. Written contract provisions

Each element makes reference to the other and must be consistent, using similar language to mean the same in each instance. Each element is briefly discussed here.

Specifications generally fall into two categories. Descriptive specifications use words and make reference to industry standards to describe a method of construction or to describe a building product/material. Performance specifications use words and make reference to industry standards to make clear how a part of the construction is to perform. Both types are used successfully in health care facility construction. The project’s final specifications are developed from the earlier outline specifications prepared during schematic design and design development. Specification writing is a highly specialized endeavor that is the responsibility of the design team and typically is carried out by a design professional with special qualifications in this area.
In medical facility construction, it is very common to have unresolved issues even this late in the design. An example of this is the procurement of certain types of equipment such as medical imaging systems that will be attached to the building but will be supplied by a third-party vendor. Such issues will need to be dealt with in the specifications so that the builder is fully aware that these late decisions will be coming and that funds must be included to accommodate the work to be done.

Certain items to be specified may be covered by proprietary specifications. These are items where no competitive alternative exists, and the owner is willing to state an exact make, model, or product name to be used exclusively.

Drawings will be prepared during this phase that will become a legal part of the contract for construction. These drawings are based on the work of earlier phases. The intended audience is the builder and individual trade workers, so the drawings focus on providing the data needed to successfully construct the building. Each element to be constructed is drawn in detail, with all dimensions and explanatory notes shown. In the case cited earlier of a delayed decision regarding equipment (say, for imaging), the drawings must show how the work is to be undertaken to allow for a later decision.

Written documents called General Conditions, Special Conditions, and Supplemental Conditions are included as important parts of the contract. These set down the various procedures to be followed by the contract parties in constructing the project. The American Institute of Architects publishes a model of these documents (AIA document A201) that is the standard of the construction industry.

38.2.4 Codes, Standards, and Industry Data

There are literally thousands of documents published by more thousands of authorities that provide information, best practices, professional criteria, and otherwise control every part of a project from inception to completion. We will deal here in outline form with those that influence the medical or technical aspects of planning the project.

Building codes have the force of law over the project. The team must comply with the provisions of the building code applied by the authority having jurisdiction over the project. This is usually a building department at the municipal or state level. Building codes often include sections of other documents, most notably the Life Safety Code published by the National Fire Protection Association. Three major organizations predominate:

- Building Officials and Code Administrators International (BOCA), publishers of the BOCA National Building Code
- International Conference of Building Officials (ICBO), publishers of the Uniform Building Code
- Southern Building Code Congress International (SBCCI), publishers of the Standard Building Code

These model codes form the basis for most building codes in force around the United States.

The International Code Council (ICC), established in 1994 as a nonprofit organization, is dedicated to developing a single set of comprehensive and coordinated national model construction codes. The founders of the ICC are Building Officials and Code Administrators International, International Conference of Building Officials, and Southern Building Code Congress International. The nation’s three model code groups created the ICC by developing codes without regional limitations providing one code document series that can be applied from coast to coast in all jurisdictions. There are advantages in combining the efforts of the existing code organizations to produce a single set of codes. Code enforcement officials, architects, engineers, designers, and contractors have access to consistent requirements throughout the United States.

In addition to the state-controlled building codes, a number of other important codes having legal standing are in force. These cover areas of architectural and engineering practice, such as
Most code documents refer to a large body of construction industry standards. The American National Standards Institute and the American Society for Testing and Materials publish enormous volumes of important standards to be followed in designing a building, specifying products, and carrying out construction activities.

The National Fire Protection Association (NFPA), headquartered in Quincy, Massachusetts, is an international nonprofit (tax-exempt) membership organization founded in 1896. The mission of NFPA is to reduce the worldwide burden of fire and other hazards on the quality of life by developing and advocating scientifically based consensus codes and standards, research, training, and education. NFPA activities generally fall into two broad, interrelated areas: technical and educational. NFPA’s technical activity involves development, publication, and dissemination of more than 300 codes and standards. NFPA codes and standards are developed by nearly 250 technical committees. The Health Care Section of NFPA is comprised of individuals with a focus on the protection of patients, visitors, staff, property, and the environment from fire, disaster, and related safety issues.

Other regulations influence facility design as well. In health care, the requirements for licensure by the states invoke an additional body of criteria to be followed plus other standards by reference. The Joint Commission on Accreditation of Healthcare Organizations conducts surveys of hospitals using criteria that refer to the American Institute of Architects’ Guidelines for Design and Construction of Hospital and Health Care Facilities. These guidelines, in turn, refer to other sources that govern planning and design. The 2001 edition of the Guidelines covers most health care departments and functions and contains a brief chapter on medical equipment.

Federal regulations strongly influence the design of buildings. The provisions of the Occupational Safety and Health Act (OSHA) of 1970 control many of the conditions found on construction sites. Failure to comply with OSHA can involve stiff penalties. In 1990, the Americans with Disabilities Act (ADA) was passed, governing the provision of reasonable access to people with disabilities. This act covers all buildings, both existing and new construction. The Department of Justice (DOJ) administers this act. DOJ has developed accessibility guidelines for use by design professions. Further, the federal government, in regulating the design of its own health facilities, has developed a full panoply of codes, regulations, and other criteria to follow.

Important standards are published in addition to all the preceding by the following organizations that directly or indirectly influence the design of health care facilities:

- Association for the Advancement of Medical Instrumentation (AAMI)
- American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
- Centers for Disease Control and Prevention (CDC)
- College of American Pathologists (CAP)
- Compressed Gas Association (CGA)
- General Services Administration (GSA)
- Illuminating Engineering Society of North America
- National Association of Plumbing, Heating, and Cooling Contractors
- National Bureau of Standards (NBS)
- National Council on Radiation Protection (NCRP)
- National Fire Protection Association (NFPA)
- Underwriters Laboratories, Inc. (UL)
Health care industry data are an important part of this library of criteria that influence design. Each manufacturer or supplier is a useful (and usually willing) source of up-to-date information on products or systems to be included in the project. Some of these have profound effects on the design of spaces and on building systems. During the life of a project, this material must be updated and verified as new items are introduced or as variations are made by the manufacturer.

38.2.5 The Importance of Project Management

The key to successfully mobilizing a health facility planning effort lies in the strength of the work of a team of professionals. Designing a health care facility is a complex task. The team needed to carry out this task is large and multidisciplined.

Project management has emerged as an important area of special experience and training within the architectural profession. Project managers not only pull together the efforts of the architectural and engineering staff but also must coordinate the efforts of the hospital staff and ensure that all the various points of view are included in the effort.

The Joint Commission [on Accreditation of Healthcare Organizations] expects … a collaborative design process. This process should team department direction, medical staff, and individuals having special knowledge….

The project manager needs information in a timely manner and will come to rely on the hospital’s technology managers to provide it. No other group is more completely aware of the hospital’s capital equipment program. No other group is more completely engaged with the medical equipment industry. This unique knowledge, properly applied, as suggested here, will help ensure a successful, responsive, and flexible design result.

38.3 KEY POINTS OF INFLUENCE: CHECKLIST FOR MEDICAL TECHNOLOGY INPUT INTO THE HEALTH CARE FACILITIES PLANNING PROCESS

38.3.1 During Project Inception

Prior to beginning any formal work, review and evaluate capital purchasing plans for 3 to 5 years into the future to check for possible deferrals. Evaluate leases and maintenance contracts. Evaluate technology staff. Survey technology-intensive departments for upcoming changes or anticipated new technology. Coordinate with IT group.

It would be useful if a technology master plan were in place.

Prepare (or gather together) all existing medical equipment listings, showing details useful for programming and later planning. Identify key individuals to serve on programming and design user groups to represent medical technology management.

Organize materials by department or cost center or other hospital organizational entity for ease of use by planners.

38.3.2 During Programming

Direct participation in or authorship of

• Key room sizing and diagramming
• Room data sheets
38.20 CLINICAL ENGINEERING

- Equipment listing
- Manufacturer technical data sheets

Representation on user groups
Review, comment on, or refine programming documents

38.3.3 During Schematic Design and Design Development

Continued representation on user groups and continued responsibility for review and input to design products
Liaison with manufacturers and clinical staff for equipment and systems decision making
Testing critical room layouts with real templates for equipment (plans, elevations, ceiling plans)
Mockup room design and evaluation

38.3.4 During Construction Document Preparation

Continued liaison for design team and clinical staff on equipment and systems questions
Liaison with manufacturers for updated accurate installation templates and diagrams
Prepare a logistics work plan for specification, procurement, receipt, storage, and placement of equipment to be purchased outside of construction contract
Provide coordination for vendor workforces if access to construction site is necessary for rough-in or for equipment placement

REFERENCES

