

Planning, Design, and Construction of Health Care Facilities

Addressing Joint Commission and
JCI Standards and Other Considerations—
from Planning to Commissioning

Foreword by Charles H. Griffin, AIA, FACHA, EDAC



revised third edition

Updated to reflect 2012 *Life Safety Code*®



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Human health and well-being are intrinsically linked to the built environment. This linkage is where the principles guiding the American Institute of Architects Academy of Architecture for Health

(AIA-AAH) and The Joint Commission come together. Each organization aims to improve the lives and the outcomes of patients and the public:

- The Academy believes in improving the quality of health care through design.
- The Joint Commission strives to improve health care by promoting safe and effective standards of care.

We believe that this book unifies our missions by guiding health care institutions through one of the most critical and costly activities—that of design and construction of a new or renovated facility. Each design decision for health care facilities impacts the care and well-being of users for many years to come.

Building for Health

Building design can help us live better and longer lives rather than contribute to current lifestyles that may not promote a healthy and motivational activity, thereby indirectly lessening our opportunities to be more active and healthy by design. Such an approach takes on even greater significance for health care facilities such as hospitals and clinics. For example, a safely lit central garden space centrally located in a hospital could encourage ambulatory patients, visitors, and hospital staff to take short walks in a calming space rather than navigate through internal corridors or sit in a windowless lounge or break room.

Impact of Health Care Trends

Living longer and healthier through better building design is a laudable approach, but it may not always be an affordable one. In recent years, the health care market in the United States has

been wrestling with cost containment due to annual health care costs that, until recently, have far exceeded the consumer price index. This has resulted in health care costs escalating to more than 17% of the gross national product, per the World Bank, double that of any other developed country. At this rate, the cost of health care in the United States is not sustainable. In addition, the market is redefining itself following passage of the Patient Protection and Affordable Care Act (ACA) legislation of March 2010. The ACA, while increasing the number of insured patients, is also reducing the level of reimbursements provided to hospitals and providers; this further exacerbates the pressure to reduce the costs of providing care. These developments have expressed themselves in several trends in health care that have had strong impacts on design and construction, such as those described here.

Lower-Cost Environments

Providing care has shifted its emphasis to the least complex and lowest-cost environment—from the acute care hospital to the ambulatory clinic, and from the clinic to the home. This has resulted in a significant increase in the design and construction of ambulatory and intermediate-care facilities, which has shifted funds away from hospital construction.

Lean Methodologies

Health care institutions are using Lean methods to reduce waste and improve the quality of the patient and staff experience, thereby improving quality and helping to reduce costs (Lean methodology is a set of principles and practices for continuous process improvement by elimination of waste). Institutions such as Seattle Children's Hospital and Virginia Mason Medical Center borrowed from Lean manufacturing strategies to incorporate continuous process improvement and patient-centered care for their newly designed facilities. It is critical for architects to be engaged in process improvement at an early stage of design to avoid rework that could result in incorporating old inefficient processes into the new design.

Collaborative Teams and Spaces

Integrated clinical team delivery allows each activity to be performed at the lowest cost possible while still providing appropriate patient care. This frees each professional to perform at his or her highest skill level. Such collaborations have a direct impact on staff spaces in terms of both their openness and their relation to patient spaces.

Mobile Technologies

The use of mobile devices that serve as health tracking, diagnosis, and medical tools is still in its infancy. However, these devices may significantly shift health care provision to a range of locations beyond the hospital or clinic. Such shifts would change building utilization patterns in ways that are difficult to anticipate. These trends generate uncertainty as to how and where health care will be delivered in the future. The uncertainty leads to greater emphasis on the flexibility and adaptability of new and renovated facilities.

Impact of Design and Construction Trends

At the same time, there are similar trends evolving in the design and construction fields. These are described here and will be elaborated upon in the book.

Evidence-Based Design (EBD)

Evidence-based design (EBD) is a decision-making approach that provides research-backed information for decisions made during the design process. This may lead to shorter hospital stays due to improvements such as daylight in patient rooms. It may result in a reduction of medication errors as well, thanks to features such as appropriately sized and better lit medication rooms located away from distractions. (See [DESIGN FOCUS: Designing for Safety and Reliability](#).)

Building Information Modeling (BIM)

Building information modeling (BIM) has replaced traditional drafting of plans and details. Using computer technology, BIM entails building a true-to-life three-dimensional model of the planned building, allowing more coordination of all disciplines prior to the construction phase. More elements may be accurately fabricated in a shop and brought to the field for quick assembly. Both design and construction teams use this method, resulting in a more collaborative effort, a safer construction environment, and the prospect of less costly changes during construction. (See [Chapter 2](#).)

Integrated Project Delivery (IPD)

Integrated project delivery (IPD) and similar procurement methods are new means of collaboration between the design and construction teams. IPD is a joint contract between the owner, the architect, and the contractor that has them all share in the risks and the rewards (in different proportions) of the profits or savings. Similarly, there has been an increase in the use of traditional design-built and public-private partnership contracts. Either of these methods can serve to shorten the design and construction period and provide potential cost savings.

There is greater integration in the design/construction process than we have seen in recent decades. Such integration calls for radical changes in the way design and construction are procured and in the composition of their teams and contracting methods. (See [PLANNING FOCUS: Alternative Facility Delivery Models](#).)

Education

We at the AIA are committed to educating our peers and collaborators on the impact these changes will bring to our practices. An example of a health care architect's advanced professional development is obtaining certification from the American College of Healthcare Architects (ACHA). This book is part of recommended reading in obtaining that certification. Joint Commission Resources (JCR) is making a similar educational effort with this book. We applaud them for their efforts. We are excited to participate in this endeavor, and we look forward to working together on projects that may result from it.

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introduction



The health care landscape has changed significantly since the last edition of *Planning, Design, and Construction of Health Care Facilities* in 2009, and the reported construction boom under way is just one aspect of the industry reflecting that. According to figures reported by major health care architecture firms in 2014, the number of signed contracts and their total dollar value are both higher than in 2012.¹

One trend spurring this increase in health care development both in the United States and internationally is based on an evolution of consumer health care needs. The US Census Bureau has projected massive growth in the population of those aged 85 and over, while the World Health Organization (WHO) has reported that the average life expectancy globally continues to increase. A larger population living longer means that health care organizations must prepare for an influx of patients.

This is just one example of the increasing need for more and more efficient health care facilities worldwide, and those facilities are obliged to offer safe care in a safe physical environment.

Readers of This Book

This book is aimed at readers who may have differing backgrounds, but who must come together and work collaboratively on a health care facility construction or renovation project. These readers may be from health care organizations (clinical and executive leaders, construction supervisors, accreditation professionals, facilities directors, safety officers), architecture and design firms, and construction firms. Having a common understanding of the phases and issues involved in health care facility projects, as outlined in this book, will help to ensure a smoother process and a better outcome.

Purpose of This Book

This revised third edition of *Planning, Design, and Construction of Health Care Facilities* serves as an overview of the planning, design, and construction phases of a new or renovated health care facility, as well as the commissioning (move-in) phase—historically given less than proper attention. The primary intent is not only to define and explore each of these phases, but to also examine them, where possible, through the lens of The Joint Commission and Joint Commission International (JCI) standards, which make safety a top priority. By working with the American Institute of Architects Academy of Architecture for Health (AIA-AAH), we can ensure that this new edition meets the needs of the architects and designers in the field who are working with accredited health care organizations to upgrade or build new facilities.

Most of the concepts discussed in this publication are applicable to health care facilities throughout the world, despite the many variations within countries and among regions. That helps make this one-of-a-kind book valuable on both a domestic and an international level for architects, designers, and planners, as well as for health care leaders (including clinical leaders), administrators, and facility directors. It is a comprehensive guide for health care organizations looking to build new facilities or update their current ones.

Specifically, readers can use this book to gain a better understanding of the following:

- *Up-front issues for planning:* Issues to consider before building or renovating health care facilities, including information that allows readers to make an effective, efficient plan at the outset. This saves time and money by moving the construction process from concept to completion more quickly and economically.
- *Joint Commission and JCI standards:* The current Joint Commission and JCI standards related to the planning,

design, and construction of health care facilities. Knowing the standards and the concepts that guide the standards gives organizations a basis for sound decision making that meets accreditation requirements and supports maximum quality and patient safety.*

- *Community needs via data analysis:* The importance of comprehensive data collection and analysis to align the strategic plan, master plan, and architectural plan. The key benefit to this approach is a project plan that addresses the needs of the community and establishes the goals of the organization to meet those needs.
- *Continuous process improvement:* The critical early role of process improvement and its use as an iterative activity throughout the project—first for design, then for process alignment with the design.
- *Collaborative design:* How to take building design from concept to reality, which requires the ability to make adjustments within the parameters of the overall plan and budget. This also requires all parties involved—leadership, staff, architects, construction workers, and others—to have a clear understanding of the plan and implementation to avoid unnecessary distractions, delays, and regulatory barriers.
- *Specialty-area design:* Special considerations for the design of laboratories, pharmacies, and hybrid operating rooms. This ensures that patient and staff safety are paramount when planning functional areas where very small mistakes can make the difference between providing safe care and negatively impacting patient, visitor, and staff safety.
- *The critical role of commissioning:* The importance of commissioning both the systems of the building and clinical processes. Properly test driving the equipment and simulating processes through realistic scenarios (starting in the design phase) while modifications may still be made has short-term and long-term benefits for the organization.

Content and Organization of This Book

This edition provides readers with information and strategies to help them succeed in their efforts to plan, design, construct, and safely occupy new or renovated health care facilities. The

scope of this book does not allow for detailed examination of every aspect of that lengthy and complex process and how to meet all local and national standards worldwide. However, it does provide guidelines and strategic linkages that organizations can use to plan and implement safe health care design in accordance with Joint Commission and JCI standards.

Chapters

The chapters in this book are organized to follow the typical process of a health care facilities construction project: planning, designing, constructing, and commissioning and the stages within those phases.

Chapter 1: The Planning Phase

This first chapter covers the specific aspects of the planning phase, the first phase of a health care facility construction project, including the importance of strategic planning on master facility planning and predesign (programming), and other important considerations within the planning phase, such as team selection, data collection, and budgeting.

Chapter 2: The Design Phase

This chapter focuses on key stages of the design phase that constitute the framework for the building process. For most projects, the stages of predesign, schematic design, design development, and construction document preparation are all fundamental to a well-designed and functional facility.

Chapter 3: The Construction Phase

This chapter discusses the stages of the construction phase that flow from the design phase and how to manage the subsequent increase in risk during construction through various types of risk assessments, interim life safety measures, and other actions.

Chapter 4: The Commissioning Phase

The final chapter addresses the commissioning/occupancy phase, including preparation for and activities needed to operate safely in the new space. An overview of both system/facility and clinical operations commissioning is provided, along with a discussion of transition and move-in activities.

* Standards referenced in this book are current as of this book's publication and are subject to change. For current Joint Commission or JCI standards, please consult the most recently published accreditation manual appropriate for your health care setting.

FOCUS Features

Before and after the chapters are special FOCUS features, some chapter length, that cover issues related to the various phases of the construction project process.

FOUNDATIONS: Standards and Regulations

This feature focuses on the role and importance of Joint Commission and JCI standards in the development of health care facilities, including how those apply to the construction project process. It also explains the Facility Guidelines Institute (FGI) *Guidelines* and other applicable regulations to the process.

PLANNING FOCUS: RPI and Change Management

Robust Process Improvement® (RPI), a process improvement method used by The Joint Commission, is introduced. The change management process that forms a part of this method is outlined with suggestions for applying it during a construction project. Note that the acronym RPI is also used extensively in Lean process improvement as Rapid Process Improvement, short studies of a limited-scope process.

PLANNING FOCUS: Alternative Facility Delivery Models

Four different alternative facility delivery models are summarized in this feature.

PLANNING FOCUS: Design Outcome Plan™

The Design Outcome Plan, created by the Safe Health Design ServiceSM of JCR for use on construction and renovation projects, is explained. A sample plan is provided as well.

PLANNING FOCUS: Value Engineering

This feature describes how this approach can be used for management of costs during a health care facility construction or renovation project.

DESIGN FOCUS: Forward-Thinking Design

This feature touches on the significance of patient-focused and environmentally sustainable design, as well as design for expanding technology and design for adaptive environments.

DESIGN FOCUS: Designing for Safety and Reliability

This feature describes issues involved in designing for life safety, infection prevention and control, security, worker

safety, and more. It also addresses evidence-based design and designing for facilities in developing countries.

DESIGN FOCUS: Specialty Design

Approaches to design for technically complex areas, including laboratories and pharmacies, comprise this feature. Special considerations are detailed.

CONSTRUCTION FOCUS: Construction Risks and Measures

Various types of risks present during construction of health care facilities are listed and explained. Measures to address these risks are provided as well.

COMMISSIONING FOCUS: Moving Day

This feature provides an overview of issues involved in moving into a facility, along with suggestions for making that transition easier and safer.

Key Terms

The health care, architecture, and construction fields are awash with terms and jargon. Understanding these and “talking the same language” are crucial for effective communication and collaboration. A list of key terms appears at the beginning of each chapter and feature. Key terms are in red and defined at point of use in the text.

Other Items

Throughout the chapters of this book, the following items will appear as appropriate:

- *Overarching Issue:* Insights into issues that occur throughout health care facility construction and renovation projects
- *Standards Sidelight:* Information highlighting how Joint Commission and JCI standards relate to the topic under discussion
- *Project Gallery:* Case studies focusing on organizations’ struggles and successes during construction and renovation projects

Joint Commission and JCI Standards

The Joint Commission and JCI are not involved in the design or construction process of health care facilities. There are, for example, no standards that drive the building codes. However, there are standards associated with construction and renovation projects. These are included in both the domestic accreditation manuals and the international manuals

(see [FOUNDATIONS: Standards and Regulations](#)). While project planning, design, construction, and commissioning issues remain fundamental to a safe design, most manual chapters address facility design in a broader sense because facility design can help an organization meet accreditation standards, offer safer care, and provide a safer and more efficient building.

Manuals to Consult

Early in the planning process, the most current edition of any relevant manual should be obtained for use and reference during the project.

Domestic Program Settings

Joint Commission standards for built environments in the United States appear in manuals for the following health care settings:

- *Ambulatory health care:* Surgery centers, community health centers, group practices, imaging centers, telehealth providers, sleep labs, rehabilitation centers, student health centers, urgent care clinics, and other ambulatory providers
- *Behavioral health care:* Organizations that provide mental health services, substance-use treatment services, foster care services, programs or services for children and youth, child welfare, services for individuals with eating disorders, services for individuals with intellectual/developmental disabilities of various ages and in various organized service or program settings, case management services, corrections-based services, and opioid treatment programs
- *Critical access hospitals:* Hospitals in the United States that offer limited services and are located more than 35 miles from a hospital or another critical access hospital, or are certified by the state as being a necessary provider of health care services to residents in the area. A critical access hospital maintains no more than 25 beds that could be used for inpatient care. It provides acute inpatient care for a period that does not exceed, on an annual average basis, 96 hours per patient. A critical access hospital can also have a distinct part psychiatric and/or rehabilitation unit; each unit can have up to 10 beds.
- *Hospitals (including academic medical centers):* General, acute psychiatric, pediatric, medical/surgical specialty, long term acute care, and rehabilitation hospitals
- *Laboratories:* Clinical laboratories, point-of-care testing facilities, assisted reproductive technology labs, and reference labs

- *Nursing care centers:* Organizations that provide specialized services to patients or residents, which may include rehabilitative care, dementia-specific memory care, and long-term nursing care
- *Office-based surgery practices:* Surgeon-owned or -operated organizations (for example, a professional services corporation, private physician office, or small group practice) that provide invasive procedures and administer local anesthesia, minimal sedation, conscious sedation, or general anesthesia that renders three or fewer patients incapable of self-preservation (able to leave the facility independently) at any time, and are classified as a business occupancy

International Program Settings

The international standards are available for the following JCI accreditation programs:

- *Ambulatory care:* The standards are applicable to a variety of service models, but primarily organizations where the patient population is outpatients seeking services—general or specialty, urgent or planned. Examples of specialty services include outpatient surgical services, diagnostic testing, dental services, or palliative care. Patients stay in the facility for short periods; however, if patients need to stay overnight due to a prolonged recovery, they are expected to be released or transferred to an appropriate facility within 24 hours.
- *Clinical laboratories:* Facilities that perform laboratory testing on specimens obtained from humans in order to provide information for health assessment and/or for the diagnosis, prevention, or treatment of disease
- *Hospital (including academic medical centers):* General, acute psychiatric, pediatric, medical/surgical specialty, and rehabilitation hospitals
- *Long term care:* Organizations that provide specialized services to patients or residents, which may include rehabilitative care, dementia-specific memory care, and long term nursing care
- *Primary care centers:* Organizations that focus on community integration, health promotion and disease prevention, first-contact medical services, and linkages to other parts of the health care delivery system

Common Themes

Common themes among all of the manuals and expectations that may be pertinent to a facility construction project include

those listed below. These will be woven throughout the book, with several called out in the Standards Sidelight features.

Leadership

- Leaders base project planning on the needs of community and/or the population base.
- Project plans reflect current best practices.
- Project plans are made with input from those in the field with knowledge of the various clinical and environmental needs—for example, pharmacy, nursing, infection prevention, imaging, and so on.

Patient-Centered Care

- Facilities provide the support services necessary for specific patient populations, such as radiology, food service, and laboratory services.
- Design is centered on the well-being of the patients, both physical and psychological.
- Privacy is provided for patients in care settings.
- Built environments reflect the needs of the disabled, age-related services, cultural needs, and others as may be appropriate.
- Families are integral to patient care.
- Belongings are secure at all times.

Staff

- Staff is provided appropriate and safe work space.
- Staff training is essential and space is identified for this purpose.

The Physical Environment

- Facilities are designed and built to provide a secure and healthy environment to patients, visitors, and staff.
- Systems are in place to manage hazardous materials and waste.
- A secure environment is maintained for users, equipment, and supplies.
- A safe physical facility is maintained for users, equipment, and supplies.
- Facilities plan for and manage probable emergency situations.
- Adequate utility systems and controls are in place.
- Fire safety protocols meet prescribed local or national requirements.
- Supplies of potable water and electricity are available 24 hours a day.
- Interim life safety measures can be met.

Infection Control

- Current scientific practices, as well as local and national laws, are followed to reduce the risk of infection.
- Appropriate airflow technology is installed to mitigate contamination potential.
- Hand hygiene accommodations are made.
- Proper equipment and processes are in place for disposal of waste.
- Sterilization and/or disinfection of equipment reflect current standards.
- Infection control risk assessments are conducted and solutions applied.

Information Management

- Patient records are protected and maintained so that they are secure.
- Confidentiality is maintained.

Medication Management

- Medications are safely received, processed, stored, distributed, administered, and disposed of.

Surgical and Anesthesia Care

- The physical environment supports the customary requirements of patient monitoring and medical technologies for life support.
- Air management is appropriate for temperature, humidity, and required exchanges.

Tissues

- Appropriate and adequate technologies are adopted to protect and maintain tissues for testing, research, transplant, or other purposes.

Exit Note

Some readers of this book will be new to many of the concepts contained within, while others will find familiar topics discussed. Regardless of experience, all readers should understand that entering into a construction and renovation project in a health care facility is a huge responsibility that will affect the lives and health of millions over the years that the facility is in operation. Knowing as much as possible about such projects is part of that responsibility.

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About This Revised Third Edition

The revision reflects the adoption of the 2012 *Life Safety Code*[®]* by the US Centers for Medicare and Medicaid Services and the subsequent changes to The Joint Commission's domestic Life Safety standards, effective November 2016.

This revised edition is current with Joint Commission International (JCI) standards in effect as of February 2017. Please note that JCI revises and publishes standards for its accreditation programs on an ongoing and as-needed basis. With each revision, standards may be added, changed, or eliminated due to evolving health care practices, changes in the health care environment, and clarifications needed to the standards. Refer to the current editions of JCI standards manuals for requirements that may not be reflected in this book over time.

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