An Architect's Retrospective

An Emergency Department Architect Looks Back: What a Long Journey!

Wow, what a wild ride it's been since I wrote and ACEP published the last emergency department design book more than 14 years ago. At the time of the last edition (referred herein as the 2002 edition), I had to date been involved in approximately 60 emergency department design projects. Now, as I reflect back on how emergency department design has changed since the turn of the century, I have the opportunity to draw from experiences of being involved in more than 325 emergency department design projects. This experience includes emergency departments of all sizes, shapes, and configurations and has taken me from Alaska to Hawaii to Florida in the United States, across Canada, down to Colombia, South America, and over to the Netherlands, Scotland, and England. While every location has unique emergency department design goals, it's amazing how much the challenges of each emergency department project are similar: having to shape operations and an environment to treat rising patient volumes and escalating acuities with less capital to spend on new facilities. Everyone in the world is focused on developing high-performance facilities in less space with smaller project budgets.

The variables shaping future emergency department designs are multiplying exponentially as the complexities of health care continue to evolve. The design responses for each client's set of unique operational goals include innovative responses for flexibility, efficiency, surge capacity, safety, technology integration, patient satisfaction, and staff satisfaction. And all of these variables need to be met within dwindling project budgets due to a tight worldwide economy and unknown future with regard to (in the United States) health care reform. Back at the turn of the century, the chief concern for most emergency department clients was, "How do we get away from curtained cubicles to all private rooms?" A few years later, the emphasis on lean operations added the focus of, "How do we make everything and everyone as efficient as possible?"

At the publishing of this book, early evidence suggests similar results as to what was recently found in *The Wall Street Journal*, that "American emergency departments have become busier since the Affordable Care Act expanded insurance coverage … despite the law's goal of reducing unnecessary care in 'ER.'"[1] In Louisville, Kentucky, *The Courier-Journal* reported that, nationally, nearly half of emergency physicians responding to a recent poll by the American College of Emergency Physicians said they've seen more visits since January 1, 2014, and nearly nine in 10 expect the number of visits to rise in the next 3 years.[2]

So, in the United States, with rising acuities, continued integration of technology, and growing competition (from competitor hospitals, freestanding emergency departments, urgent care centers, and commercial store-based convenience care clinics), the future of emergency care is headed for unforeseen horizons. Similar struggles are being felt with rising volumes in Canada and nearly all areas of Europe. And the design considerations to apply to your physical emergency department design to balance against the uncertain future are nearly overwhelming. However, I worked hard to develop this book in a way that will help you to define the key variables unique to your facility and services and to set the key architectural design drivers that will deliver success, no matter what country or region you're serving. This book will also present multiple options for design responses based on lean operational patient flow, rising acuities, volume surges, safety concerns, upgrading the patient experience, and the ability to treat the right patient in the right place by the right person.

The 2002 edition of this book was beneficial for the many physician leaders, nursing leaders, health care organizational leaders, and design professionals as they ventured into the process of redesigning, expanding, or relocating an emergency department for the first time. However, times have changed, and I know that developing a new edition for this book meant reviewing the information in the last edition, identifying what may still be applicable in the future, jettisoning the now-irrelevant information, and developing a new set of strategic emergency department design drivers based on the complexities of today's health care environment, including an eye to the future. I believe this edition will be a valuable asset to any emergency physician, nursing director, facilities director, administrator, architect, or contractor who is facing the specter of shaping an emergency department that will need to function for the next 15 to 20 years.

Whom This Book Can Help

This book is intended to help two types of professionals facing emergency department design projects:

- **The first-timer.** You're facing an emergency department project for the first time, and you need to understand the basics of initial planning methods, architectural design processes, various design concepts, alternative construction delivery methods, and the basic building blocks for sizing and shaping a successful emergency department design.
- **The grizzled veteran.** You're headed into another emergency department design project, and you might have read the last book, and now you want to explore new, updated design delivery methods, design concepts, and features to support future lean operations.

Please note that, throughout this book, I use the terms new or future, as in "your new emergency department" or "your future emergency department." These references are for any emergency department project—whether it be a completely new emergency

department, large (or small) renovation, or expansion of your current department. The terms new and future referred to within this text apply to any project you might be considering, no matter what size, scale, or cost.

Also, when I refer to the design team, I mean all participants: physicians, nurses, staff, your facilities department, ancillary department representatives, your architect, and maybe even your contractor (builder). Please don't relate the term design team only to the outside professional architectural and engineering designers with whom you are working. You'll see throughout this book that design team means everyone involved in the process … you included! And while architects, design students, contractors, and others from the design world might be reading this book, keep in mind that I wrote it primarily for clinical leaders.

New Points of Emphasis

The emphasis on lean operations (an approach that sprang from the process reengineering ideas at the end of last century) and the innovative approaches to streamlining patient care and movement continue to shape emergency department designs across the country and around the world. The focus on operational redesign as part of emergency department architectural design is part of this edition and is highly recommended for any design project you initiate.

The application of wireless technologies, portable charting tablets, and expanded emergency department information systems have all had impacts on emergency department design and will continue to affect new emergency department designs as more and more technology integration is achieved to assist the clinical staff in treating patients while addressing the ever-increasing emergency department volumes and acuities. Safety and security are more heavily stressed in this edition due to the continuing rise of safety concerns and events that occur in emergency departments across the globe in both urban and rural settings.

The impact of special patient populations, such as the ever-expanding health care needs of behavioral health, geriatric, pediatric, and bariatric patients, is also affecting emergency department designs as people compare the concepts of specialty spaces with that of multifunctional, universal patient care areas. Although the emphasis on universal rooms is still a driving recommendation for most emergency departments, the goal of meeting the needs of special patient populations remains an issue and challenge with regard to defining a flexible design solution.

While there has always been an emphasis on "patient-centered" design, there is a new focus on staff satisfaction, including the importance of staff retention. Simple design considerations such as accessible break rooms, locker rooms for the staff's personal items, and lactation rooms are taking on greater importance. Job satisfaction is also being supported with safe, clean, and appropriately sized charting and dictation spaces, some of which are glassed-in to provide auditory privacy for private discussions or visual privacy for computer or PACS screens.

The number of staff and clinicians working in emergency departments has grown over

Keeping Vertical Patients Vertical

What does this mean, exactly? To me, it means identifying patients who don't need to be positioned horizontally on a stretcher for care and, instead, can be treated in a vertical position—in a chair or recliner. Jody Crane, MD, MBA, coauthor of *The Definitive Guide to Emergency Department Operational Improvement*, says (and I'm paraphrasing) that the term vertical patient refers to someone who walks into the emergency department and will likely walk out of the department, that is, be discharged. This is a patient who doesn't need a bed for treatment or monitoring and could have his or her workup done as an outpatient with a primary care physician or in some other medical setting but, for whatever reason, either doesn't have access or chose to come to the emergency department.

the past few decades. Physicians, nurses, and technicians are being joined by advanced practice providers, patient navigators, social workers, crisis management personnel, patient advocates, discharge techs, and increasing numbers of students and residents.

There's a new emphasis on the use of observation units with the pressures associated with readmission policies. There's also more attention being paid to the design of infectious disease areas: they have to support policies and procedures for treating patients and keeping staff and clinicians safe, and they have to accommodate the donning and doffing of personal protective equipment (PPE) with enough space for a trained observer.

There are numerous other clinical, operational, technological, and regulation-based issues and components that are affecting emergency departments that are either new since the turn of the century or were in their infancy at the time of the 2002 edition. This new edition attempts to include alternatives for design that incorporate the numerous issues affecting efficiency, effectiveness, and sound clinical practice.

Also, the freestanding emergency department was in its infancy at the turn of the century. We now have nearly 20 years of history to evaluate older freestanding emergency departments and new information for future freestanding emergency departments that are currently on the drafting boards.

There are many new design and construction delivery methods as well that might be a part of your project delivery process. They will affect the way you interact with your design and construction team(s). Issues like lean design/construction methods, design-build firms, and integrated project delivery (IPD) will shape the way your project is delivered and are defined in more detail in Chapter 3, Project Delivery Options and Selecting Your Consultants, Designers, and Builders. You don't have to be an expert on these design and/or construction delivery methods, but I do believe it's important to clarify how the different processes might affect you as an in-house design team clinical leader.

Special thanks to Kathy Clarke, RN, BSN, CEN, for her unique clinical insights and information contained herein.

So, what's new since the last edition?

- Lean process redesign
- Greater scrutiny on clinician coverage (cost and availability)
- Increases in the number of advanced practice providers in emergency departments
- CMS reporting requirements for lengths of stay and "door-to" measures
- More widely integrated emergency department information systems: CPOE, wireless technology, biometric identification, computerized documentation
- At-home emergency department patient check-in software or apps
- Registration kiosks
- Greater scrutiny and management of frequent utilizers and "superutilizers"
- Combined triage and nonurgent/fast-track modules
- Strategies to "keep vertical patients vertical"
- Volume impacts from closure of emergency departments
- Five-level Emergency Severity Index (ESI) as the standard; the Canadian Triage and Acuity Scale (CTAS); and England's Manchester Triage System
- Competition from freestanding emergency departments
- Use of patient navigators
- Geriatric emergency departments
- Bariatric design regulations
- Prescription dispensing kiosks

- Universal use of WOWs (workstations on wheels)
- Highway billboards displaying wait times
- Ancillary standards such as CLIA
- Influence of TJC with national patient safety goals
- Focus and management based on real-time dashboards for length of stay, room utilization, and so on
- Increased security concerns
- Increased focus on infection control and Ebola-type patient processes
- Pressure of national best practice standards and benchmarks
- Emphasis on "door to study" (ECG, CT) and "time to intervention" (cardiac catheterization, interventional radiology, revascularization)
- Bedside ultrasonography (portable)
- Noninvasive positive-pressure ventilation (NIPPV) machines
- Conscious sedation procedures in the emergency department
- Thrombolytic therapy for strokes and MIs
- Focus on medication reconciliation
- Capacity plans to include surge volumes
- More implementation of no-diversion policies
- Communication devices with point-to-point (person-to-person) services
- And the things that never seem to change: rising volumes, rising acuities, increase in behavioral health issues, tight staffing budgets, and more

Have we seen these trends before?

While "today in the emergency department" feels very different than it did 10 years ago, I'm shocked at how similar the data being collected at the turn of the century are to the data being collected today: increasing emergency department use rates, an aging population, and in turn, increasing quantity of emergency department visits in nearly every region of the country. While we know that the new emphasis is educating the public and treating the right patient in the right place, whether that is in a primary care, urgent care, emergency care facility, or other location, the current utilization trends (increasing!) are very similar to emergency department utilization trends that we were all experiencing 10+ years ago.

Special thanks to David White, MBA, for assistance, unique insights, and information contained in this section.

In 2002, the American Hospital Association reported that there were more than 110 million emergency department visits in the United States.[3] With an estimated 2002 United States population of more than 288 million people,[4] the resulting emergency department visits per 1,000 population (also known as emergency department use rate) were 381.9 (meaning, for every 1,000 people, there was an average across the United States of just over 381 emergency department visits). Along with overall population, this emergency department use rate had been increasing at strong rates since the turn of the century—see **Table 1.1**.

The prevailing wisdom at that time was that the continued rapid growth in the number of emergency department visits was unsustainable, and that with the increased presence of more urgent care clinics and the advent of convenience care clinics, the number of emergency department visits would surely not exhibit such rapid increases or

TABLE 1.1.

Emergency department visits per 1,000 population, 2000–2002.[3]

2000	2001	2002
366.5	371.6	381.9

possibly even start to decline. Flash forward to data from 2012: there were more than 133 million emergency department visits in the United States.[5] Combine that with an estimated 2012 US population of almost 314 million[6] and you end up with a jump in emergency department visits per 1,000 population to more than 424. Not only that, over the past 3 years, the growth in use rates was still relatively strong (**Table 1.2**).

2010	2011	2012
411.7	415.5	424.4

When I wrote the 2002 edition of this book, only 19 states and the District of Columbia had an emergency department use rate over 400, and only six (including DC) over 500. By 2012, those numbers soared to more than 32 states with an emergency department use rate higher than 400, and 12 were higher than 500 (both include DC). There is tremendous disparity in emergency department use rates across the different geographic regions of our country, with the Pacific region (Alaska, California, Hawaii, Oregon, Washington) traditionally having the lowest (only 3,206 emergency department visits per 1,000 population in 2012) and the East South Central region (Alabama, Kentucky, Mississippi, Tennessee) having the highest at 524.[6] However, when comparing 2002 to 2012 (see **Table 1.3**), it's evident that each of the different regions has experienced strong growth in its respective emergency department use rates. Back in 2002, only three of the nine regions had an emergency department use rate over 400, with only one over 500. By 2012, there still was only one region over 500, but there were seven of the nine with emergency department use rates over 400.

TABLE 1.3.

Increases in emergency department visits per 1,000 population, by region.[5]

Region	States	2002	2012	% Change
New England	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	441.1	489.7	11.0%
Middle Atlantic	New Jersey, New York, Pennsylvania	386.3	444.7	15.1%
South Atlantic	Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia	397.6	435.8	9.6%
East North Central	Indiana, Illinois, Michigan, Ohio, Wisconsin	397.2	475.9	19.8%
East South Central	Alabama, Kentucky, Mississippi, Tennessee	501.6	524.7	4.6%
West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota	365.0	420.5	15.2%
West South Central	Arkansas, Louisiana, Oklahoma, Texas	408.4	434.7	6.4%
Mountain	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	321.8	345.8	7.5%
Pacific	Alaska, California, Hawaii, Oregon, Washington	295.6	320.7	8.5%

Doing More With Less

All of these data point to the continued need for state-of-the-art emergency departments. I can't quantify the exact future upward (increasing) emergency department volume impacts from health care reform. Nor can I quantify the future downward (decreasing) impacts, or potential success rate, of educating and diverting the nonurgent patients away from the emergency department. But I can tell you that the "new" economy has my emergency department clients rethinking every architectural design project

and focusing tremendous energy on confirming true facility needs for the future. No construction project dollar can go unjustified! All clients considering an updated or new emergency department wonder if they can afford the project or if there are more cost-effective strategic or operational alternatives to alleviate volume impacts and, thus, reduce new construction needs.

This book will show you how to analyze the need for a new emergency department, how operational redesign is a key component to not overspending on architecture, and how to develop economically sound solutions for any emergency department construction project. In summary, a lot of this book is focused on how to deliver more capacity with less available capital resources.

Think beyond.

The goal of this book is to push you beyond traditional architectural design concepts and to help you identify the common threads of what makes a successful emergency department design. This book identifies various architectural design and construction processes, planning guidelines, design tools, and numerous issues to consider that will help you throughout the planning and design process. I've placed great emphasis on providing practical step-by-step information as well as pearls and pitfalls based on actual case histories—from both my personal experiences and those reported by ACEP and Emergency Nurses Association (ENA) members.

This book will allow you to confidently take the lead on your design team, use your energies to make a positive impact on the project, and be successful in developing an emergency department design that meets the goals of your organization and the expectations of the patients, families, and communities you serve.

Am I hearing what you're saying?

And on that note, let's face it, physicians and architects speak different languages. As an architect, I have no idea what you mean when you say that a patient has a tension hemopneumothorax, flail chest, cardiac tamponade, DIC, ARDS, and so on. (I hope I got that right.) And as a clinician, you probably don't know how to respond when I ask you, "What's your preference on the vertical and horizontal alignment of the contextual fenestration on the southeast exterior elevation?" You're talking about a patient in trouble, and I'm just asking you where you want windows.

To help bridge this communication gap, I've attempted to include insights on what architectural terminology you might hear during a project and what your focus should be during various phases of the project.

The Design Experience

As a clinician or health care executive, you'll find that designing a new emergency department will take you out of your comfort zone and put you in a position to lead an in-house team through what might be a foreign process for you. However, a successful design project can be extremely rewarding for everyone involved, especially the in-hospital team leader. The challenge lies in defining the future needs and physical design solutions for an emergency department that will need to last 15 years or more. The reward will come when your new department opens and you know that you were a driving force for

its development and ultimate success, especially as you watch your emergency department design continue to support future operational and technological changes over the coming years.

Every architectural design project is complex, whether your department is renovating existing space, expanding into new construction, or building in a completely new location. No matter how big or small a challenge you think designing your emergency department will be, I can guarantee that it will be more difficult, more intricate, at times more frustrating, and more time consuming than you planned. However, by approaching the project systematically with clear goals, quantifiable objectives, and an ability to delegate to trusted team members, you can minimize the complexity of the challenge, reduce wasted time during the process, enjoy the process, and focus all your input on creating a truly exceptional emergency department. But what is success? That will be the initial question for you and your team to ponder as you start the process.

Cultural Similarities of Successful Projects

Every project is different, and due to existing facility conditions, challenging sites, different capital budgets, different design codes based on your jurisdiction, or limited space, no two projects are the same. However, the most successful emergency department design projects I've been involved with have included the following cultural similarities on which successful projects have been developed:

- **A view to the future.** Many times, emergency physicians and nurses create designs only as a reaction to what they hate about their current physical environments. Some examples: the current nurses' station is too cramped, so they tell the architect to make the new nurses' station as big as possible. The current patient care spaces are curtained cubicles, so all they want is as many private rooms as possible. More space and private rooms might be a part of the future solution, but defining the future based only on bad history is what I call a view to the past. A truly successful design team has clinical and organizational leaders who push the design team to look to the future. What *can* we do? How can we design for the future? A true leader will inspire and support originality, innovation, inventiveness, and creativity. By supporting out-of-the-box thinkers (who I like to refer to as out-of-the-curtained-cubicle thinkers) and establishing a design team culture that supports new ideas (operational, technological, and physical), the team will develop creative solutions that will set a course for a flexible and successful emergency department design that works well into the future. This brings me to my next point: leadership needs to come from within the emergency department.
- **A defined clinical leader.** Yes, your project will most likely be managed or directed by a vice president, director of engineering, or director of facilities. But strong leadership from within the emergency department is another key to success. If you expect your facilities director or architect to make all the right decisions for you without your input, then don't be surprised or disappointed when the new department is finished and it isn't all you dreamed it to be. No one knows your business like you and your staff do. As an emergency department leader, you have to be the champion for your team—and your team includes physicians, nurses, physician assistants, technicians, ancillary staff, and the architect! I don't believe the architect is the main reason a project is or is not successful. The architect is a major part of a successful team, but not even an architect who has a wealth of

knowledge and experience in emergency department design should be the driver of an emergency department design project. The drive, direction, and vision of a design should come from the people who deliver the care. A superior architect is someone who positions the caregivers to lead the project, inspires the caregivers to be creative, challenges traditional assumptions, and creates an environment in response to the caregivers' future needs.

- **Multidisciplinary teams.** Your in-house design team needs to be inclusive of physicians, nurses, physician assistants, technicians, registration support, and other emergency department staff. And the emergency department is not an island unto itself, so the most successful teams also include "partner" departments, such as Information Services, Imaging, Pharmacy, Laboratory, Environmental Services, Security, and more. The key point is that no physician, physician group, nursing group, or facilities department group can design a truly effective emergency department in isolation. Be very inclusive, and when appropriate, ask for input from volunteers, patients, and families. A great time to do this is at the outset of a project when you're defining goals and objectives. Work with your organization to set up a meeting with people who have used your services, and include their families. Yes, you should be able to guess the first 10 items your patients will want in a new emergency department, but you'll be amazed that you never thought of their 11th comment!

- **Physicians and nurses integrated from the beginning.** It's my experience that nurses (nursing staff, managers, directors) tend to jump right in and make the time commitment to be at every emergency department project design meeting. Physicians, on the other hand, tend to hang back and really want to get involved with the project only "when there's something to see." Meaning, many physicians want to set aside time for the emergency department project only when some preliminary drawings are ready to evaluate (OK, I mean criticize!). You'll see in this book that there are many key steps before the actual drawing is started that will shape the project, quantify a budget, define its path to success, and, ultimately, deliver a facility that will meet your needs. If you're a physician and wait to join the team to see the first drawings, you most likely are joining the team too late to actually affect the scope, budget, configuration, and overall success of the project. It sounds simple to get involved early, and I know with increasingly busy schedules it's very hard for emergency physicians to commit time to a design project. However, the earlier you're involved in a project, the more impact you'll have on its successful outcome.

- **A commitment to focused time.** So when you do set aside the time to be a part or lead the design team, make sure that when you are with the team you are *focused* on the emergency department project. I've seen many physicians and nursing leaders jump in and out of meetings, giving 5 minutes here and 5 minutes there, while they attempt to read e-mails and manage the department at the same time they're participating in the design meetings. I know you already have a job that takes 125% of your available time, but by setting ground rules with yourself and your staff about focused participation during the design meetings (ie, "for the next 90 minutes, don't call me unless it's an emergency"), the time you spend at the meetings will be the most impactful.

- **Strong support from administration.** If you don't start with support from senior administration (whether hospital or health system support), you're doomed to fail.

Or, at best, doomed to a project that will be delayed for multiple years. Convincing administration you need a new emergency department is addressed in this edition, but hiding the fact that you're building a case for a new emergency department can have severe impacts to project success or project schedule. I was part of a design team that was working diligently to define the needs, scope, configuration, and cost of an emergency department project when, after a few meetings, I said to the vice president over emergency services (who was a part of the design team), "So when will the CNO or COO or CEO be able to join us for a project update?" Dead silence. The vice president told me they didn't know anything about the project. "I wanted to get the scope and cost for the project established so we can get it approved more quickly," is what I recall his saying. Imagine the look on my face when I realized that senior administration (those over the VP) had no idea we were on campus developing a design for a new emergency department. Well, I scheduled a private meeting with this same vice president, and my message to him was that doing all of this work with no knowledge or support by his senior administration could be a problem for him in the long run. He took no heed to my warning; after another meeting, he told me and my team to wrap up the scope definition work, which at this point included a conceptual design and expected project cost in the $30-million range. The vice president thanked us and told us that we had completed our task. To make a very long story short, a year later I was finally summoned to a meeting in the CEO's office of this same organization. The CEO's first statement to me, as I recall, went something like this: "We hear you were on our campus last year working with the emergency department staff. Please update us on what occurred since the VP over emergency services no longer works here." (By the tone, I could tell, and you can probably guess, that it wasn't the vice president's idea to leave the organization.) Thank goodness the CEO and his administrative team weren't angry with me since the emergency physician previously involved with our work had relayed to them that I had recommended getting senior administration involved the previous year. The story has a happy ending, and an emergency department project was finally defined, designed, and constructed. But the schedule was delayed 24 months because of the need to reevaluate all findings and decisions with the input of the senior administrative team.

- **Managed expectations.** Another key to project success: always manage expectations. This might seem to conflict with "think outside the box." Successful thinking outside the box results in new ideas and innovative solutions; it does not mean "build a long wish list of everything you can think of and everything you could ever possibly want in the future emergency department." No project has unlimited money or available space (however, if you have unlimited money and unlimited space, please call me as soon as possible because *I want to work with you*!). Managing the expectations of the design team, the overall emergency department staff, and the ancillary department representatives will lead to a focused effort on defining true needs for the project. Consistently remind your design team that designs and budgets will go through a detailed review by your hospital, organization, or health system, and that every part of the recommended design must be justified. The intent is not to crush everyone's dreams, but to design and build an emergency department within reasonable expectations that will serve your clinicians, staff, patients, and families for years to come.

- **A focus on the patient experience.** Finally, always bring decision-making back to this question: "How will it affect the patient experience?" We all get myopic at times and tend to focus on how every decision affects our own little worlds. In reality, every design decision you make will affect hundreds of thousands of people over the coming years: you, your staff, the ancillary department staff members, the facilities department (who will keep the facility running), the families, and the patients. Any time you're confronted with a tough decision or a combative issue among your team members, step back and ask yourself: "How will each possible solution affect the patient experience?" The best design teams ask themselves this question consistently.

In summary, develop your design team with the following cultural mandates:
- ✓ A view to the future
- ✓ A defined clinical leader
- ✓ Multidisciplinary teams
- ✓ Nurses and physicians integrated from the beginning
- ✓ A commitment to focused time
- ✓ Strong support from administration
- ✓ Managed expectations
- ✓ A focus on the patient experience

Rethinking the Basics From 2000

When ACEP approached me many years ago about writing the previous edition of this book, it seemed like an easy task. There were just so many bad emergency departments designed over the previous 30 years with tiny curtained cubicles, limited privacy, and no flexibility. How tough would it be to recommend all private rooms and maximum flexibility? The emphasis back in the 1970s and 1980s seemed to be jamming in as many curtained cubicles as you could to maximize capacity. For that very reason, the major emphasis in the last book was maximize all private rooms; enlarge private rooms to allow for multiple family members and equipment; and develop all universal rooms to be able to see any and all types of patients in any space or room. While all of those design ideas are still being considered as part of the planning process for future emergency departments, the "new economy" and the impacts of health care reform are reshaping our focus.

Now, as I'm writing the new edition, I'm amazed by how emergency care continues to evolve, year by year, and day by day. I've had to review the 2002 edition of this book and challenge myself as to what has changed and what design components in the last edition are still applicable for the future. In researching emergency departments designed over the past 10 years that used the last edition of this book as a baseline, it seems most of the emergency departments have been successful. Now, as we all look into the future, we need to consider the impacts of a new economy (limited capital for projects), the unknown impacts of health care reform (what seems like even more patient volume arriving every day), the ability to treat the right patient in the right place by the right people, the continued need for maximizing flexibility, and the integration of key security and control features. We need to challenge ourselves to continue to develop responsive and flexible emergency department designs that will last another 15 years. Just saying, "Make all the curtained cubicles private rooms," was a great place to start 10 or 20 years ago, but the variables affecting emergency department design are much more complex as we look to the future.

There's no such thing as a perfect emergency department design.

I've designed hundreds of emergency departments across the United States and around the world and have interacted with many more people in ACEP, ENA, and similar organizations in Europe, and someone always asks me, "Who has the best emergency department design?" Or, "What's the perfect design?" While I have my favorite emergency department designs that are up and operating wonderfully, every project has different needs, budgets, and existing facility or site conditions that affect a final design. (Note: any of my past clients reading this book, my reference to having my personal "favorite emergency departments" was in reference to yours!)

While this book doesn't attempt to design a single perfect emergency department that you can all copy, it will outline the components to consider based on your unique variables, which include potential future volumes, patient types, services you're providing (or might be in the future), technology applications, workflow, staffing, and your goals for the patient experience. Yes, there are examples of excellent designs, but each one supports a unique set of circumstances. This book will identify such variables and how different operations and environments were developed (in parallel) to create successful physical designs. The intent is to deliver past success stories that give you a window into how you might design your future emergency department. This book will not, and cannot, identify a template or cookie-cutter solution. It will, however, provide you with a clear approach to identifying issues and discovering how innovative operational and design solutions can be used to deliver the very best in emergency department environments for a challenging, and as yet unknown, future of delivering emergency care.

The History of Emergency Department Design—Where It's Been, Where It's Going, What Went Right, What Went Wrong

The postwar era, 1945 to 1960, was a time of tremendous growth in the demand for emergency services as a result of increasing medical specialization, a declining number of general practitioners, increasing hospital-based medical technology, greater expectations by the public, and increasing third-party insurance support for emergency care.[7,8] The physical design of the postwar "emergency room" was that of an accident ward, usually a single room with limited materials, utensils, equipment, and personnel. At the time, emergency "room" architecture was not a design specialty; this area within a hospital was limited to a few spaces that had limited design features.

The first ACEP book on emergency department design, published in 1993, provided this perspective on emergency rooms of the postwar era: "It is estimated that 80% of [emergency department] visits were for treatment of less-than-life-threatening conditions, treatment that previously would have been given in a physician's office; 15% were for emergencies requiring immediate attention, and 5% were for treatment of critically ill patients."[7,9] The only thing that seemed to matter was having a door or corridor to the outside that was most likely accessed by the loading dock, dumpsters, morgue entrance, or any of the other "back-of-the-house" hospital services. Even though the American College of Surgeons and other groups were developing loose guidelines for emergency department

physical plants in the late 1950s,[7] few architects were incorporating the needs of emergency department care clinicians. In the architectural world of the 1950s, very few architectural firms specialized in health care design.

In the late 1960s and early 1970s, when emergency medicine started to emerge as a medical specialty, new architectural designs were being constructed in response to growing patient volumes. In turn, specialized "health care design firms" were starting to develop. Health care architecture was expanding as an architectural specialty. Only the most innovative health care design firms were incorporating caregivers into the design process. But because the number of hospital design projects far outnumbered the available specialized health care architects, most of the architects hired to do hospital designs were the same architects who were designing homes, commercial buildings, apartment complexes, and other non–health care projects.

During this boom period, the majority of the non–health care architects took their best shot at designing what they perceived were large doctors' offices designed for sicker patients. The cumulative effect of the absence of insight into emergency care, failure to incorporate caregivers in the design process, and rapidly changing services provided in emergency departments is this: 25-year-old emergency departments that have been physical and operational disasters since the day they opened.

At the same time emergency medicine was becoming the 23rd certified medical specialty in the late 1970s,[7] the general design and construction industry was coming to a standstill as a result of the declining US economy. The only industry in the late 1970s that still seemed to be doing new construction, out of necessity to meet patient growth, was the health care industry. And at that time, the majority of health care construction projects were undertaken to meet the rapidly expanded need for medical office buildings (MOBs). Most non–health care architects who needed to keep their firms alive in the depressed economy pursued and completed MOB projects. At the time, very few MOBs actually had imaging or outpatient surgical facilities within the buildings. Although any architectural project has its own complexities, the MOB projects were, in effect, general office buildings with examination rooms.

By the early 1980s, the specialty of health care architecture was flooded with architects whose only health care design experience was through their work on low-tech MOBs. These MOB architects were being identified as hospital design specialists. In turn, MOB architects were being hired to design highly complex hospital structures, many of which included emergency departments. Subsequently, numerous emergency department designs completed in the late 1970s and early 1980s were the first real high-tech, highly complex hospital projects for many aspiring health care architectural firms.

Many of these emergency department designs were not based on caregiver input or any functional knowledge of how emergency care was being delivered (or how it would be changing in the future). Even designs based on caregiver needs were not adequate as a result of the understandably limited foresight of emergency department caregivers into the rapid changes affecting emergency care.

Although some of the longstanding health care architectural firms completed successful emergency department projects, most of the emergency department designs completed in the 1980s were nonfunctional. The only saving grace was that most of the new departments had limited patient volumes, and the nonfunctional designs were not having tremendous impact on functional efficiency and patient throughput times. The tidal wave of emergency department volumes that was just around the corner in the early 1990s was going to expose these nonfunctional departments as a threat to efficient, effective, and

safe emergency care.

During the 1980s, more architects began to include emergency department caregivers in the design process. The timing was excellent; emergency departments were being reinvented with specialties and included more trauma spaces, pediatric and psychiatric components, fast track and urgent care areas, and so on. By partnering with emergency department caregivers in the design process, health care architectural firms gained intimate knowledge of emergency department operational workflow. In turn, more functionally efficient designs were created. However, too much of a good thing can be a bad thing. The increasing need to accommodate specialty care within the emergency department was going to have a negative impact on overall emergency department design.

By the late 1980s and early 1990s, the emergency department specialties (fast track, observation, chest pain, psychiatry, and so on) were starting to influence caregivers into requesting completely separate care components, or modules, for each specialty. This began a wave of what I termed "segregated" emergency department designs. For example, numerous fast track modules were being designed completely separate from the emergency department, some even down the hall or on a separate floor. Chest pain units were also being constructed across corridors or down the hall from the main emergency department. Some designs completely segmented four or five or more acuity levels (trauma, emergent, urgent, nonurgent, medical, surgical, psychiatric, and so on) into separate units. This segregation eliminated the flexibility for sharing examination rooms as needed between patient care areas, increased the amount of materials and equipment duplicated in each area, and increased staffing needs to cover each separate component.

Granted, some of these separate modules still function relatively effectively for some hospitals. However, I still believe that separating emergency department modules across public corridors, in remote areas of a building, or even on separate floors can jeopardize efficiency and effectiveness. This is especially true when patient volumes change within each segregated module and there are no more adjacent spaces available to handle overflow. Dr. Charles Eckert, in his 1967 (yes, 1967!) book on emergency care, stated: "Since the workload of an emergency room cannot be easily controlled or compartmentalized, all space should be planned so it can serve multifunctional purposes."[7,10] Funny how what goes around comes around! I believe the overspecialization and segregation of emergency department modules severely affected the flexibility, efficiency, and effectiveness of many emergency department designs throughout the 1990s.

Dawning of the New Millennium: A New Front Door

Well, after we all survived Y2K (ha!), emergency department design was taking on added importance in a large number of hospitals around the country. The C Suite (ie, CEO, COO, CFO, CNO, and so on) in many organizations seemed to realize for the first time (or admit for the first time) that the majority of the patients in their hospital inpatient units or using their outpatient facilities had gotten there through the emergency department. With rising competition in nearly all corners of the United States, the emergency department was becoming a major piece in the chess game of outmaneuvering the competition for increased market share. Many older emergency departments were being renovated for the first time in 20+ years, and many emergency departments with minor renovations in the previous few years were being expanded again. Many of the emergency departments that I worked on personally were being relocated to the front side of the hospital with easier access and better visibility for automobile traffic. Emergency department design seemed to be hitting its stride, and with the help of the previous edition of this book, many of those emergency

departments were designed for maximum flexibility. Add to this the increase over the past decade in the number of freestanding emergency departments, and it became obvious the emergency department was becoming an important tool in the push for market share and organizational success.

The emphasis of the 2002 edition was to eliminate overspecialization of emergency department space, maximize flexibility, and decentralize materials, supplies, charting areas, and so on to maximize efficiency. While I had personally integrated emergency department process redesign into my standard process with every project since 1994, many times we had to persuade hospital and emergency department leadership to redesign operations as part of the physical design process. But as we got closer to year 2010, it seemed all areas of the United States, Canada, and Europe were focusing on lean operational redesign. Now, as the lean movement (or some form of operational redesign) became more readily acceptable in most hospitals, I was finding that emergency department staffs around the world were already accustomed to rethinking the way they work as part of an emergency department design project.

However, I was still touring other emergency departments that were designed and constructed without thinking about streamlined operations. This led to many emergency physicians finding me at conferences and saying, "I have a beautiful department that doesn't work." Luckily, in this day and age, it is very uncommon to find an emergency department being physically redesigned that is not considering new, streamlined operations at the same time. In fact, that should be the first red flag in your emergency department design journey. If your architect asks you how you work now so he or she can redesign the emergency department to meet your old way of working, you need to challenge your architect to forget about the past and think about the future.

Even emergency department clinical teams that have redesigned operations in older emergency departments (without physical redesign) have still had to make operational compromises, or workarounds, due to inflexible or challenging physical environments. The challenge for these staffs as they enter a new emergency department design project is to determine what newly designed operational flows that they currently use in the existing emergency department would still be considered best practice in their future emergency department.

Two Decades Into the New Millennium: The New Normal

Will there ever be a time when the economy isn't a challenge? I think we can all admit that the "old normal" of what seemed like readily available capital isn't coming back any time soon. As we deal with this "new normal" of challenging economic times, we in the United States also have to consider the impact of health care reform.

Recent reports indicate that health care reform and the millions of new covered lives are leading to immediate emergency department volume increases in all parts of the United States. I believe this trend will continue until at least 2020: it will take that long for most hospital systems or standalone hospitals to develop the appropriate facilities, primary care networks, and implementation strategies for educating, diverting, and staffing facilities outside of the emergency department that will handle the sudden increase in nonurgent patient volumes. Emergency departments designed over the coming years will have to be designed with enough flexibility and capacity to handle this 5+ year rapid increase in volumes while not overbuilding for the long term. And overbuilding isn't going to happen with tightening budgets and limited financial resources that are affecting nearly all hospitals and health systems.

A Lesson From Europe

If the ability to educate and proactively divert nonurgent patients away from the emergency department is realized, we only have to look to the Netherlands for the impact on the emergency department. I led an international design team while I was with DLA FreemanWhite during an emergency department design project for a facility in The Hague, Netherlands. It had been mandated by governing authorities that the overuse of the emergency department by nonurgent patients was going to be addressed by the development of a general practitioner office immediately adjacent to the emergency department. With no worries about EMTALA or similar US laws governing a medical screening examination (MSE) prior to diversion, triage personnel in The Hague could immediately divert to the adjacent general practitioner office. The successful ability to immediately divert 15% of their patients to another location yielded short-term volume reductions and, thus, short-term capacity increases in the main emergency department. However, after just a few months, the emergency department volume reductions filled in with higher acuity patients. This led to increased length-of-stay times in the emergency department because the nonurgent (ie, quicker) patients had all but been eliminated in the main emergency department (during general practitioner hours).

So, I believe this poses a very interesting operational and design challenge for new emergency departments in the United States: How do we design an emergency department in the short term that might have an increase in nonurgent patients due to health care reform while still designing an emergency department for the long term that will need to treat a much higher average acuity when (if?) nonurgent patients are successfully and proactively diverted to more cost-efficient locations? The key is to design emergency departments so that providers can see the right patient in the right place by the right person and have the flexibility to change operationally as acuities and volumes change over the coming years. This book addresses these challenges and more (ie, security, confidentiality, technology integration, lean operations) by documenting how we've addressed these challenges in recent designs and those new concepts being considered for future designs that are currently under development.

The Debate Over Future Volumes

The debate will continue over whether emergency department patient volumes will continue to increase, level off, or decline over the next 10 or 15 years. I believe that growing populations, increasing patient volumes, and larger numbers of older, sicker, and more seriously injured patients will dictate the need for expanded emergency departments with larger, more flexible patient care spaces. In the future, emergency departments will be high-tech environments to support the sickest of the sick patients. We all will have to reevaluate traditional design concepts. Staff safety and tightening staffing budgets will influence the planning and design of emergency departments as well. Finances are getting tighter and tighter. Hospitals are not throwing money at new facilities as they might have seemed to in the past. When you get the chance to redesign your emergency department, do it the very best you can within the resources available.

Next Chapter: Preparing to Lead and Internal Team-Building

The next chapter covers why you need to lead your in-house design team—or why you should delegate that responsibility to someone else if you can't make the commitment and set aside the time to lead. The next chapter also covers the creation of your in-house committees and teams to gather maximum input for your project.

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FOR MORE INFORMATION

These five online resources have a lot of good information about emergency department utilization.

- National Hospital Ambulatory Medical Care Survey/cdc.gov
- The National Center for Biotechnology Information/ncbi.nlm.nih.gov
- The National Emergency Department Sample/hcup-us.ahrq.gov/nedsoverview.jsp
- The RAND Corporation/rand.org
- The Robert Wood Johnson Foundation/rwjf.org

Chapter 1: An Architect's Retrospective

Key Considerations Worksheet

Some of the chapters in this book lend themselves to a workbook approach. So I'll summarize some key points and define a few items to consider and give you space to jot down notes and ideas.

Your Personal Viewpoint on Health Care Reform and Emergency Department Volumes

If your organization's administrative leaders ask you how health care reform will affect future emergency department volume, what will you say?

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Your Personal Design History

Are there past emergency department experiences that you've had that are applicable to your new emergency department project? Are there operational systems, physical design components, or technology applications you would use again in the future emergency department? Or some you would avoid repeating?

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Any Help Out There?

Do you have colleagues who have been through an emergency department design recently that can offer you insight?

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What Will Be Your Design Team's Cultural Mandates?

❑ A view to the future
❑ Multidisciplinary teams
❑ A commitment to focused time
❑ Managed expectations
❑ Other?

❑ A defined clinical leader
❑ Nurses and physicians integrated from the beginning
❑ Strong support from administration
❑ A focus on the patient experience

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