Office Space Planning and Design for Medical Practices: Part 3, Implementation, Design, and Construction

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The decision to build anew or remodel/add-on to your existing facility can be a tough one. Once that decision is reached, the implementation of design and construction presents many difficult hurdles on the road to achieving a functional office space in a cost effective manner.

This article will continue to explore just how a practice goes about that implementation process.

Key words: Medical practice facilities; building new medical practice facilities; remodeling medical practice facilities; planning medical practice facilities.

Editor's Note: *In this issue, we present the third of four articles that describe the process of evaluating space needs, planning, and construction for medical offices (see Volume 18, Pages 244–249 and Pages 299–303.). Although some readers may not currently be contemplating remodeling or new construction for their practices, we believe the points described will be of value for understanding the intricacies of the process. (Parenthetically, they are useful as a background even for home improvements!)*

INTRODUCTION

In the previous articles in this series, we have been concentrating on the nuts and bolts of assessment and planning, giving the left side of our brain a heavy workout in analyzing your practice and determining how you should move ahead. You have decided that a new or remodel project is the best way to achieve your practice goals, and more than likely, you are now ready to start pounding nails. You have a ways to go before the concrete trucks show up.

In reviewing the Flow Chart that has been part of each article, we are now further down the decision-making tree (Fig. 1). Now we will start to give form to the spaces needed to support your practice as well as discuss the construction process of getting the office built.

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IMPLEMENTATION: DESIGN AND CONSTRUCTION

The process of designing a new medical office is complex and requires the talents and expertise of many professionals. Keep in mind that the more complex your practice, the more complex the design process. However, smaller offices should go through the basic design steps to arrive at the goal of a maximally productive office.

Why an Architect?

First, you will need the services of a design professional who is trained and experienced in medical design. If your project is a new building, you will need an architect, as mandated by state laws. An architect functions on two parallel levels: on one level the architect is working for you on the design of your new building, and on another level the architect is working for the general public in protecting their health, safety, and welfare when it comes to the completed environment. Architects are familiar with the building codes, Americans with Disabilities Act (ADA)

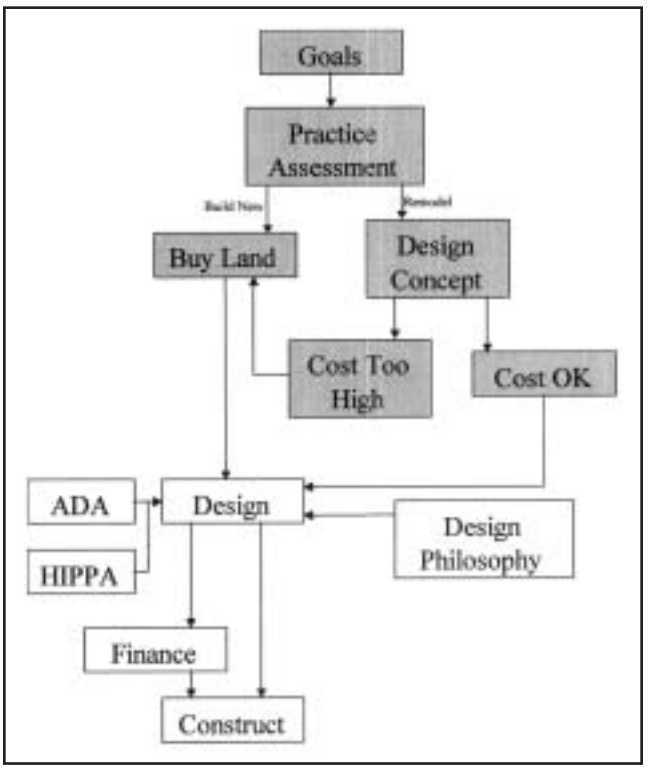

Figure 1. Flowchart of decision-making and design process.

requirements, accessibility requirements, and other governmental regulations that affect how you build your project. It is a legal requirement that the drawings and specifications used to build your project be prepared and sealed by an architect licensed by your state.

Architects are familiar with the building codes, ADA requirements, accessibility requirements, and other governmental regulations . . .

Beyond the legal requirement to employ an architect, there are many other reasons to enter into a relationship with an architect, particularly one that is skilled and knowledgeable about your practice and medical planning and architecture. Medical architecture is not about building buildings; it is about building practice space and manipulating workflow patterns. Your office is a practice tool, and to maximize the effectiveness of this particular practice tool, an architect experienced in medical architecture is needed. When considering whom to use, be sure to ask certain questions:

- How experienced is the architect with ambulatory medical facilities?
- How experienced is the architect with practices of your specialty?
- What is the experience level of the people who will be working on your project?
- Is the architect licensed in your state?
- Who will do the medical planning for your project?
- Who will do the architecture for your project?
- Can the architect meet your schedule expectations?
- Do you and the architect share common values and design aesthetics?
- Does the architectural firm have the depth and manpower to design your project in a timely manner?

SIX STEPS OF THE ARCHITECT'S PROJECT

After an architect experienced with your type of project is selected, he/she will assemble a team of engineers and other consultants to work on your project. The project will then be organized into six basic steps, with the information developed in one step building on the prior steps.

1. Project definition
2. Schematic design
3. Design development
4. Construction documents
5. Bidding and negotiations
6. Construction phase services

Project Definition

The first step is to define how you expect your building to perform. What kind of materials are appropriate, who will maintain the structure, what level of quality do you expect, and what are your expectations on indoor air quality and temperature? What kind of roofing systems do you want or need? You may have an opinion on some of these (no one has asked us to design a high-maintenance building), whereas you may not have any experience with others. Nonetheless, this is an important first step in defining the quality of the building you expect and understanding the cost relationships of those decisions. Your architect can help guide you through these issues to help you achieve the quality levels you want balanced with your budget goals.

Many times, an owner may express an opinion on a building material or design feature that has implications on other aspects of the project. We once had a client who did not want a low-slope roof ("flat roof") and they had no idea that the type of roof they desired had an impact on the mechanical system, the storm water drainage system, and the cost of the building. The pros and cons of the different roofing systems were discussed, along with the impact that those systems have on the building technology and long-term costs; then, the owner could more appropriately determine if the bias toward sloped roofs was really the correct one for the project.

During this phase, some basic information on the selected site or building is gathered. For a new building, the architect will need a comprehensive land survey iden-

tifying boundaries, utilities, easements, topography, and other site features. Sub-surface soils investigations will need to be performed to determine the type of foundation system that is suited to your project. Local codes and ordinances and the process for approvals are researched.

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For a renovation or tenant up-fit project, "as-built" documents and drawings are needed. After the basic parameters of the project are defined, the design process will start in earnest. The next step is the schematic design phase.

Regulations

Many aspects of your facility are regulated through various building codes, zoning ordinances, and federal and state requirements. Your design team will help guide you with decisions relating to each of these. However, a basic understanding of what these mean to your development is important to have. Let's start with the local regulations and then broaden that to the state and federal levels.

Local. Each locality will have different bodies and governmental agencies that will interact with you and your construction team on your project. These include:

- **Zoning and Development:** This department will determine if the land is zoned correctly for the use you intend and what specific requirements must be met on the land usage. This generally includes parking requirements, building setbacks, height and area restrictions, landscaping requirements, and buffers (typically required adjacent to residential areas).
- **Engineering Department:** This department will have specific requirements on storm water management, water metering, sewer connections, and driveway design and location.
- **Fire Marshal:** The fire marshal will review your plans to determine how the fire-fighting apparatus can be deployed. They will also review your sprinkler design and fire exits. In some states, both a local and a state fire marshal will review your plans.
- **Building Department:** The building department will review your plans, issue the building permit, and inspect the project at different stages of construction. Typically, this department is charged with interpreting and enforcing the building code. The Building Code is a comprehensive set of requirements on how a building must be designed. It includes such things as height and area limitations, allowable construction materials, exiting, fire resistance, and minimum design requirements for structural, mechanical, electrical, and plumbing design. It is important to note that the building code is a collection of minimum requirements; often, sound engineering and architectural practice will exceed these requirements.
- **Department of Health:** This department or other similarly named state agency will review plans for some types of medical facilities such as ambulatory surgery centers, nursing homes, or another type of facility where the occupants may not be capable of self-preservation. This department may have its own set of regulations or will have adopted the regulations of widely published guidelines such as the American institute of Architects (AIA) Guidelines for Design and Construction of Hospital and Health Care Facilities. These documents will often refer to other codes and standards, as well. This can create a long list of requirements that unfortunately are sometimes in conflict with one another.

Federal Requirements. Two of the federal requirements that will impact your design are the ADA and the Health Information Portability and Accountability Act (HIPAA). The ADA defines what needs to be done to accommodate persons with disabilities. For facility design, it largely requires all spaces to be wheel chair accessible (for patients, staff and doctors) or to be readily adaptable. Many states have developed accessibility codes that are more stringent than the ADA.

HIPAA concerns itself with patient confidentiality particularly in regards to access to the medical record. For your facility design, this may mean that the medical record files will need to be securable from unauthorized access. It also means that close attention be paid to the manner that patients are registered and checked out of your facility to prevent others from overhearing sensitive conversations. Even the orientation of computer screens becomes important.

As mentioned earlier, the design of the facility, both in plan arrangement and in construction details, will need to address sound attenuation, particularly in patient contact areas.

Compliance with the various regulations and requirements is a time-consuming part of the design process. Nonetheless, occupancy of projects has been delayed through inappropriate interpretation of the codes. For these reasons, it is important that the local and state reviewers should be consulted early in the design process to solicit their input and keep them informed of the decisions being made on your project.

Schematic Design

The design of a well-functioning medical office building requires the talents of both a skilled medical planner and a skilled architect. Sometimes this is the same person, but more often, two different design teams perform these tasks. The medical planner is responsible for protecting the integrity of the medical plan: patient flow, staff flow,

and doctor flow. The architect is responsible for protecting the architecture: aesthetics, building technology, construction cost, and schedules.

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By having someone working on your behalf in both of these critical arenas, the best balance can be achieved to reach your facility needs. Often, we see a building that has created a particular aesthetic or solved a site problem in a way that made sense to the architect but created an unworkable or inefficient medical space plan. This happens often in speculative medical office design. Most often, the developer is primarily concerned with getting the cheapest building with the most rentable square footage at the expense of creating workable floor plates and configurations for the medical practices that will reside inside.

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We have also seen just the opposite, where an architect blindly built walls around a particular medical space plan and created not only an unattractive building but also one that added unnecessary cost to the construction.

When projects undergo multiple concept developments . . . either the underlying program is in error or the design team does not understand the operational requirements of the practice.

In developing the schematic design of your new facility, your design team will endeavor to develop a comprehensive design that solves the needs of your practice, creates attractive and appropriate architecture, and places the building on the selected site. Generally, the schematic design will be illustrated with scale floor plans, building elevations, site plan, and artist's drawings or models of what your building will look like. Our primary focus in preparing the medical space plan as part of Schematic Design stresses the following:

- Minimizing doctor movement within and between exam and treatment rooms.
- Controlling patient flow.
- Providing patient confidentiality by plan arrangement.
- Encouraging in-office collections.
- Providing an attractive work environment.

This phase is usually an iterative process where the design team will devise a solution, present and discuss the solution with you, and then make changes or enhancements to the design. If you have followed the roadmap up to this point (proper planning and design team selection) then the schematic design will go quickly. Most of the facility designs that we develop are approved after only minor modifications. When projects undergo multiple concept developments and schematic designs it usually indicates that either the underlying program is in error or the design team does not understand the operational requirements of the practice.

Design Development

This is an intermediate step in the creation of documents that a contractor will use to construct the building. During the previous phase, the general nature of the project was defined; however, many aspects of the design were not addressed. It is during design development that the design of your building is fleshed out, including the structural system, the heating and air-conditioning systems, the electrical requirements, and other engineering requirements. The ceilings and lighting designs, cabinet designs, equipment layouts, exam room details, wall construction, window types, and other aspects of the building are determined. Decisions are also made regarding communication systems (and how the practice will integrate them into their practice style).

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At this stage, you will be asked to approve the details of the design that you can see and touch. The particular details of the building, such as the thickness of walls and the depth of beams and structural elements, with which most doctors have little experience, are left to the design team to determine.

At the end of the design development phase, you can expect to have an extensive set of drawings and outline specifications that define what your new facility is going to look like and what is generally required to construct it. At this point in the process, local contractors or project estimators can estimate the project.

Construction Documents

When you put together your design team, you entrust them to design a building that will meet your medical needs and expectations for the building's performance and aesthetics. To bring that vision to a successful con-

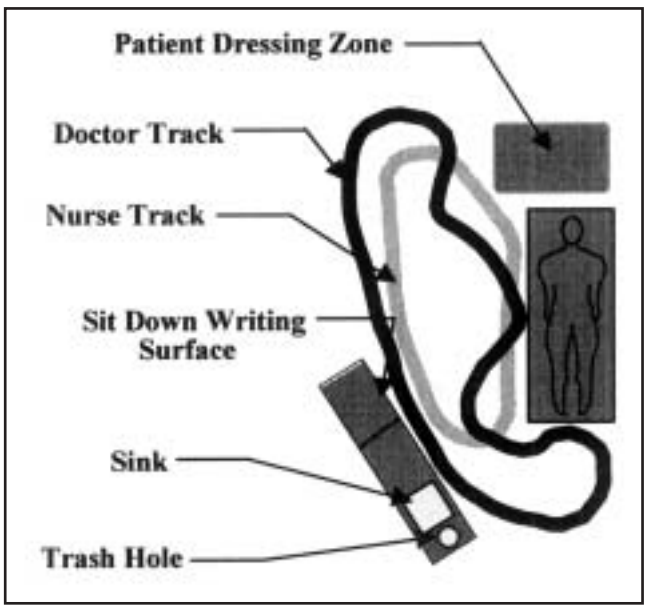

Figure 2. Room organization sample (shows relationships of elements).

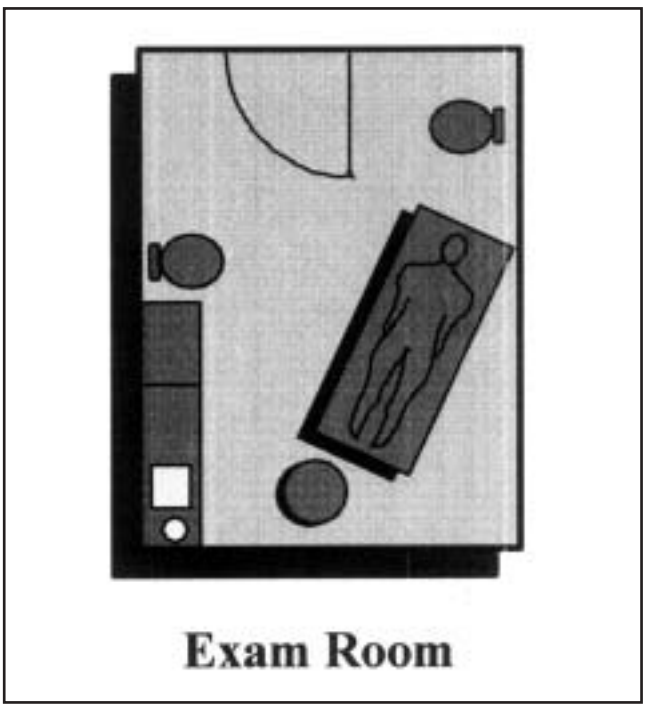

Figure 3. Sample exam room.

clusion, the design team will need to prepare detailed construction documents, often referred to as "working drawings." These documents spell out in detail the quality and quantity of materials and how and where these materials are to be installed.

The construction documents are extensive and describe the building to the governing authorities, as well as the contractor and sub-contractors that will perform the construction. These documents also form the backbone of the owner-contractor contract and define the responsibilities of the contractor, the owner, and architect during construction. These documents are then given to the selected contractor or contractors for pricing.

Bidding and Negotiation

There are two basic methods that are used to select a contractor to build a project (excluding design-build, which will be discussed in Part 4 of this series), competitive bidding, or direct negotiation. When a project is competitively bid in the private marketplace, you are free to select and pre-qualify the general contractors for your project. Find contractors that are familiar with medical office construction, are appropriately sized, and have a track record of successful projects.

When competitive bidding is selected, each general contractor is given the drawings and specifications and asked to provide a bid due at a specific time and place. Under this method, the lowest qualified bidder is awarded the project. If the project is to be negotiated with a single pre-selected general contractor, then the completed drawings and specifications are given to him, and he/she will provide either a lump sum price or a guaranteed maximum price.

In either case, at the end of this phase, the cost of the project is determined. However, the final cost of the building is not determined until actual construction is started and finished. In the history of construction, a perfect set of construction documents has never been created. There will always be coordination issues, missed items, and other construction-related costs that should be planned for (that is why you have a contingency in the economic pro forma discussed earlier).

Construction

This is when the building or suite is actually built. During the construction of the building, the contractor and the design team will handle many issues. You may be asked to approve some aspects of the project, and you will most certainly find some things that you want to do differently.

The contractor will generally submit payment applications monthly, and your design team will visit the construction site periodically and approve and certify the contractor's application for payment. The local building officials will also visit the site and inspect the work of the contractor at various stages of the construction. When the project nears completion, you and your design team will inspect the work and develop a list of items (the punch list) that need to be addressed or completed.

Closing out the construction will require a significant effort on everyone's part. The contractor will need to complete his work and provide the necessary closeout documents, and you and the design team will need to make the final inspections and approvals. After the final touch-up is complete, the facility will be ready for final move-in.

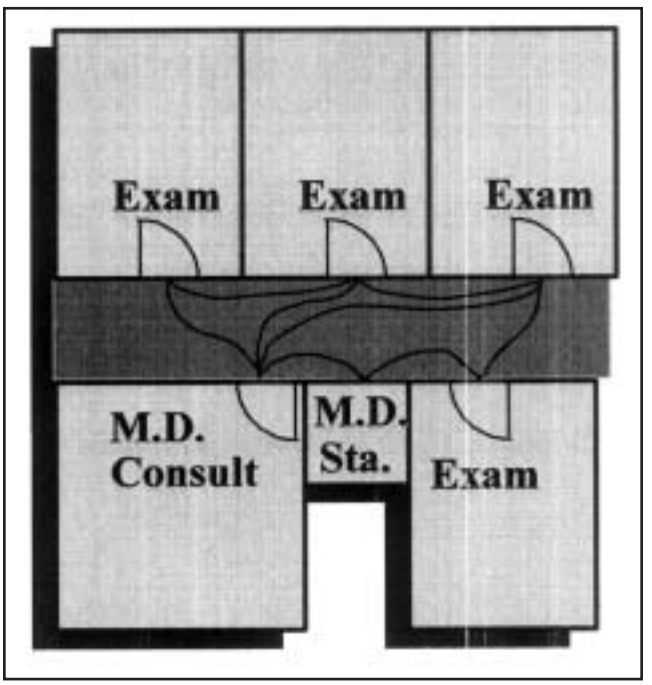

Figure 4. Conceptual 4-room exam module.

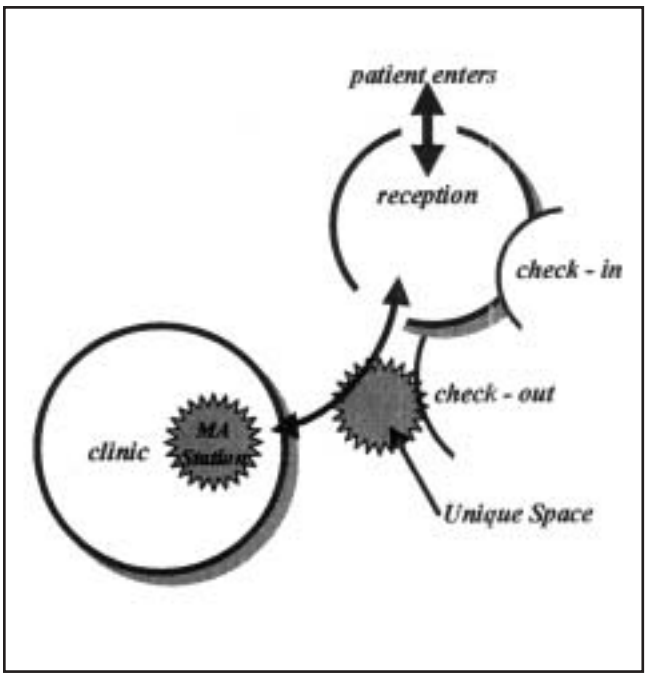

Figure 5.

MEDICAL DESIGN CONCEPTS

The one aspect of your new medical office that requires the talents and expertise of an expert in the field is in the medical planning of your space. Most medical offices will center on maximizing access to the specialized medical knowledge of the doctor. This interaction usually takes place in the exam room, so that is a good place to begin.

Exam Room

The exam room must accommodate the patient and a family member, the doctor, and a staff member. The design of the exam room needs to be broken down into zones for each user. Figure 2 illustrates the relationships for a primary care, internal medicine, or sub-specialty exam. Other specialties will require different exam room organization.

The exam room must accommodate the patient and a family member, the doctor, and a staff member.

This set of relationships allows the doctor to do a "right-handed" exam, control the exam room, have the patient and counter within an arm's reach, and be assisted by a nurse without getting in each other's way. By placing the doctor/staff work zone near the door, you can eliminate the tendency for a patient or family member to block the exit from the exam room.

After you have determined the work zones, it is important to also understand the interaction that takes place in the room and how to configure the room to keep the doctor and staff in control of the exam process.

A design of an exam room that reflects these needs is shown in Figure 3. After placing walls around the work zones, the particulars of the room can be worked out, such as:

- Is there a need for a sink in the room?
- What does the cabinetry need to hold?
- Are view boxes needed?
- Where should the sharps container be located?
- Do you need to accommodate a monitor for an electronic medical record?
- What type of lighting is appropriate?
- Where is the room light switch to be located?

One important aspect of the exam room is the need for acoustical privacy. This will dictate how the walls and ceilings are constructed and the types of doors that are used. These are medical planning issues that require close coordination with the architect to be sure the intent of the planning is carried through construction.

Exam Modules

With the basic work environment for the doctor developed, you can then begin to arrange them into exam modules. As discussed in our previous article, the exam module contains the rooms and spaces that are used by the doctor in the course of their clinical day. The exam module is supported by staff workspaces and should be developed to allow the doctors to be well supported.

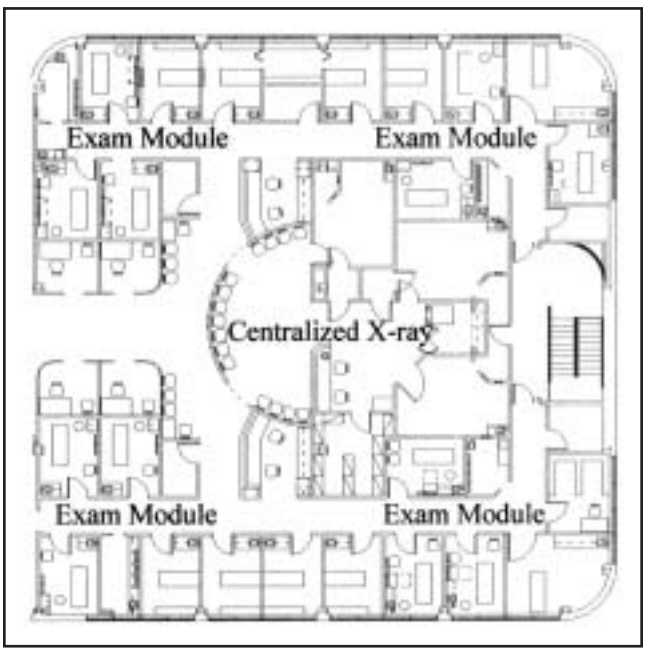

Figure 6. Floor plan sample.

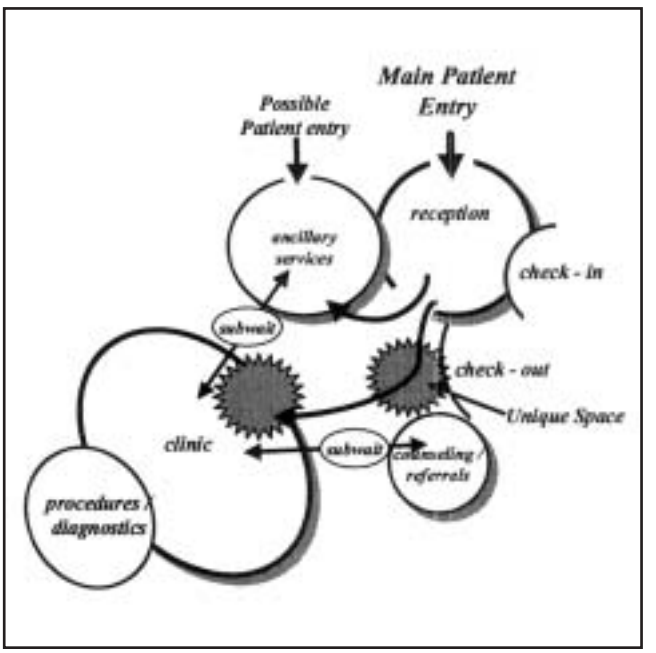

Figure 7. Sample sub-waiting area.

Some important concepts that drive the planning of the Exam Module include making all of the rooms identical and arranging rooms to:

- promote efficiency,
- reduce walking,
- allows the patient to self-exit,
- provide for control of the space by the staff, and
- enhances patient privacy through plan arrangement.

One important aspect of the exam room is the need for acoustical privacy.

A conceptual 4-room exam module is illustrated in Figure 4. It promotes efficiency by keeping the space that needs to be covered by the doctor to a minimum. The sketch also shows a doctor's consultation office. In this case, it is proximal to the exam rooms because it is used for direct patient management. If patients are not seen there, then the office should be remotely located.

Organizing Exam Modules

In most practices, there will be more than one doctor seeing patients at one time. It is the practice's responsibility to provide each doctor with the resources that he or she needs when seeing patients. Along with proper staffing, this includes the proper amount of space configured for maximum efficiency. This generally requires an exam module for each doctor seeing patients. There are several guidelines that need to be considered when developing the arrangement (Fig. 5):

- Patient travel distance from waiting to the exam room should be kept to a minimum.
- The spaces that the patient travels through should be memorable and direct, avoid multiple turns and twists.
- Patient travel should not go through another exam module (with the exception of very low volume practices)
- Access from the exam module to diagnostic functions should be direct.
- Nursing control of the exam module is needed.
- Group Exam Modules into logical groupings.

A floor plan example of the clinical end of a practice exhibiting these characteristics is shown in Figure 6. In this example, two doctor exam modules are grouped around x-ray. There is a sub-wait area, so patients can be staged from the exam room to x-ray and back. The nurses' station is at the front of the patient flow sequence into the exam rooms. The doctor's dictation station is at the rear of the flow sequence, minimizing cross traffic with patients.

DIAGNOSTIC/ANCILLARY SERVICES

Often, the patient will need to go to a diagnostic function during the exam process. This could be x-ray, laboratory, stress testing, visual field, or other tests that the doctor needs to diagnose and treat a patient. Access to this space should be easy. However, because the patient will be escorted, the typical way-finding cues are not always necessary. Because we have established that the exam room is for the doctor's use, and is not to be used as an (expensive) waiting room, the creation of sub-waiting areas to regulate the flow of patients to and from diagnostics is

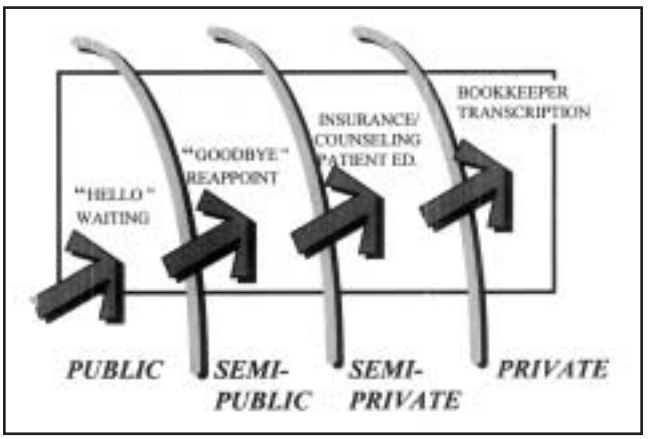

Figure 8. General zoning concept.

desirable. They also take up the "slack" in the differing production rates of the different parts of the office. For instance, the exam module will discharge patients at its own rate, without regard to whether the lab or x-ray can accept the referral in a timely manner. Sub-waiting bridges the gap (Fig. 7).

If patients are coming to the facility for a diagnostic test, and will not see a doctor, the location of the diagnostic area with in the facility needs to be carefully considered. You do not want those patients walking through the exam modules to get to diagnostics. There needs to be a separate path for those patients.

Business Office

In your practice, there will be staff that will have direct patient contact and those that will never or rarely need to meet with patients face-to-face. A general zoning concept of the business office is illustrated in Figure 8.

The "public" areas are those with direct interaction with patients, like check-in. The "semi-public" areas, like real-time registration and check-out, are easily accessed by patients but need acoustical privacy. "Semi-private" areas need access to the patient track but are more private for patient counseling. This might include someone like the office manager. The "private" spaces are those that never (or almost never) have face-to-face contact with patients in the office. These would include bookkeepers and transcriptionists. A careful consideration of the job descriptions of your business staff will need to be undertaken (and sometimes adjusted) to determine the best location for your staff. In smaller practices, consideration should be given to keeping the business staff contiguous, something that is problematic in large practices.

Some key considerations in the design of the business office are:

- Make reception an inviting space; try to avoid sliding frosted glass windows. In fact, having the reception desk stick into the waiting room is an inviting way to receive patients while maintaining the connection between the check-in desk and the rest of the office. However, you must keep in mind the needs for privacy and confidentiality.
- Check out should be performed outside of the waiting room; this is not only a privacy concern but also an issue of controlling the patient flow and being sure that each patient checks out before they leave your facility. The desk shown in Figure 9 shows the check-out desk on the clinical side of the practice, yet close to the receptionist. In this case, the patient has to go by the check-out desk to get back to the waiting room.
- Pay close attention to sightlines to keep the waiting patient from seeing back into the clinical area.
- Privacy concerns need to be addressed at check-in, check-out, and for staff in that area on the phone to patients.
- Sound attenuation is important in the business office as well. Noise and telephone conversations can be a large distraction and impediment to productive work.

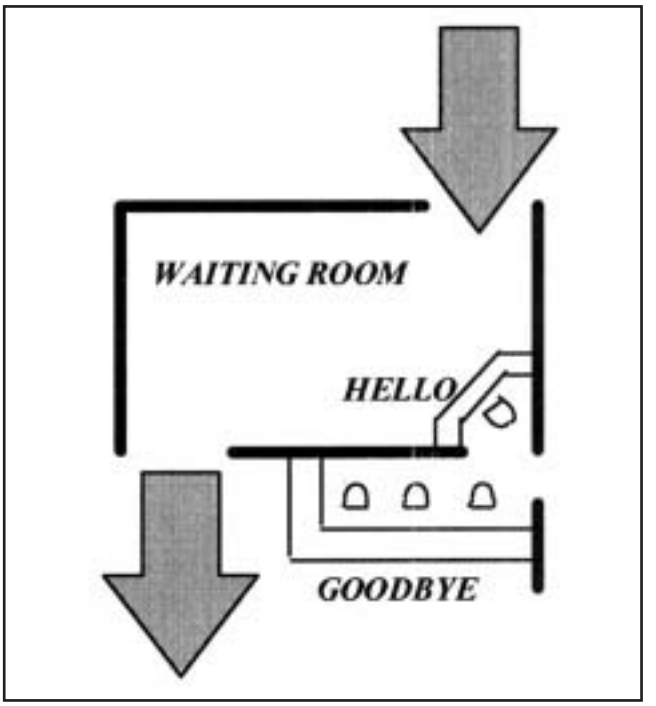

Figure 9. Sample reception area/business office.

CONCLUSION

You now have defined your project, conformed to local regulations, designed your space, and negotiated for construction. You still need to arrange for financing your project and the actual bidding-construction process.

In the next issue, the final article in this series will provide some guidelines in this phase of the building process. ■