Medical Office Design: Positioning for the Future

Submitted August 19, 2013
Final Submission: October 6, 2013

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This case study is submitted in partial fulfillment of the requirements for election to Fellow in the American College Medical Practice Executives
Title: **Medical Office Design: Positioning for the Future**

The majority of existing clinics that have been built throughout the nation are based upon old models of care delivery with minimal changes over the last 100 years even though our knowledge and technology has advanced significantly. Existing clinic exam rooms and flow of the clinic lead to inefficiencies in patient care, create safety risks, and create waste of motion and rework. A new clinic design is needed that eliminates waste of motion, promotes patient and staff safety, and achieves the greatest practice efficiencies possible. Designing a new clinic brings wonderful challenges around lean principles, patient flow, staff flow, safety, and future proofing for changes in health care delivery. New concepts in clinic design have resulted from advancements of technology, medical knowledge, lean process understanding, and changes in patient demand. The new medical clinic must incorporate a design that can meet changing demands with minimal expense while maintaining a safe patient care environment.

In recent years the patient populations have changed, and so must the clinic designs. Designs must accommodate larger patients and highly mobile disabled patients; they must also allow for the greatest efficiency of space due to rising costs of facility renovations. Financial struggles for clinics based upon changing reimbursement models are forcing clinics to identify ways to do more with less staff and less overall cost. These changes force a new focus on efficiency of design.

Keeping with the “standard” clinic model will perpetuate inefficiency, waste staff and patient time, and potentially expose staff, providers, and patients to risk. In addition, this standard model does not allow for future proofing of the clinic without excessive cost.
for renovation. Keeping with the current design also raised the question as to why it is necessary to build a new clinic. For a clinic not to evaluate clinic designs when building new facilities leaves the clinic at risk for financial struggles and patient dissatisfaction.

*Alternatives Considered:*

As this project developed there were two options presented to the team. These options were to duplicate the existing design or start with a clean slate and design a clinic around the processes needed to deliver excellent patient care. There was resistance to the second option as the first option was familiar and comfortable.

Duplicating the current model of clinic design was the first option to consider. The team asked itself, "Why does the design need to change? It has worked for 100 years." Human behavior tends to adapt to conditions over time. Often times this adaptation occurs without conscious decision; it is just part of the natural progression of life. When compared to the goal of delivering excellence in the patient care experience, the current design was found to be insufficient in terms of meeting the needs of the patient. The current design was also laden with inefficiencies, which caused wasted motion for staff and providers.

When the team reflected on the current clinic design they easily identified issues that were not good for providing care. One of the most obvious issues was that large-sized wheelchairs did not fit through elevator or exam room doorways. This left patients feeling awkward and created safety issues for the patients and staff trying to maneuver through these obstacles. Yet the initial reaction was just to make the doorways and elevators larger while maintaining the current flows.
There are risks associated with not changing the current process. The practice will not be able to respond rapidly to future demands, the changes will be costly, and wasted cost is being built into the system at a time when efficiency of practice is key to financial viability. Other than familiarity, there are no advantages of keeping the current clinic design. To help the team understand the patient perspective, the current floor plan was projected on the wall. Three staff members were given different colored markers and assigned the roles of “patient,” “provider,” and “medical assistant.” With the markers, they traced the flow of a single patient upon the floor plan. They did this for three different care scenarios. Figure 1 (below) is an example of the flow within the Urgent Care setting. Each diagram clearly showed the redundancy of flow for each person, including the patient. This became the point at which the team realized that the current model was not what was needed to provide the best care for patients, and the team requested other options to consider.

So the journey began to explore justifications for a new design and rationale for changing the long-standing clinic office design. After discarding the current clinic design, the design of the new clinic started at ground zero with no pre-determined layout of services or flows. The design began with the team focusing on the concept of delivering excellent patient care. They were not shown an architect's floor plan to react to, but rather focused on principles and goals to guide development of the floor plan at a later date.
To design the new clinic utilization of Lean theory, concepts such as eliminating and minimizing waste and tools such as flow diagrams (spaghetti) and Pugh matrices were the starting points before physical design even began. Utilization of these concepts and tools assisted in keeping the team focused on their goals as they discussed components of the design. Use of the Pugh Matrix set the top priorities for the design that would help the team reach their goal. Each service and design element was tested utilizing the criteria of the Pugh Matrix. See Table 1: Pugh Matrix and Criteria Weighting.

The use of these tools focused the team on the ultimate goal of delivering excellent patient care. This, in turn, generated new excitement about the vast options that
could be incorporated. Once the team recognized the flaws of the current design and the opportunities available by starting with a blank slate, the choice became obvious. The team unanimously chose to pursue a brand new layout.

Table 1: Pugh Matrix and Criteria Weighting

**Chosen Solution:**

A core team was identified to participate in design development for the new clinic. This team consisted of a lean facilitator, clinic manager, clinic regional director, architect, and the staff and physicians who would work in the new facility. This included two physicians, one nurse practitioner, one radiology tech, one laboratory tech, two health care associates, one registrar, and one registered nurse. Each team member was
responsible for communicating design discussions with their co-workers and gathering feedback. The architect was present to listen to process discussions that would later be incorporated into the floor plan design. This allowed the architect to understand the truly critical elements.

Based upon the business plan presented to the Board of Directors, the team was given the square footage allowed for the future clinic and the building location. They started with a clean slate with no preconceived floor plans. During all discussions the team kept the overall goal of excellent patient care delivery posted in front of them, and the top criteria from the Pugh Matrix weighting (refer to Table 1). The spaghetti diagrams of the current clinic became the catalyst for the improved design (refer to Figure 1). The team was stunned at the wasted steps identified for themselves and the inconveniences experienced by the patients in the current model. They also recognized through this process that the current design did not achieve the goals of their vision for best care of the patient.

The team chose a design that incorporated Lean principles to assure minimization of waste, maximized safety for staff and patients, and a modifiable design that would change along with knowledge of health care delivery. This would ultimately allow for the delivery of excellent patient care.

These discussions then evolved to proximity of services within the new clinic. To determine this, patient care data was examined to understand which departments the patient most frequently utilized at each visit. An example of this was the determination of the highest volume services ordered by each department and how those services were delivered during the visit. This led to the conclusion that it was most efficient to design
both the laboratory and radiology services closest to the urgent care department. The Urgent Care department generated the highest volume of same day orders for those departments. From these discussions and data, the architect created bubble diagrams to show proximity of services. This helped the team to visualize how future flows within the new clinic might work.

Another key concept was that the work areas should be designed around the concept of teamwork. This supports proactive patient care and population health management by the whole group of caregivers. Published research has proffered the idea of utilization of bullpens versus traditional offices for providers. The rationale is that they encourage teamwork and collaboration versus separation. The team struggled with this concept. There were concerns about being overwhelmed by the sound and commotion of this type of design. The clinic also needed to incorporate the needs of a multigenerational workforce. After the review of many options, a compromise was developed. Standardized provider offices were incorporated, but the design allowed utilization of the office space by a single provider or a provider and staff member. Then pods of staff work areas were designed immediately outside the office doors. This allowed the team to constantly communicate and interact while having facilities that allowed individuals to focus on work to be accomplished outside the patient visit. The pod design allowed the staff to easily assist each other in accomplishing patient care, while giving some separation so they were not overwhelmed by the environment.

The next phase of pre-design work was to determine square footage requirements for each department. To do this the team analyzed the patient registration data to understand the number of exam rooms needed per provider. This was done to eliminate
or minimize the need for patients to have to remain in the waiting room. One of the goals prioritized by the Pugh Matrix was elimination of non-value added time, and sitting in the waiting room was just that. Based upon the number of patients registered each minute and the average length of a clinic appointment, the flow diagramming indicated that 3 exam rooms per provider would minimize waiting time. This evaluation of data allowed the team to determine that each provider needed 3 exam rooms to be most efficient. This conclusion was validated against the original data. The team realized that 3 exam rooms was the correct number but determined that number of exam rooms could be slightly decreased to be 3 exam rooms per provider present each day. Due to provider days off and scheduled office time, it was wasteful to have exam rooms stand empty when a provider was not seeing patients. Thus, providers would not have 3 exam rooms dedicated solely to their use but would vary exam rooms utilized dependent upon who was in the office each day.

With each new process analyzed and related concepts developed, the team kept checking back to assure they were remaining true to the original goals of the design. The design must impact error reduction through standardization of processes and flows. Standardization reduces errors and minimizes waste associated with searching for items. This is especially valid in times of emergency, so care providers do not waste time looking for things located in different locations within each room. Because of this, standardization of the exam room design and flow was the next critical element to be addressed.

The team had to challenge the rationale behind current exam room design, in order to assure they were keeping with the goals of the Pugh Matrix (Table 1). The
design of the exam room was weighted heavily for patient and staff satisfaction, and the team struggled with validating the concepts on paper. Because of this, a mock exam room was built, that allowed the team to modify wall lengths, doorway placement, and furniture placement. This 3-dimensional, full-sized model allowed the team to physically evaluate and test the design concepts, size, shape, and room flow. This model was used for room sizing, furniture placement, equipment, and electrical placements.

The flow within the exam room was researched, and the architect provided the team with several recommended layouts. The team utilized the Lean tool of the “5 Why's” to determine the best option. The 5 Why's is a tool that has the team ask "why" five times to help get to the root cause of the issue. This process helped get to the base rationale of the room layout, including placement of the exam table. The team considered the door swing to assure patient privacy and access for those in wheelchairs or with strollers. This sounds like a simple decision but can have a large impact on the patient experience. Through this process, the options provided by the architect were narrowed down to two viable possibilities.

Staff and patient safety had to be taken into account within the exam room design. The team realized that they frequently had to step over patient legs and feet or around family members during the course of providing care in the exam room, causing tripping hazards and inconvenience. Figure 2, "Exam Room Design Options and Flow," (below) illustrates the space and flow for the two models. The traditional exam room design had staff and patients bumping into each other and placed the sink in a location that did not encourage hand-washing. Providers and staff also acknowledged that in the traditional design they sometimes felt trapped in a room since the patient could easily block the
doorway. The new design gave them a separate space from the patient within the exam room. This improved flow and patient safety. Since this was a significant change of design for a basic flow within the clinic, the mock-up was left in place, fully furnished, so that all staff and providers could experience the new model and role-play to assure the design worked and met the objectives.

Figure 2: Exam Room Design Options and Flow
The chosen exam room design led to a better patient experience; while providing safety for clinicians and staff. Critical to the design was the exam table placement and standardized location of built-in cabinetry, which created mobility of all other items in the room and assured patient privacy when the door was opened.

The only item permanently placed in the exam room was the sink area. All other furnishings were mobile. The standard exam room size and sink area were incorporated into all exam and consultation rooms. This allowed for future versatility of the clinic. If additional exam rooms were needed, then the consultation room could be converted by the simple exchange of the furnishings. This created flexibility while eliminating renovation costs each time the needs of the clinic changed. The design maximized versatility and minimized future cost for an evolving health care delivery system.

The design reduced the waste of waiting, travel, and flow. This was accomplished by putting high demand services and supplies closest to the area causing the demand. The proximity of services was established based upon flow diagrams as discussed earlier. After this work was completed, the architects determined approximate square footage required for each service and created flow and bubble diagrams for adjacencies. These diagrams were taken back to the team to validate that the integrity of the clinic design goals were maintained. Minor adjustments were made, and the architects then developed a "blue print." The team thoroughly assessed the drawings. Many people have difficulties visualizing a space from a blueprint, so the architects created a virtual 3D model for the team. The team took a virtual tour of the clinic, comparing goals with the feel of the walk-through. Due to the thoroughness of the concept creation process, very minimal changes were required for the final design; the
team moved from blueprint review to final approval very quickly and with minimal additional cost.

Overall the new clinic and its design has been a great success. Patient volumes have increased 25% within 8 months of opening the doors of the new clinic, which exceeded the goals of the business plan. Patient and staff satisfaction improved immediately upon opening. The rating of "overall visit" satisfaction went from 72% excellent to 83%. While there were new processes and flows for the team to learn, the increase in efficiency and decrease in wasted motion was wonderful for the staff. Even with this increase in patient visits, there are very few found utilizing the waiting rooms. Thus, another one of the core goals has been achieved. On occasion, out of habit some old processes started to resurface, but the actual design and flow of the clinic prevent them from taking hold. As process flows need to be updated, the team validates those changes against the design goals to assure they do not drift away from the primary goal of providing an excellent patient care experience.

Lessons Learned:

This was an extremely beneficial yet unusual process to go through in designing a clinic. In the past, teams were given a base "blue print" to react to and repeatedly sent it back for modifications. In the old process, the original design and multiple modifications did not create a design around what was best for the patient or the staff and providers; created a design that fit in the allotted footprint. The new process created an idealized design and ownership of the concept by the team who would be working in the new facility.
The proper proximity of services caused a decrease in time spent transporting patients, supplies, and staff. Thus, the Lean principle of minimizing waste was effectively incorporated.

Provider and staff safety through use of working triangles improved efficiency and decreased obstacles in the exam rooms. The design created two distinct triangular areas within the room: one for the clinician and one for the patient and family.

Work stations encourage teamwork and decrease situations where a patient waits for one staff member to complete a task before receiving service. The work station allowed team members to see when another member was in need of assistance and step forward to better serve the patient.

Clinic flow was critical to a successful design. The design kept sight on maintaining patient privacy throughout the care experience. This included consideration of back hallways to keep patients out of public waiting spaces while receiving treatments. It also included making sure there were enough exam rooms to maximize provider productivity and keep patients out of general waiting rooms.

No design is perfect, but each evolution should be a learning experience to use when the next opportunity for a new clinic arises. Eight months after opening the new facility there are areas which should be improved upon. During the design phase the team spent a lot of time on the registration area but was never completely satisfied. What was built worked but definitely could have been enhanced. The registration area needs slight adjustments to move patients away from the doorways. The crowding in that area causes congestion and is not as welcoming as desired. The registration stations themselves are very good. They incorporate protection of patient privacy and
visualization of public spaces by the staff to assure safety. It is the positioning of those stations that could be improved to create a better patient experience.

This was the first clinic designed around the utilization of the electronic health record. The team envisioned "touchdown" stations interspersed throughout the exam rooms to decrease the need to return to the office areas and improve efficiency in the process. Many of the “touchdown” stations throughout the area should be slightly smaller, and this would give some additional storage space within the facility. Even with an electronic health record, there is still a need for storage.

*Recommendations and Insights for Other Administrators:*

As an administrator of an outpatient clinic it is important to position your business so it is successful today and in the future. An important place to begin is the design of your clinic, as this sets the tone for the patient experience and staff satisfaction. Utilizing Lean principles, identifying goals, and remaining focused on them allows for the development of an idealized flow that maximizes efficiency and patient care. This process also creates ownership and "buy-in" to the concepts and design by the team who would ultimately work in the facility.

If designing a new clinic and the existing clinic has not yet transitioned to an electronic health record, it is important to transition prior to the move in order to avoid duplication of past inefficient processes in the new location. This way electronic health record and associated new processes are reinforced, and old paper processes do not take hold in the new facility. In addition, storage of paper records does not have to be incorporated into the new design.
The clinic design works for primary and specialty care providers, staff and patients. Process flows and departmental proximities will most likely change dependent upon the patient volumes associated with each specialty and the type of departments placed within each clinic. Yet the team must work through the processes of their workflow to make the design the most efficient and effective for the care of patients within each specialty. The providers and staff members who work in the clinic on a daily basis and the team who worked with this process believe that they have created the ideal design. All involved, including the patients, are very pleased with the new clinic.