MAYO CLINIC

From

Foamcore

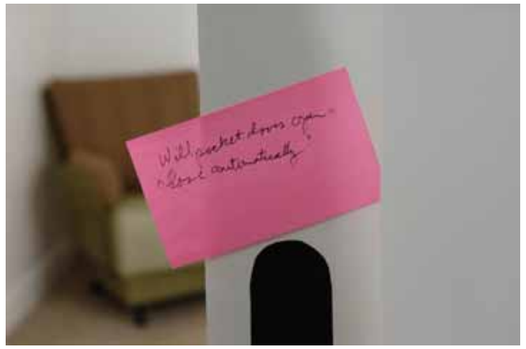
To

Function

30 days of prototyping concepts for the outpatient practice.
In real time. In real space. With real people.

SPARC your innovation

Phase 1 : Lifesize foamcore model of re-imagined outpatient space.



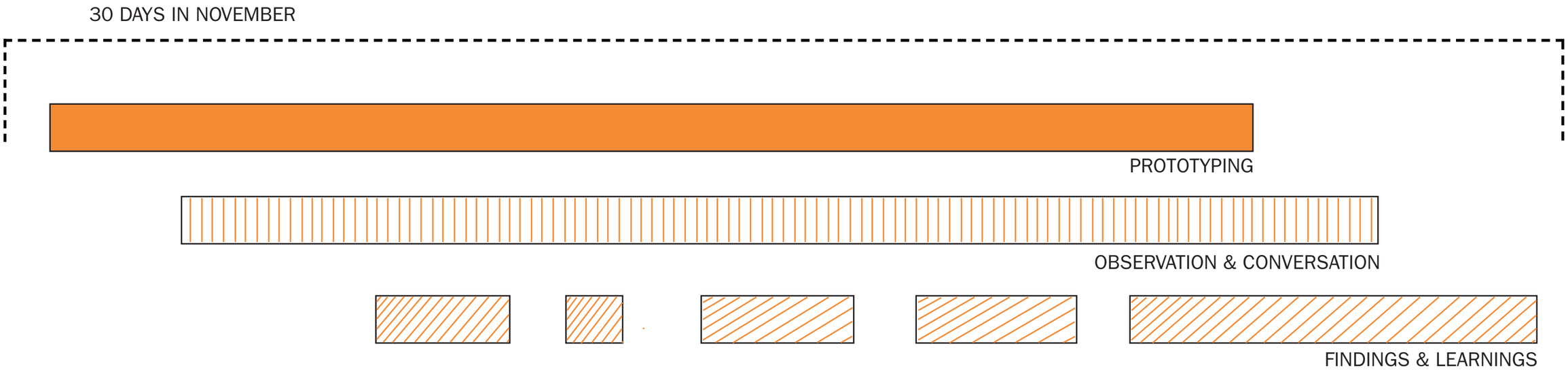
Looking at the outpatient practice has been an ongoing project for SPARC. In August 2005, the first prototype was developed as a life-size foamcore model of a re-imagined outpatient practice space. Complete with exam rooms, care team areas and a waiting room, the model stayed up for over 2 months while the comments of everyone from physicians to administrators to patients were solicited through leave behind post-it notes attached to every surface.

WHAT IS SPARC?

The SPARC Innovation Program is a fusion of design methodologies and the medical practice within the Mayo Clinic. Guided by its methodology (and the basis of its acronym; See, Plan, Act, Refine, Communicate), SPARC takes on projects that show promise in redefining how health care is delivered.

SPARC's unique environment plays an instrumental role in allowing it to be a different kind of problem solver. By blending the physical spaces of a traditional design studio with that of a traditional out-patient clinic, SPARC is a place where healthcare services can be envisioned, modeled and implemented within a functioning clinical environment.

To accomplish this, the SPARC Innovation Program is staffed with designers and project managers, is supervised by medical directors and is empowered by patients, physicians and care team members dedicated to prototyping healthcare services in a safe yet true-to-life environment.



Building upon that feedback and additional research, the next step was to articulate the prototypes in a form that allowed them to be used and evaluated in an actual clinical setting. Focusing on the space and technology recommendations, SPARC designed the prototype space and recruited four physicians to see their patients in our exam rooms, use our physician offices and occupy our clinical space. Data was gathered through extensive observation and conversation and in the end, synthesized into the findings presented at the conclusion of this document.

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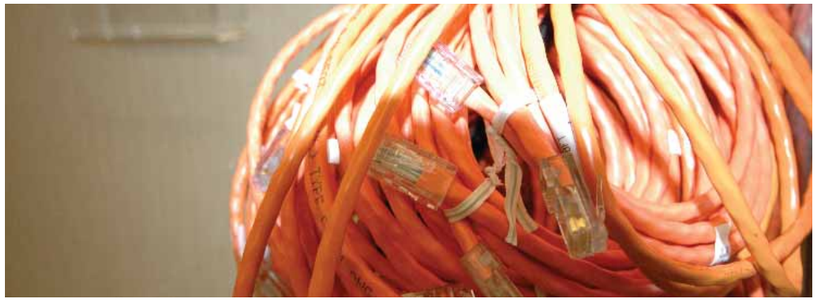
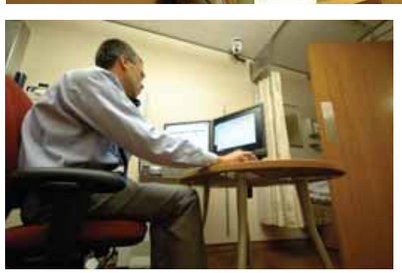
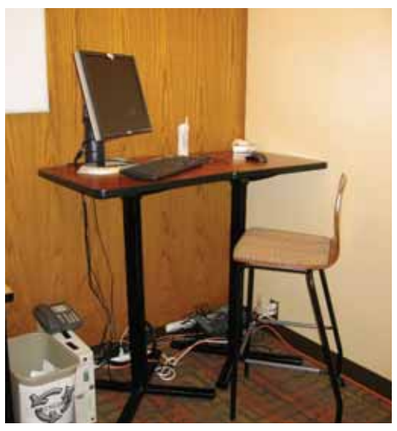
The **Process** *of* **Prototyping**

Prototyping in a functioning clinical setting brings a unique set of challenges. Creating these new spaces required the help of facilities and IT as well as a flexible care team.

Snapshots of prototyping in progress...







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The ***Art*** *of* ***Observation***

Observation is a key tool in SPARC's methodology. What you learn by watching is very different from what you learn by asking. In order to gather the most data, researchers went into exam rooms during the patient/physician visit. The stories we saw and heard in these spaces informed changes to the prototypes as well as the overall learnings.

Observation (Room #71)

Patient — Male, early 70s

Narrative — With a knock, the physician enters the room to find his patient with a stack of papers on his lap and sitting up straight and ready in the bench placed against the side of the wall. The physician settles into the seat behind the desk, adjusts the screens of the dual monitors and logs in. The conversation is cordial and evolves into a discussion about the New Year's Day when the patient awoke unable to shave or brush his teeth.

The physician glances back and forth, from computer to patient and temporarily focuses on the computer while reviewing the information on the screen. The physician utilizes both monitors, placing the CVI/PFH windows on one screen and the Orders window on the other. The patient has meticulously kept a chronological account of symptoms and previous doctor's appointments, which he hands to the physician who rolls across the awkward, divide to receive them. The physician then sifts through the pile, carefully separating the pages from which he has questions and setting them aside.

The physician suggests the patient stands and walks a few steps to determine any neurological issues. Next, the physician asks that the patient changes to prepare for a physical exam and excuses himself from the room in order to return to his 'Quick Office' to dictate the first part of his note. Returning to the exam room, the physician conducts the physical exam, which, aside from momentarily dragging the tools awkwardly across the patient's shoulders, goes smoothly.

After the patient has dressed, and the doctor has begun entering his orders, the conclusion of exam brings about a discussion of small strokes and a suggestion that the patient return at the end of the day following a series of tests.

Observation (Shared Physician Space & Quick Offices)

Physicians

Dr. Smith
Dr. Jones
Dr. Sorenson
Dr. Taylor

Narrative

The afternoon has continued to be extremely busy. Two physicians are stationed in their ‘Quick Offices.’ Dr. Smith prepares for his next consultation while Dr. Jones works on dictating notes, concentrating and speaking quietly while seated at his desk.

Simultaneously, Dr. Sorenson prints out his notes for his next patient, and begins to leave the shared space, focused on the task at hand, yet puzzled as how to get another of his patients into a thoroughly booked orthopedic practice. Suddenly he catches the attention of Dr. Taylor whom he knows had a similar problem last week. They stop to discuss the issue.

While, the two physicians exchange the strategy, Dr. Smith leaves his office area to begin his exam, but stops to add his strategy and a joke to the other physicians who laugh and smile at the jest. The moment of levity is a brief but welcome respite in what has been a very long and demanding day.

The three physicians finish their conversation in the shared space and proceed to go about their separate ways, with two heading to their exam rooms and the third back to his office.

Meanwhile, Dr. Jones has completed his dictation un-interrupted in his office and has begun to prepare for his next consultation.

Observation (Room #63)

Patient — Male, mid 80s (joined by wife)

Narrative — The physician enters as the patient's wife reaches for a brochure regarding nutrition from the rack of pamphlets on the wall. Her husband, who is seated beside her, is here to discuss the pain in his joints.

Though the space seems tight, the couple has made themselves comfortable at the round table with Mayo notepads and pens at the ready in front of them and their personal items stacked in the corner. The physician has seated himself at the table and next to the small work desk. He logs in and is prepared to begin. The monitor is positioned almost like a guest at the table, and is turned as to limit the amount of time the physician needs to look away from the patient and towards the screen. The physician simultaneously reviews lab results; navigates the windows with his mouse; and discusses the tests with the patient while maintaining as much eye-contact as possible. The physician clarifies a point by refering to the x-ray he has on the screen. He then shares the view of inflammed joints by twisting the screen towards the couple.

The physician returns the screen to its position and pulls up closer to the table, shifting away from the desk. He then offers his prognosis, while the wife takes notes on the pad. The physician informs the patient about neuropathy and rheumatoid arthritis and orthopaedic options. He also explains that they will receive a copy of his report, and jots down the name of another of the patient's referring physicians.

After a few more additional questions are answered by the physician, the group rises, move the chairs out of the way, and cordially leaves the room while the physician stays to complete his notes.

Observation (Room #73)

Patient — Female, early 50s

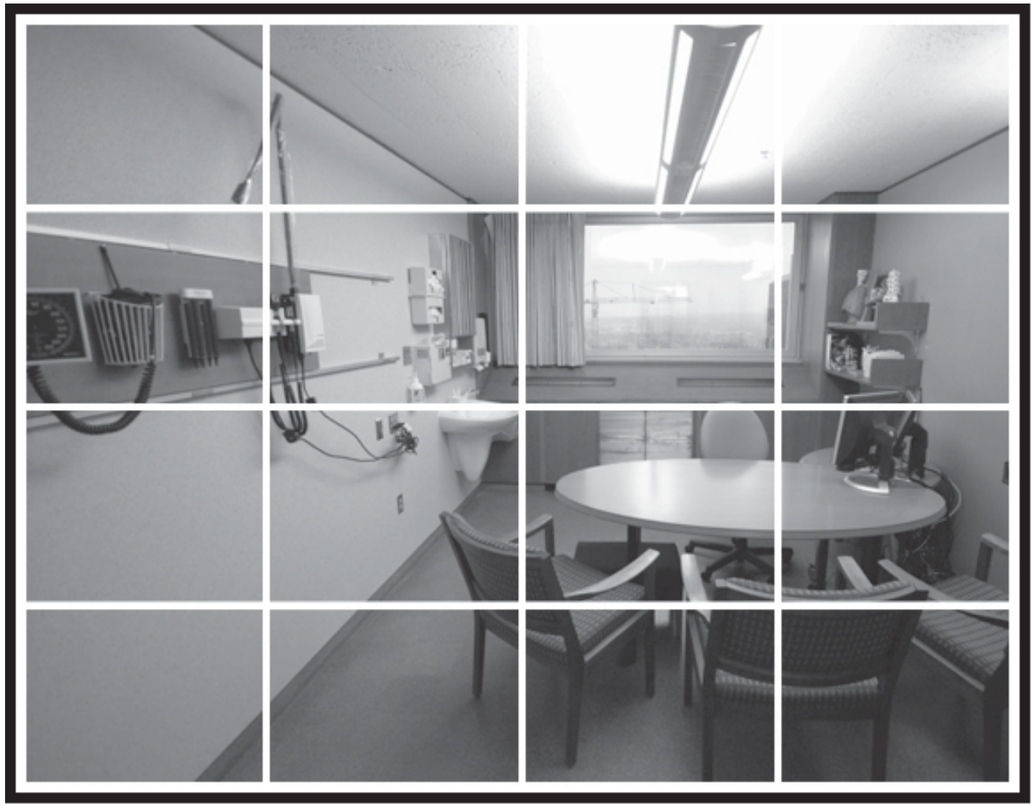
Narrative

The patient is anxious, on the edge of her seat across the distance of the large oval table. Her daily meditation book is closed in front of her as she begins to ask the physician about her issues of chronic pain. In the meantime, the physician has sat at the desk and begun to navigate the patient's records on the computer at his side.

After a cursory review, the physician turns away from the monitors and begins to address her questions. As the tests were rather inconclusive about her pain, he first starts with recapping her prescription regimen, which consists of a variety of pain medications and anti-depressants. The conversation evolves into the patient's personal life and employment history and temporarily addresses her current psychological therapies.

The physician suggests that the type of pain she is experiencing could be fibromyalgia, as the patient revisits the specifics of her symptoms, pointing to parts on her upper back. The physician responds by discussing options for chronic pain management, spending a significant amount of time on a particular service that addresses pain management through a two-week course that utilizes both allopathic and homeopathic treatments.

The patient, who has traveled from the Southwest, is interested in finding a comparable resource closer to home, and wonders also if there is a Mayo-trained physician closer to home to whom she might refer. The physician makes a note of it, and promises to find someone for her as they say their goodbyes at the door.



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The **Form** of **Findings**

With findings, the goal is to identify the patterns in what you saw and heard. Starting from the original hypothesis, SPARC researchers pooled their observations and developed their collective learnings which will inform future development of prototypes.

Seating in Exam Rooms

Background

The couches used in the current exam rooms are too low and do not have adequate support structures (armrests, support bars) to assist in getting and out easily.

Hypothesis

Chairs may offer more flexibility around an individual patient in the exam room. What effect do different types of chairs have on the individual experience and the group dynamic?

Findings

Chairs with permanent armrests restrict the width of the chair itself making seating more difficult for wider patients.

Chairs with no or only one armrest are difficult for some patients to get in and out of.

Oversized furniture makes the communication space less accessible.

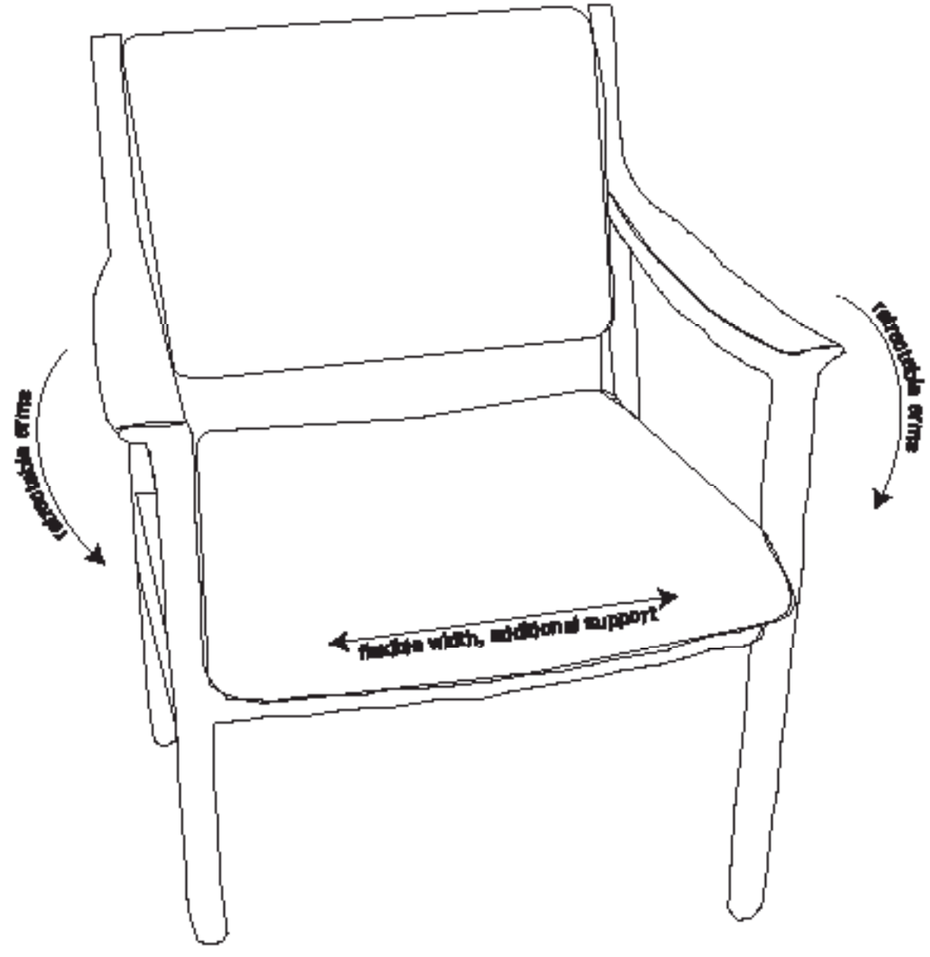
Patients are unlikely to move/adjust furniture.

There must be at least enough patient seating within the exam room for 3 medium sized adults.

Asymmetrical chairs (only one armrest) do not convey the necessary sense of stability and security.

Learnings

There is need throughout Mayo, but especially in the exam room, for an adjustable chair that can adapt to a patient's size and strength. In addition, the emotional role that seating plays should be taken into account. Chairs that provide ways of connecting with the physician or with other family members could be of value.



Patients' Sense of Space

Background

There is limited space in the exam room specifically set aside for patients, their advocates and their personal items.

Hypothesis

Creating and identifying space specifically for the patient will lead to greater patient participation during the visit.

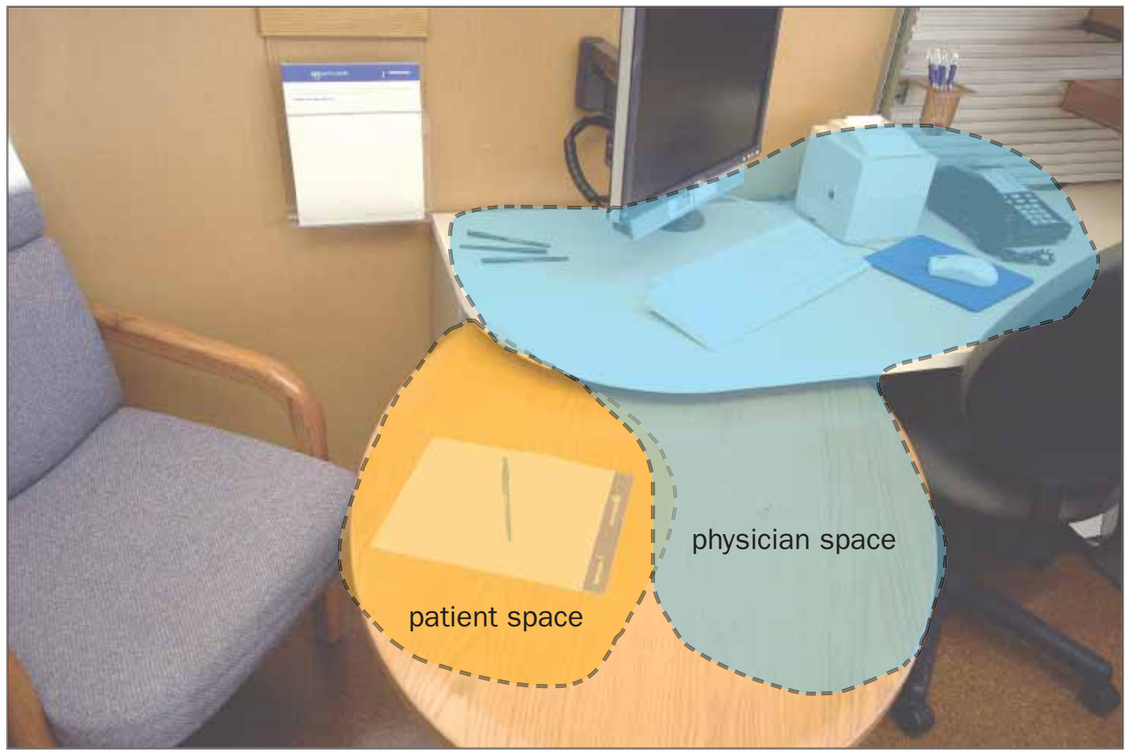
Findings

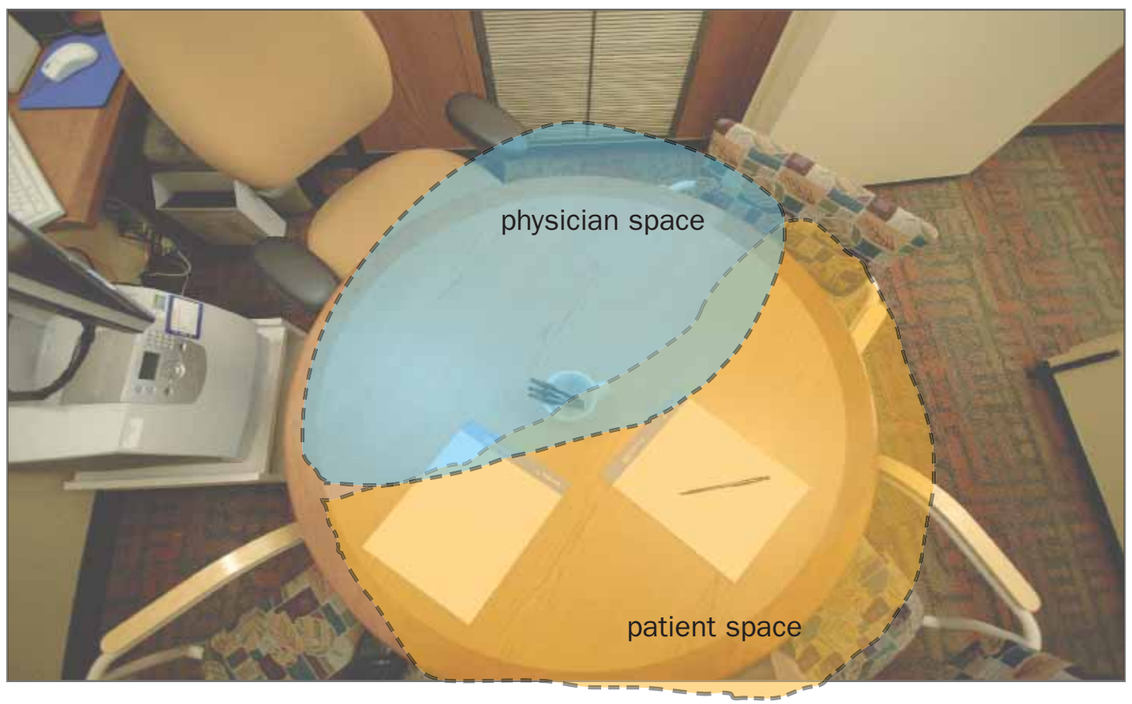
The larger the desk/table space interpreted as belonging to the patient or as shared between the physician and the patient, the more engaged the patient is with the visit. (Engagement is articulated through note taking, question asking and focused body language.)

Patient note pads give a visual cue to the patient's space and its associated boundaries.

Learnings

Providing patients with their own table space seems to encourage interaction with the physician and provides an opportunity to introduce tools like the note pad to the patient population. The concept of patient space could be expanded to include other areas, both in and out of the exam room.





Patient/Physician Communication Space (conversation)

Background

The majority of a typical exam is a conversation between the physician and the patient. Current exam space is tilted towards the physical part of the exam with little to aid the history and information gathering part.

Hypothesis

Spaces where physicians and patients sit nearer to each other and where the computer is an integrated component of the exam room will facilitate the important aspect of conversation during the exam.

Findings

Rounded (soft) edges on tables and desks brought patients and physicians closer together and encouraged participation through questions and sharing.

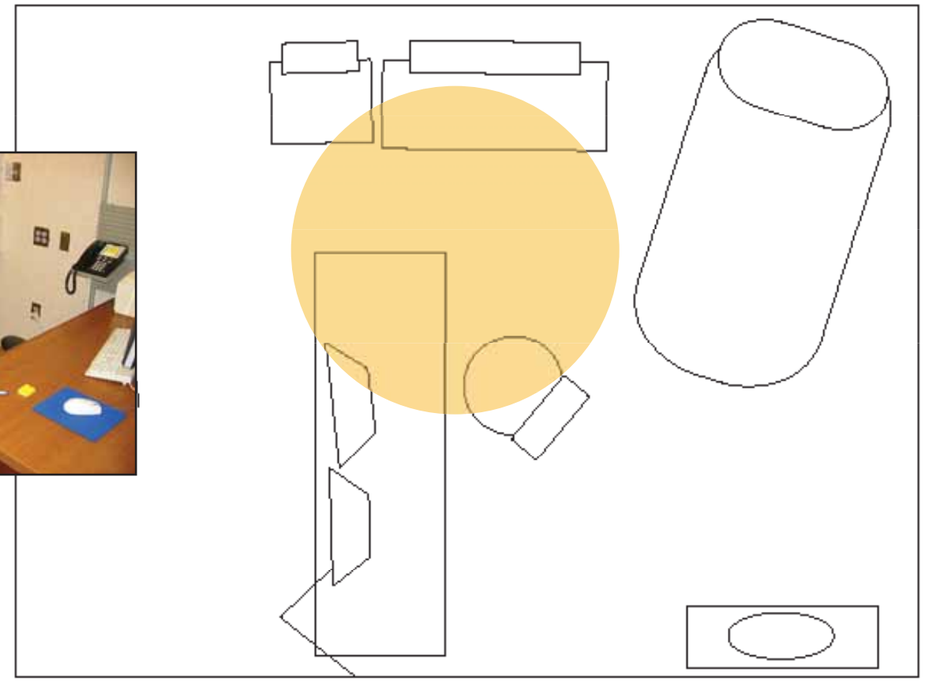
When patients and physicians sat next to each other rather than across from each other, the dynamic improved.

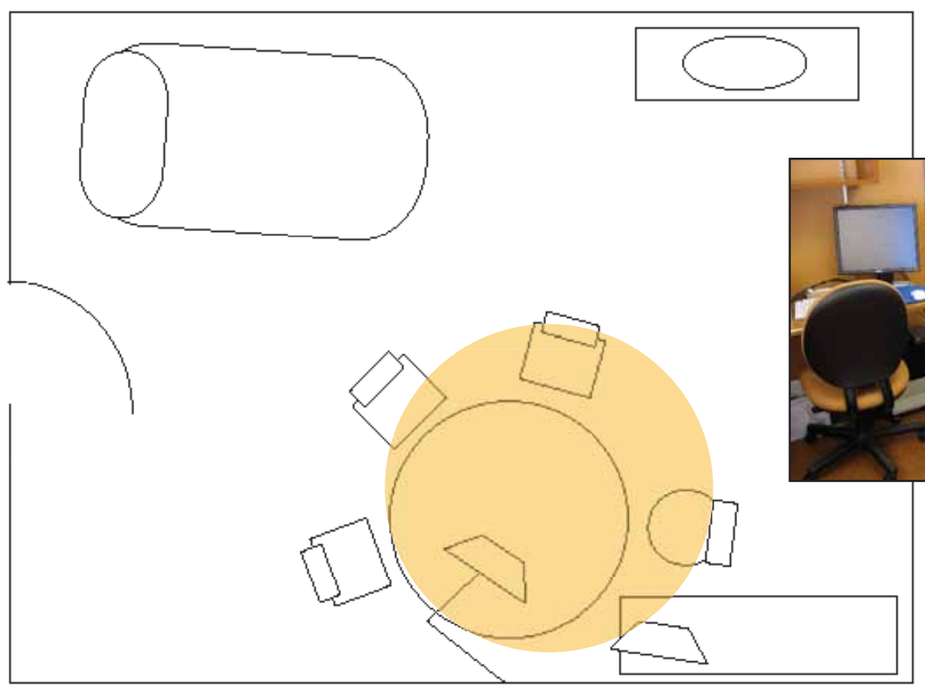
Rolling desk chairs allowed physicians to move themselves in relation to the patient.

Moving the exam table to the back of the room de-emphasized the physical portion of the visit.

Learnings

The design of an exam space and the furniture that occupies that space can play an important role in aiding patient/physician communication. Designating space for specific activities to be performed allows physicians and patients to focus and provides a future opportunity for more advanced tools. Tables/desks with rounder edges proved to soften the physical boundaries that separated the physician from the patient, which allowed both parties to approach one another with less hesitation.





Exam Beds/Exam Chair

Background

The current exam bed does not accommodate the needs of some patients, particularly those who are larger or less mobile.

Hypothesis

To perform a physical exam, it is not always necessary to have the exam bed in the reclining position; thus, an exam bed that can be adapted to either a sitting or reclining position will create more flexibility for physician and patient needs.

Findings

Physical exams are strongly dictated by routine in addition to the needs of the patient.

Exam chair bed was large and imposing (physically and psychologically) in the exam room.

Exam chair bed was awkward in providing good interaction between patient/physician/family members.

Exam chair bed (in chair mode) was successful in facilitating the transition of less mobile/wheelchair patients to sitting. When reclining patient had a hard time knowing what they were supposed to do.

Exam chair bed (in bed mode) accommodated heavier/wider patients.

Exam chair bed was difficult to maneuver when switching modes and created some issues when physicians attempted to move around the bed.

Learnings

Patients who have trouble getting onto our current exam beds are often not examined. Exam bed/chairs that attempt to correct this inadequacy change the process for everyone. The goal of a redesigned exam bed/chair should be to allow adaptability based on a patient's individual characteristics with the default setting being geared towards the most common patient type.

Enhanced Hallway Nooks

Background

Physicians need to conduct patient care-related activities in close proximity to the exam room. However, the public location of current hallway nooks create problems of privacy for patient information and increases opportunities for interruptions.

Hypothesis

Larger and more private hallway nooks will increase confidentiality of information seen and dictated as well as provide less disruption for users.

Findings

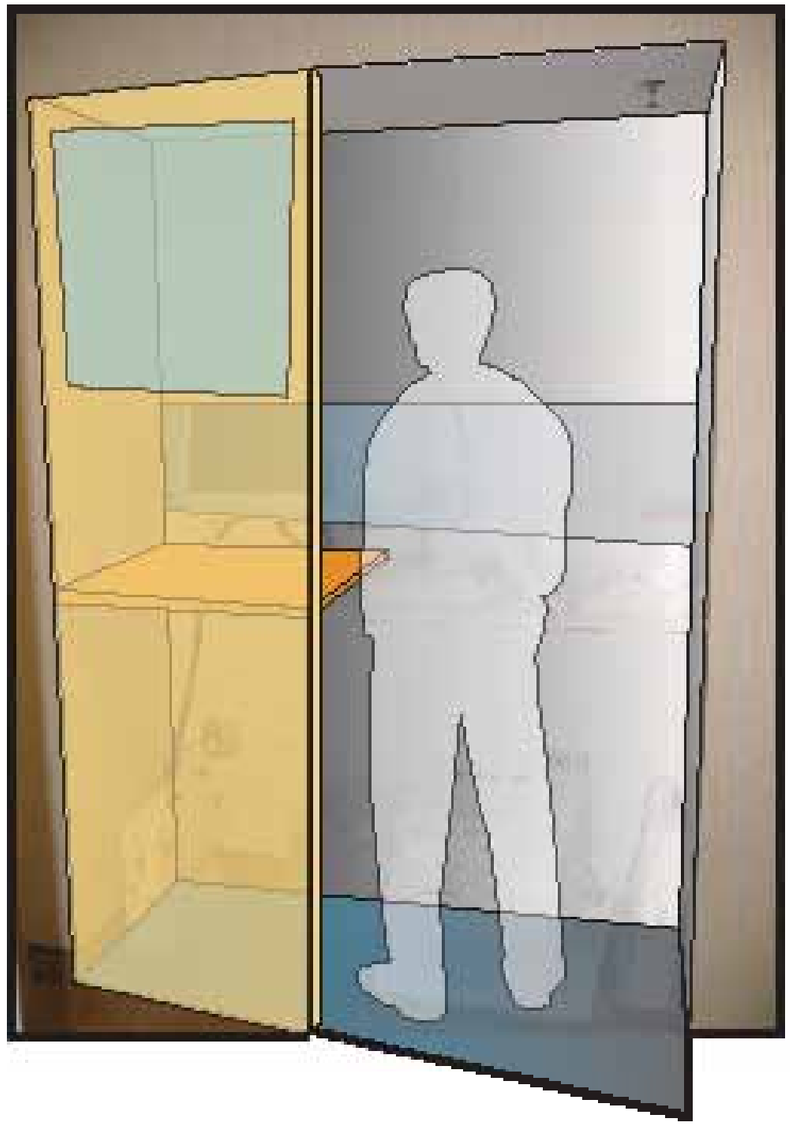
Nook space didn't accommodate the space needed for document review.

Many distractions and disruptions occur in the corridor.

Tools for many tasks like document review and dictation were duplicated in the quick office prototype. Physicians preferred to use those spaces over the hallway nook.

Learnings

In general, hallway nooks need more space and privacy to make them appropriate to the tasks they were designed to do. Their need and placement within the corridor is dictated by different practice demands, corridor traffic and space configuration issues like proximity to exam room or personal office.



Quick Offices

Background

Physician offices are segregated from areas of patient care and frequently used activity areas (front desk and exam rooms).

Physicians have a number of non-exam room tasks related to patient care that many prefer not to do in an exam with the patient present.

Hypothesis

An environment that is in close proximity to the exam room and can be tailored by the physician will help them work more effectively and efficiently.

Findings

Quick offices provided an environment where physicians could complete a variety of tasks related to pre- and post- visit. (i.e. dictation, printouts, history review)

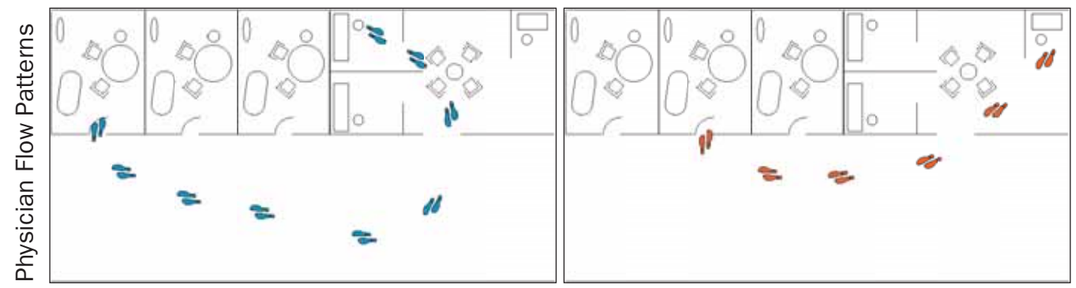
Quick offices allow for personalization and semi-permanent location for physicians.

Flexibility and customization of physician preferences in the quick office design encouraged physician “buy-in” for the concept.

Thresholds of privacy (privacy on demand) must be accommodated.

Learnings

The quick offices are successful for physician activities related to direct patient care. It is still unknown if the offices could be designed to incorporate a physician’s administrative and research activities, which could potentially lead to replacing physician offices all together. Additionally, the grouping of quick offices in one area provided previously unavailable opportunities for physicians to engage in collegial activities.



Dual Monitors & Larger Screens

Background

Physicians synthesize patient data by reviewing multiple pieces of information simultaneously. Current screen size and application design restricts the amount of information viewable at the same time.

Hypothesis

Larger screens and/or dual monitors in the exam room will allow physicians to better navigate through Mayo applications during a patient visit.

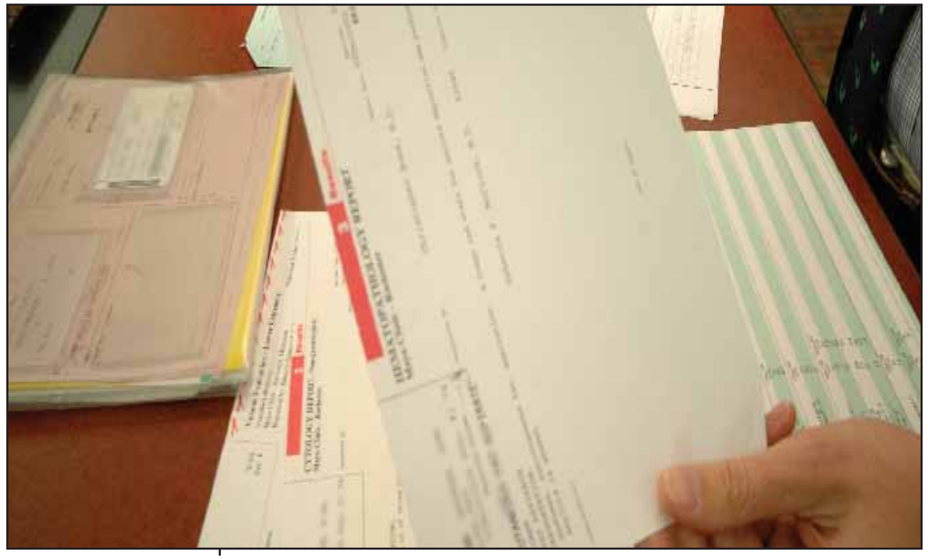
Findings

Larger monitors (19”), used in exam rooms and quick offices, allow for more information to be seen in an application window which creates less need for scrollling and panning.

Dual screens, used only in exam rooms, allow for multiple application windows to be open for viewing at the same time. When placed on separate monitors, the setup allows information to be compared and contrasted more easily.

Learnings

An additional study is being conducted that looks at dual monitors and larger screens across exam rooms and physician offices. This study will look at issues of efficiency and symmetry of activities conducted in the office and the exam room.



Sharing Digital Information with Patients

Background

A computer is available in each exam room, which affords physicians the opportunity to share EMR information with patients. However, the screen location does not lend itself to easy sharing and the EMR data is formatted for physician synthesis, not patient communication.

Hypothesis

Physicians will more regularly share information with the patient if the monitor is positioned so that the patient can comfortably see it. The information that physicians choose to share will represent that which they think has value to the patient.

Findings

Movable screens (those on an armature or adjustable stand) make it easier for physicians to share information as appropriate.

Physicians are most likely to share lab data and images (QREADS) which can be viewed chronologically.

In addition to sharing information digitally, physicians will also often provide/share a printout of the information.

Learnings

Enhanced information displays, particularly those that chart information over time, may help encourage the patient to take a more active role in their health care. Integrated hardware and software solutions would give physicians more control over the information they share.

Variety of Room Types

Background

Every exam room at Mayo is the same while patient visits, even those within an episode, can range from a full history and physical to a limited exam consult or conversation based returns.

Hypothesis

Mayo's visit coding allows for the creation of exam rooms and consult rooms. Designing these rooms for the specific activities associated with the visit type will enhance the physician/patient interaction.

Findings

The response to consult rooms was overwhelmingly positive. There was enormous value in having a different type of space in which to discuss the results of tests and make future health care plans.

The scheduling codes are an effective mechanism for placing patients in rooms better suited for their visit.

Consult rooms should be smaller than exam rooms. The more intimate feel adds to their value as conversation spaces.

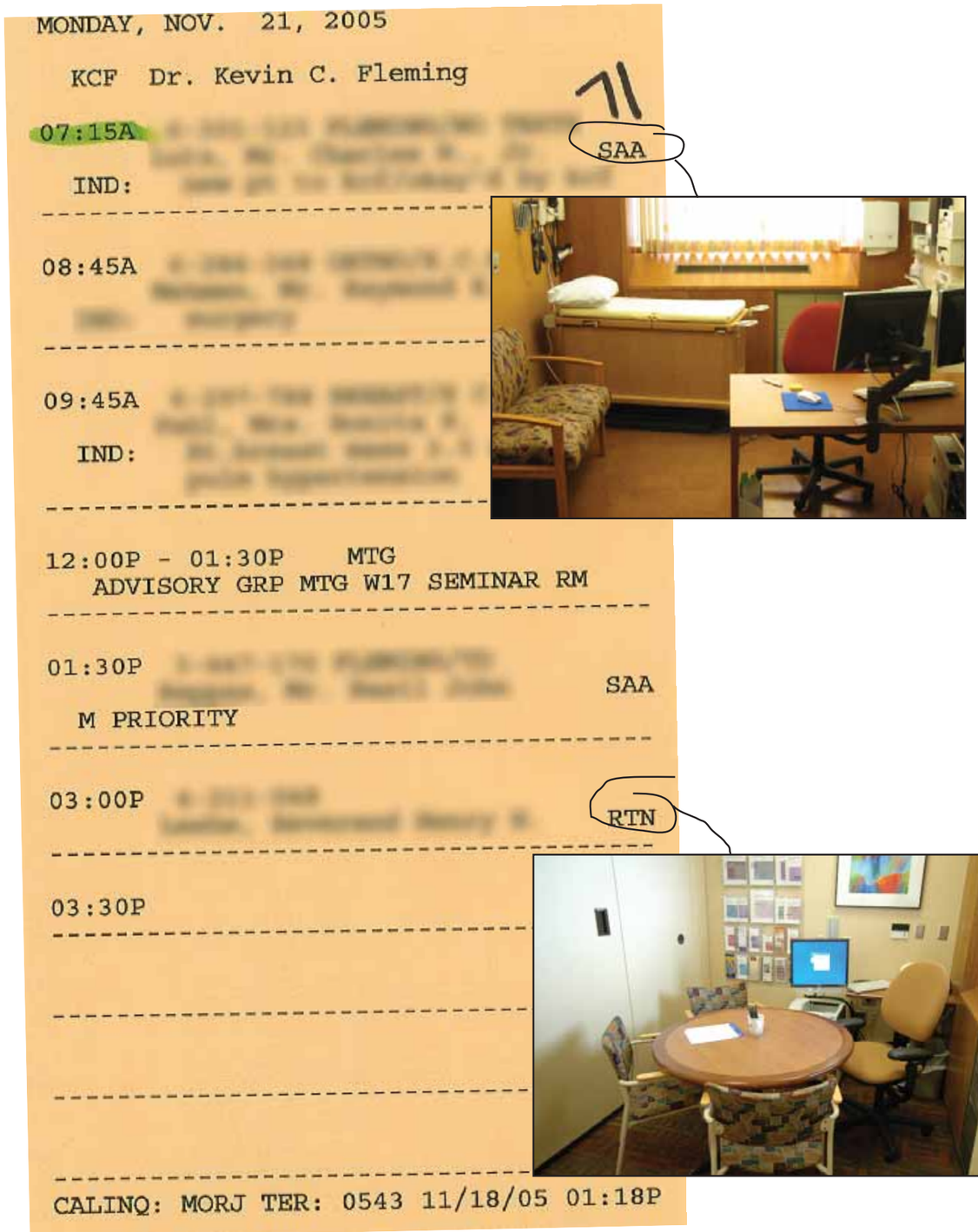
The role of conversation is applicable in exam rooms as well as consult rooms.

Exam rooms can be designed to de-emphasize the exam bed and by extension the physical part of the exam.

Mobile tools allow physicians to conduct some activities like blood pressure or ear exams without the patient having to move.

Learnings

Multiple types of visit rooms have clear value in the outpatient practice but an implementation strategy that looks at division needs and scheduling issues is still undefined. There may be need for additional types of patient visit spaces beyond exam and consult rooms.



Patient Waiting Space

Background

Patients experience many waiting periods in various locations during the course of their visit to Mayo. There are currently some waiting spaces (i.e. lobbies) that incorporate some waiting amenities like magazines and puzzles, but few spaces have a variety of amenities and some have none.

Hypothesis

Offering patients multiple activities that correspond to their waiting needs will increase patient satisfaction as well as make their waiting experience more enjoyable.

Findings

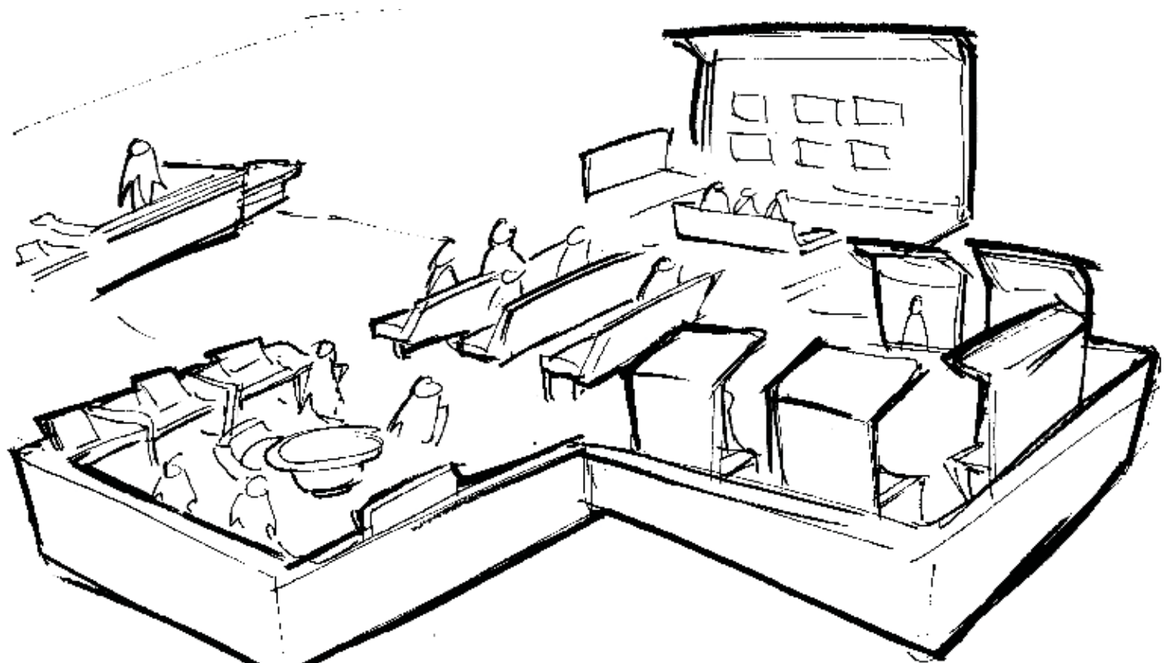
Current waiting room amenities fall into four main categories; entertainment, education, administration, and meditation.

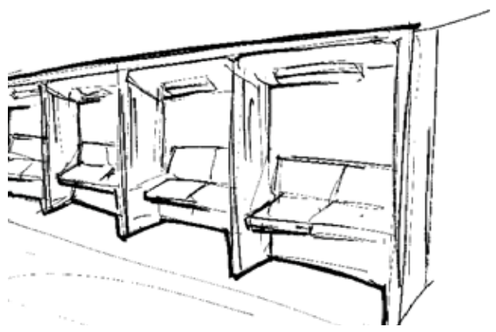
A few different types of these amenities are collocated together in the same waiting space.

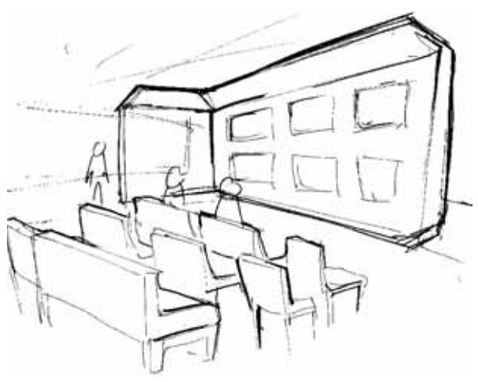
Those patients that were interested in those amenities used them, but if not, patients did not have any other choices during their waiting period.

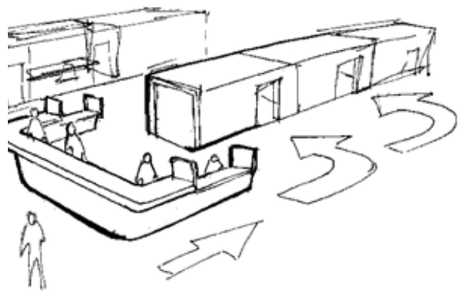
Learnings

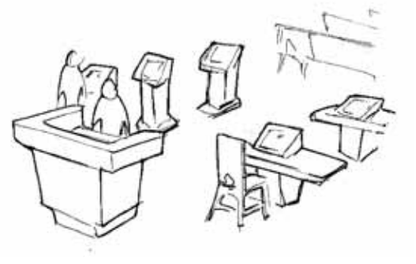
It is difficult to predict a patient's needs or wants around a waiting experience. Since they may find themselves waiting many times in a day, their needs may change. To accommodate for this, all waiting areas should seek to feature activities from each of the four main categories. This will allow patients to customize their own experience in addition to creating a unified experience throughout Mayo. The details of which amenities are offered in which areas will be practice specific as well as space specific.











Physician Sense of Community

Background

Physicians feel isolated from their colleagues. Some physicians feel that they do not have time to interact/socialize with colleagues during their daily patient schedules.

Hypothesis

Create a shared space for physicians which will increase physician interaction with colleagues and improve collegial relationships.

Findings

Despite believing that there was no time in their day for conversation with their colleagues, physicians engaged in spontaneous conversation and learning.

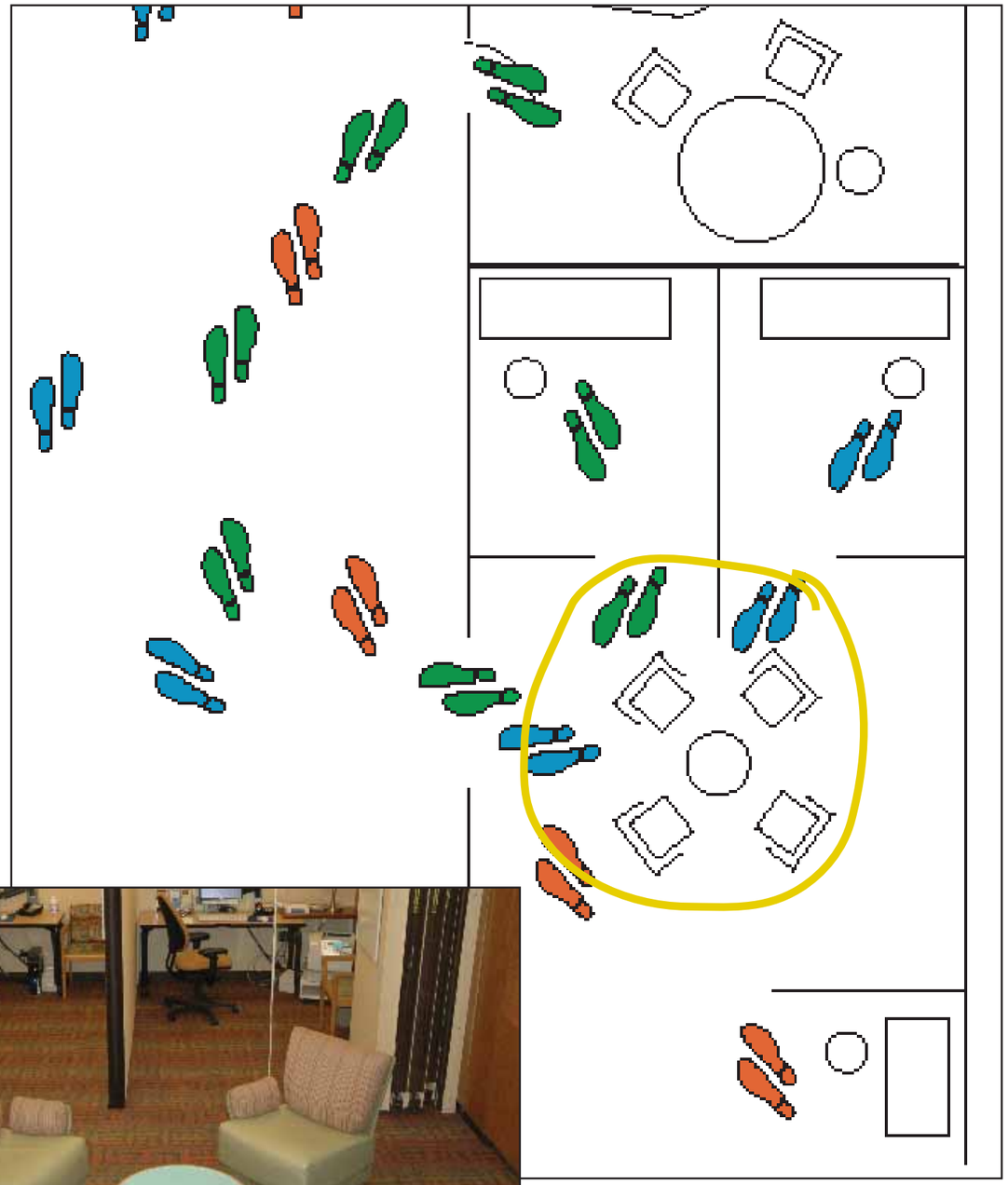
The motivation to get physicians into the shared space came from the placement of the quick offices which they used for pre and post visit tasks.

Extensive informal training takes place through collegial interactions.

Access to colleagues allowed physicians to more efficiently utilize their time. (i.e. scheduling consults, evaluating information,...)

Learnings

A shared space is an ideal environment for physicians to learn from each other. However, the demands of practice make it difficult for physicians to set aside time to talk with their colleagues. Shared spaces must be integrated into the physician's routine which necessitates further study on boundaries between public and private.



Electronic Check In Kiosk

Background

In most health care systems, patients check-in for scheduled outpatient clinic appointments at a receptionist desk. This process treats all patients as the same and contributes to inefficiencies through extended wait times and the integration of all check-in tasks through one outlet. In addition, it creates a delay to actual physician contact and has been linked to low patient and staff satisfaction.

Hypothesis

An electronic self-service kiosk optimizes the check-in process, decreases cues and waiting times, avoids unnecessary patient-receptionist interactions and is acceptable to patients.

Findings

All of the patients who used the kiosk were able to avoid waiting in line and have a seat in the lobby

Some of the patients who used the kiosk required no interaction with the reception before being called to their appointment.

Most patients who used the kiosk said they would use it again

Many of the patients who did not use the kiosk stated they would use it at their next visit.

There was a high level of patient satisfaction and future interest in utilizing a self check-in kiosk.

Learnings

Although the kiosk provides value without MICS application integration, a greater impact on process efficiency and increased kiosk functionality could be obtained with integration. The current kiosk offers little in the way of confirmation which should be explored in future versions. Additional analysis needs to be completed on the back-end to determine the most efficient CA and receptionist process to use with self check-in.

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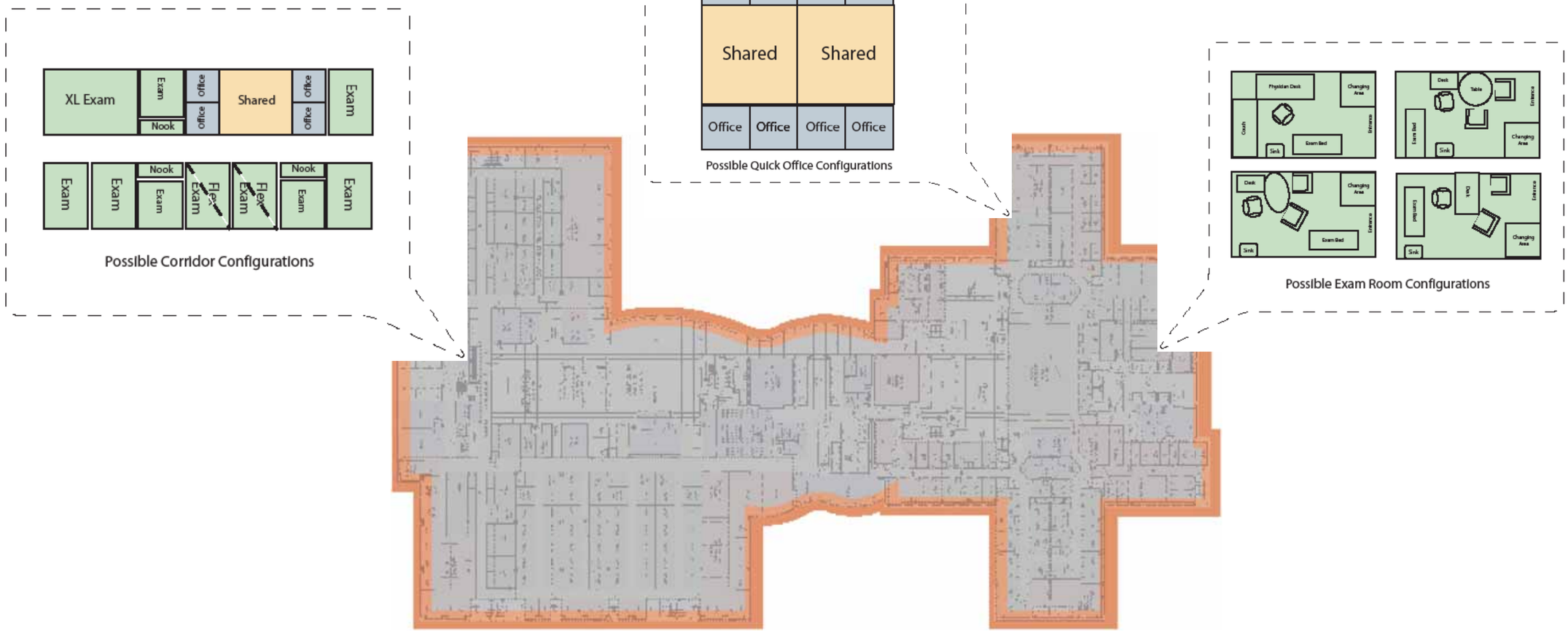
The ***Future*** *of* ***Learnings***

The learnings generated from the SPARC methodology are intended to be shared, discussed, refined and used, either through a continuation of the prototyping process, or through further testing in partnership with those people who will best inform the continued development of the solution.



A clinical setting is an integrated system of people, processes, spaces, artifacts and technologies. The next objective for SPARC is to partner with people and groups to refine and further develop these learnings in the design of clinical space at the Mayo Clinic.

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MC5733-05