

Preserving Privacy While Ensuring Access, Safety and Communication

Design Challenges in Radiation Medicine at Cayuga Medical Center

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Issue Identification

This consulting report focuses on the issue of privacy in the hospital setting. In addition, it analyzes the competing tensions between privacy and the simultaneous need for access, safety, and communication in the health care setting. Design recommendations address ways in which the hospital may enhance privacy while ensuring that competing tensions are also satisfied.

Setting Identification

The aforementioned healthcare and design issues will be addressed as they relate to study of the Radiation Medicine Department at Cayuga Medical Center in Ithaca, New York. Cayuga Medical Center is a 204-bed not-for-profit acute care facility that is fully accredited to deliver state-of-the-art diagnostic and treatment services to the finger-lakes community. As one of nine rural referral centers in the state, Cayuga Medical Center serves more than 150,000 patients each year.

Objective of Paper

The objective of this paper is ultimately to provide design recommendations which will enhance privacy in Radiation Medicine at Cayuga Medical Center. This will be accomplished through:

1. **Review** of the current literature on privacy and a discussion of its significance in the health care setting
2. **Discussion** of observations and data collected in Radiation Medicine regarding usage, patient flow, workplace ecology, and human behaviors within the space
3. **Analysis** of the observations with regard to current literature on privacy
4. **Synthesis** of observations, literature and current industry practices in order to conceptualize the specific design needs of the space that will enhance privacy
5. **Invention** of new design layouts and recommendations for enhancing privacy through the built environment

Methods of Analysis

Analysis of the privacy issues in Radiation Medicine was conducted during four separate visits to Cayuga Medical Center during October and November, 2006. These visits were scheduled at varying times and days during the week to observe the full range of patient-provider interactions and relevant privacy issues that vary as a factor of patient volume, staff composition, patient demographics and similar factors. Data and observations of patient/physician behaviors and related privacy issues were manually recorded and digital photographs were taken of the pertinent facility space and design elements. Personal interviews were also conducted with Joe Fitzgerald, the facilities planner, and two nurses staffing that facility during observatory visits. A

An extensive literature review was conducted to better understand the current challenges to ensuring privacy in the healthcare setting and as a framework for innovating design solutions that are supported by research on the clinical impact of privacy protection in health settings. Finally, innovative design recommendations were made based on a fusion of medical literature and the extrapolation of innovative design techniques currently employed in other non-medical settings.

ANALYSIS

The Concept of Privacy in the Hospital Setting

Privacy is a basic human right that must be protected in the health setting. The nature of patient care, however, poses a number of vulnerable and intimate situations with healthcare providers and more generally in the health care environment. When a person is admitted to the hospital for serious illness they are often unable to maintain control over their own privacy.

Privacy includes four states; solitude, anonymity, intimacy and reserve (1). As such, the privacy needs of individuals are broad and can be violated in a multitude of ways. In the hospital setting, violations of patient privacy are most often a result of either 1) the physical limitations of the built environment or 2) related to the communication of patient information. In particular, physical exposure related to personal care and medical treatment procedures has been significantly correlated with privacy intrusion (3). Lack of privacy has also been reported with regard to incidents of patients receiving information about their diagnosis or surgery in front of other patients on the floor or in the midst of a crowded waiting area(4). Both healthcare providers and patients did agree that the most important situations for privacy were those involving either physical care or communication (2). Accordingly, hospital spaces that support direct physical patient care and communication of confidential or personal patient information must be designed in a way that can best protect the privacy of the patient.

Several studies show significant discrepancies between patient and provider perceptions of privacy. Although nurses and other caregivers tended to overestimate patients' privacy needs, their views on the most important privacy care needs differed from those of their patients (5). Healthcare providers, often more familiar with the healthcare environment and busied with their daily work, tend to overlook privacy issues that are important to the scared, sick patient who may be experiencing the healthcare setting for the first time. Patients often cited that the most upsetting violations included simple things, such as a nurse forgetting to shut the door behind them (2). Such simple privacy issues can be better addressed with design solutions that assist providers in maintaining privacy issues critical to the patient experience.

The importance of maintaining patient privacy in the hospital setting cannot be underestimated. Already, there has been major federal legislation enacted to ensure that patient privacy is maintained when healthcare providers communicate in the health setting. The Health Insurance Portability and Accountability Act was established in 1996 to ensure the confidentiality and privacy of patient medical information, particularly when being communicated between healthcare providers in the hospital setting. These regulations include clauses that prohibit providers from discussing personal medical information about diagnosis and treatment with other patients in the vicinity and the protection of medical images and information on electronic systems from public view (6). Despite this legislation, privacy violations of this nature occur regularly in hospitals- often as a result of spatial designs that are not conducive to medical discussions or the lack of private communication spaces.

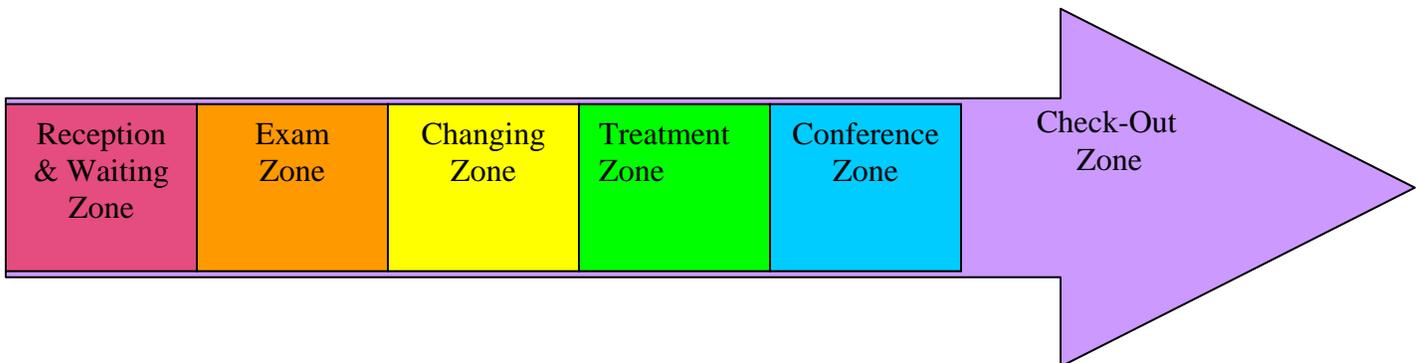
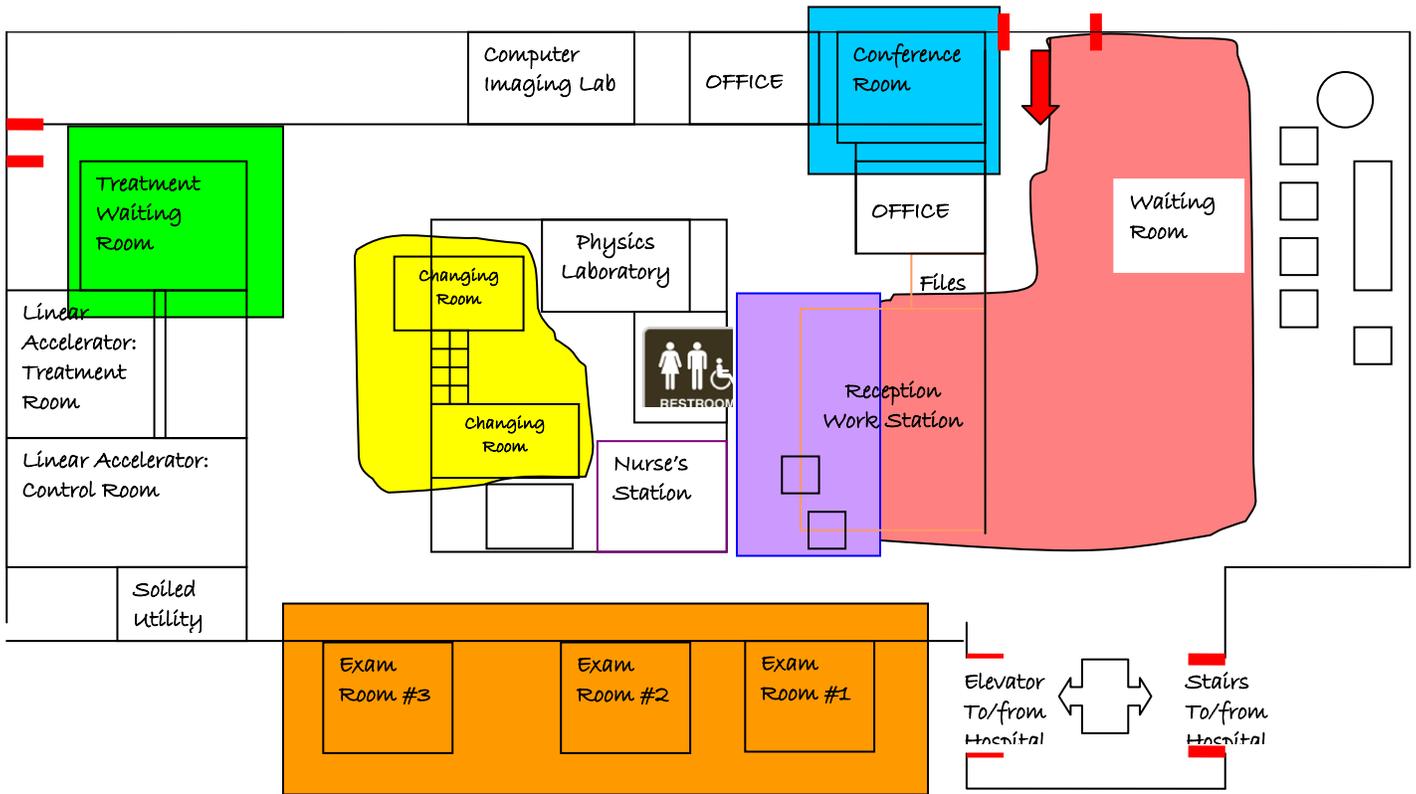
In contrast, there is a dearth of research and legislation addressing privacy violations that are physical in nature. Although there is evidence that patients have come to accept certain privacy intrusions as unavoidable in the medical setting (2), many privacy violations can be avoided with simple design solutions that facilitate privacy before, during and after medical procedures as well as during the communication of sensitive patient information.

Making people feel comfortable within hospital spaces will directly impact their care seeking behaviors, facilitate honest communication with providers, and improve overall health status in a number of ways described throughout this report. Design improvements that facilitate patient privacy while ensuring access, safety and communication will improve health outcomes and patient satisfaction with the hospital.

Data and Observations

Privacy issues in Radiation Medicine may be best discussed by breaking the unit into four separate zones utilized at different stages of the treatment process. These zones include the reception/waiting zone, examination zone, changing zone, sub-waiting zone, and conference zone. The function of each zone as it relates to privacy issues will be discussed within the observations.

The following spatial map identifies the location of each of these zones within the facility. It is important to understand the flow of each patient through the facility in order to analyze the associated privacy issues. Therefore, each zone has been color coded according to logical progression of colors in the rainbow to better understand the clockwise flow of the patient through the facility.

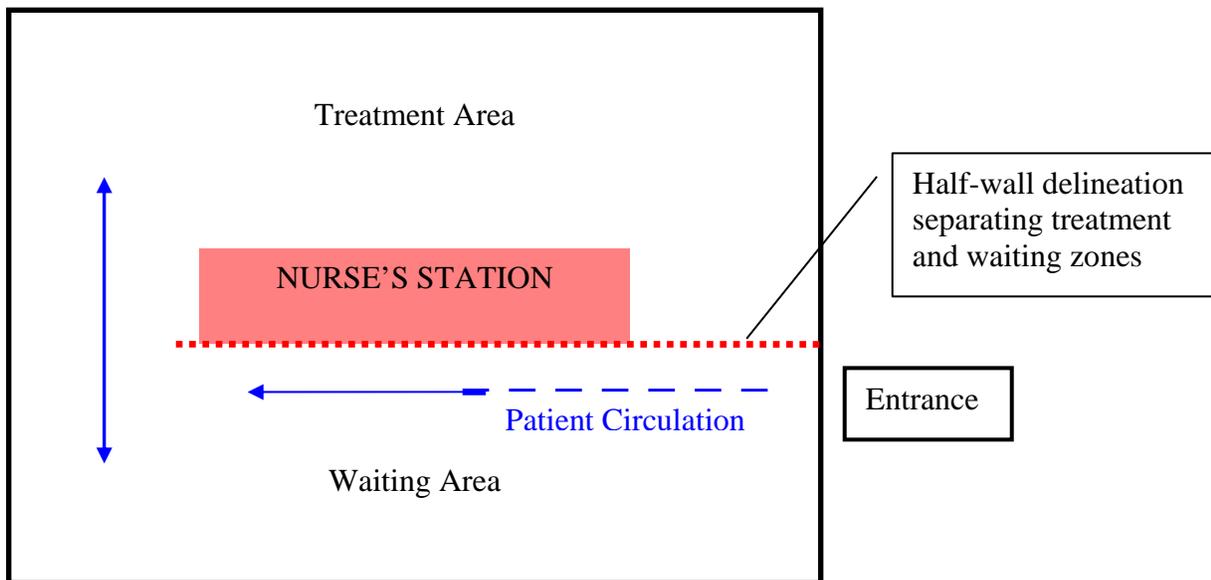


A number of interesting observations suggest that barriers to patient privacy remain despite the new construction and visual appeal of the Radiation Medicine Department at Cayuga Medical Center. These observations fell largely into two main categories; 1) **visual privacy** violations where the physical proximity or adjacency of certain spaces allowed for inappropriate viewing of a patient during treatment by other patients or individuals in the waiting area and 2) **auditory privacy** violations where non-pertinent parties were privy to communication regarding a patient's personal medical diagnosis and treatment information. As such, observations of visual and verbal privacy violations will be discussed independently.

Visual Privacy

Reception and Examination Zones

Upon entering the Radiation Medicine Department, patients check in at the front desk and then remain in the waiting room until they are called into the back work area for treatment. It was clear that there was a distinct effort on the part of the design team to separate the 'waiters' (those patients waiting for treatment) in the waiting room from the medical staff and the patients currently undergoing exams in the treatment area. This was evident by both the physical separation of the two spaces as well as the different design elements in each of the spaces. A half-wall separates the two spaces and delineates the front reception area which services both the treatment and waiting areas.



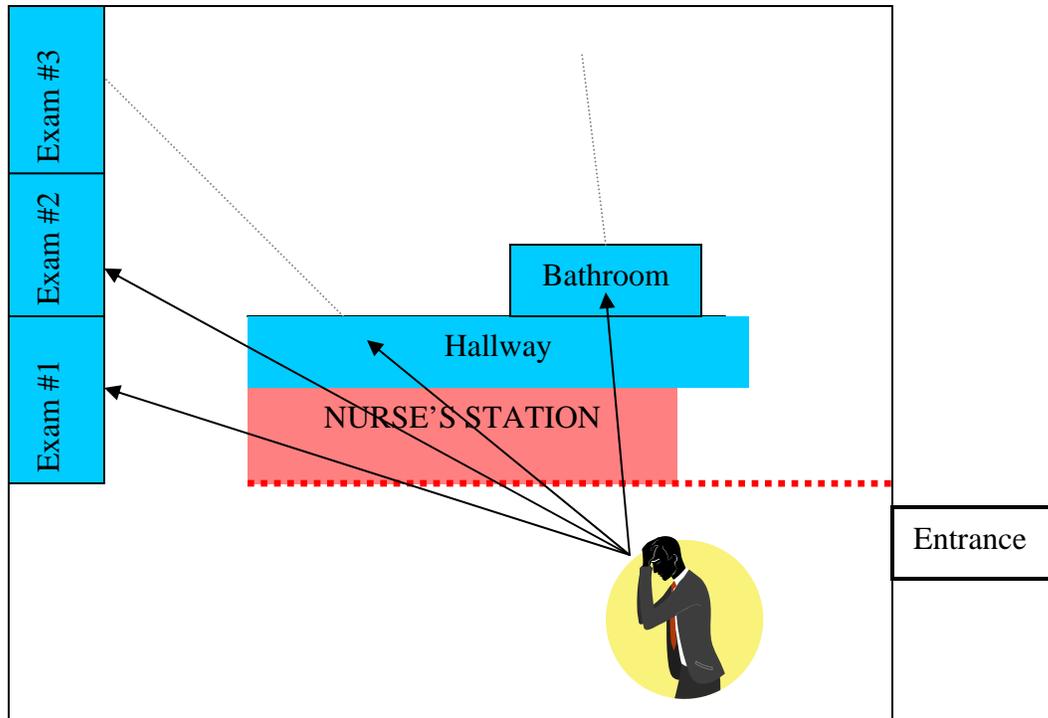
Half-wall outlines reception desk and separates waiting and treatment areas



translucent glass barrier

Observation showed clear evidence of a directed effort to separate these two distinct areas for privacy reasons. First, the majority of the chairs in the large waiting room were positioned against the farthest wall in order to minimize any view of patients in the treatment area. In addition, the half-wall which physically divides the two areas was composed of both solid wood and translucent glass. The use of this foggy glass gives the visual illusion of open space, but is supposed to prevent the ‘waiters’ from viewing patients and confidential materials on the reception desk and nurse computers.

Despite these concerted design efforts, there was a clear lack of patient privacy in both the waiting room and examination areas. The seating arrangements in the waiting room were located on the far side of the room to decrease visual access over the half-wall to the treatment rooms. The entrance to the facility, however, was adjacent to the half-wall. As such ‘waiters’ who approached the reception desk after entering the facility could see over the wall and view directly into the treatment area and thus every single patient who entered the facility (whether or not they checked in) had a direct view of patient paperwork, computer screens, and the treatment area. The view of the treatment area included direct visual access to two of three patient exam rooms, patient bathroom and hallway which directly faced the waiting area. This visual proximity allowed for ‘waiters’ entering the facility, and particularly those standing at the check-in desk, the ability to view directly into the treatment rooms when the doors were opened. In addition, they had direct view of any patients coming out of the restrooms and also those using the hallway to access the rest of the facility, as illustrated in the following diagram.



Although these visual adjacencies might not normally constitute a violation of physical privacy, observation revealed that nurses and physicians often left treatment room doors open before and after examination. This allowed ‘waiters’ and the public to view patients half-naked in their hospital gowns or in the process of undressing/redressing in their patient rooms and violated patient privacy.

A detailed study of the practice patterns of nurses and physicians seeing patients in the treatment room revealed the following data regarding the number of times the treatment room door was left open to allow visual access by ‘waiters.’

Exam Rooms (Visually Adjacent to Waiting Area)	Number of Times Door Left Open by Nurse or Physician (1 hour period)		
	Before Seeing Physician (left open by nurse)	When Doctor Entered (left open by physician)	After Seeing Physician (left open by physician)
Observation Day #1			
Exam Room #1			
Exam Room #2	3	0	3
	2	0	3
TOTAL PATIENTS SEEN =4			
Observation Day #2			
Exam Room #1	1	0	4
Exam Room #2	3	0	2
TOTAL PATIENTS SEEN =5			

This data shows that the doors to the treatment rooms were left open during the course of treatment a significant number of times (often more than half of the time) and this occurred equally in both of the treatment rooms visually adjacent to the waiting room. Moreover, both nurses and physicians were guilty of leaving the doors open before and after their visit with the patient. The pattern of leaving the door open was not random, and relatively consistent over the two hour-long study periods.

Interestingly, the door was never left open by the physician upon entering the treatment room to see the patient. One of the nurses on the unit suggested that this pattern is most frequent during periods of high patient volume where providers must see five or more patients in the course of an hour. This is an extremely high volume for this department, due to the constraints of only one linear accelerator and three exam rooms. She suggested that during high-volume periods, the nurse often directs the patient to their exam room to get undressed and enters a few minutes later instead of escorting them personally to the door because they are busy dealing with another patient or an issue at the reception desk. In addition, providers leaving an exam room after seeing a patient are often concentrated on seeing the next patient quickly and forget to fully shut the door on their way out of the room. The nurse suggested that sometimes the physicians even leave the door open intentionally to encourage patients to hurriedly dress themselves and move out of the room in order to accommodate another patient in a timely manner.

Inside the examination rooms, a curtain was used to segment the room into two sections in order to afford the patient increased privacy. This curtain separated the physician's work station from the patient exam table so that the patient could have privacy from the physician. In addition, Joe Fitzgerald had intended that these curtains also provide a safety screen from 'waiters' outside if the exam room door was opened. On almost all occasions when the exam room doors were opened during observation, however, the curtain was pulled back and failed to block the patient from public view. The nurses suggested that one reason for this might be that after the physician moves the curtain to examine the patient, it is rarely replaced. Both the physician and patient failed to replace the privacy curtain, possibly because the room door was already shut and patients were already provided some sense of privacy – thus feeling that the privacy curtain was no longer necessary. However, many patients did not realize that they would be in the line of sight when the exam room door was left open accidentally.

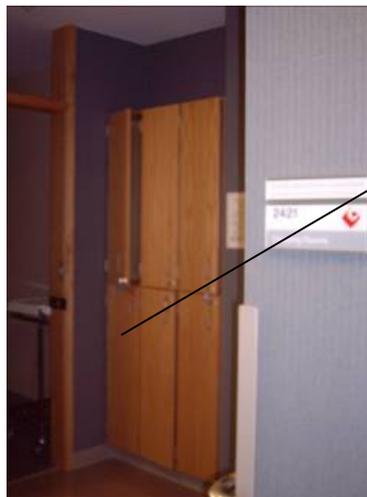
Changing and Sub-Waiting Zone

Another significant observation relating to patient privacy in Radiation Medicine was the layout of the changing rooms and sub-waiting room next to the linear accelerator. Before a patient undergoes treatment in the linear accelerator room, they must fully undress, take off all of their jewelry, and change into a hospital gown. As such, changing rooms, lockers and a sub-waiting room have been located next to the linear accelerator room. There are two changing rooms and a wall of private lockers for patients' belongings all on one side of the hall opposite the treatment room. After a patient changes in their hospital gown, they must cross to the other side of the hall to reach the sub-waiting room.

Changing Room



Wall of lockers adjacent to changing rooms



Upon initial observation, the sub-waiting room is visually appealing and well-equipped with amenities that will provide comfort to the patient during their wait: a water cooler, magazine rack, artwork, tall ceilings and a skylight which makes the room bright and airy. Upon observation, however, it seemed that patients did not feel as comfortable as intended when using this space.

Patient behaviors in the sub-waiting room suggested that patients did not feel comfortable with the level of privacy they experienced. After changing, patients exited the changing room in only flimsy hospital gown which did not offer substantial privacy for many of the patients. Moreover, once patients crossed the hallway they exhibited uncomfortable behaviors in the sub-waiting room. This room, used to hold patients that are “on-deck” for treatment in the linear accelerator, became an awkward space in which patients were extremely exposed and forced to sit extremely close to one another due to the constrained seating arrangement.

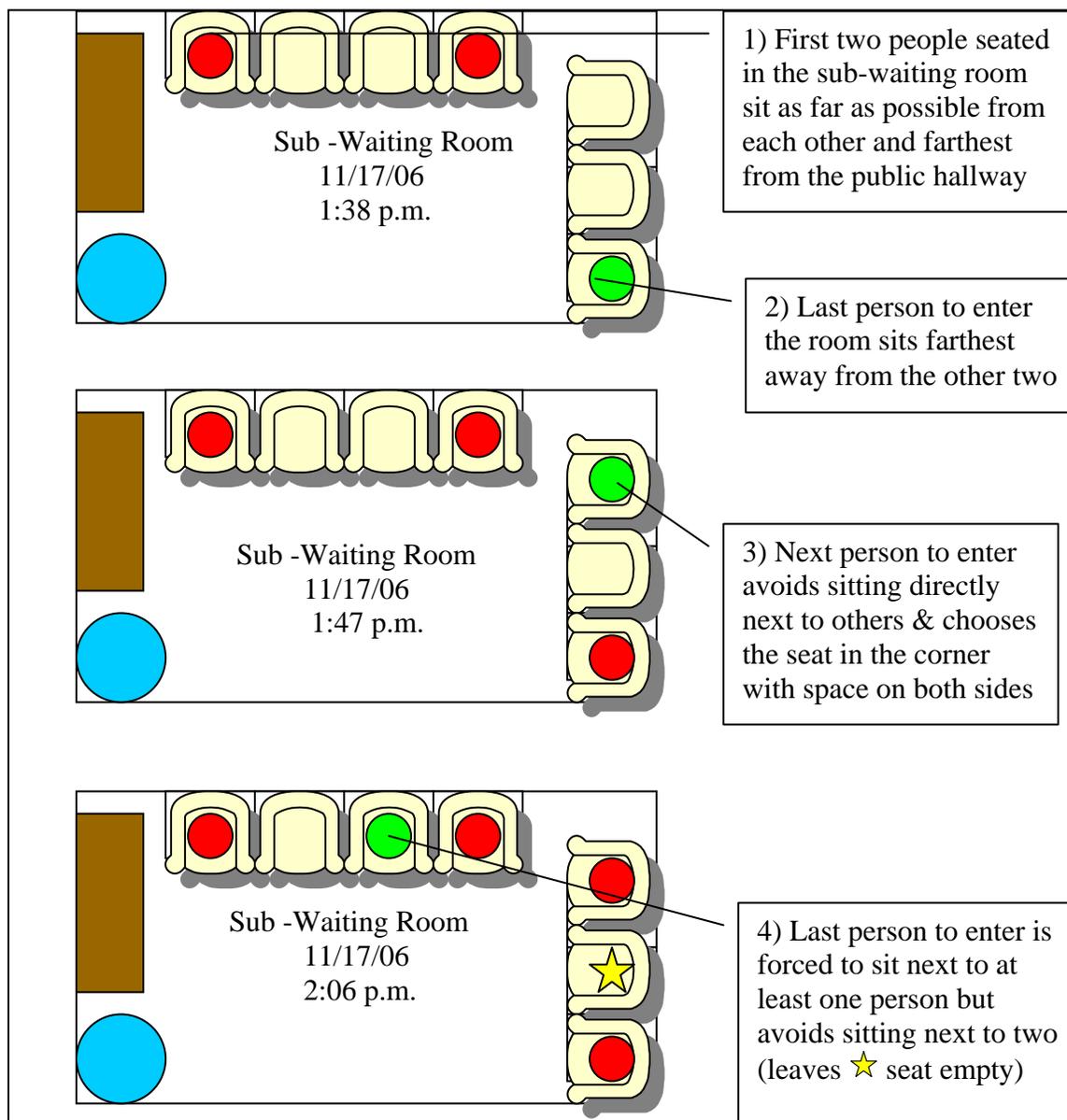


Changing Room

Sub-Waiting Room

Sub-Waiting Room

Observation yielded an interesting pattern by which patients seated themselves as far away from one another as possible. Patients sat every-other seat during the entire observation period and only sat next to each other when there were no other options (when every alternating seat was already occupied). The following diagram illustrates the seating preferences of incoming patients in the sub-waiting room within a half-hour study period.



In addition, a majority of the patients using the facility are adults or elders, who either came by themselves or were forced to change by themselves due to the small nature of the changing rooms. Many did not or could not tie their gowns properly and often needed to go find a family member or nurse in the front of the unit, thus exposing themselves to everyone in the hallway and the 'waiters' near the reception area. Moreover, many of the cancer patients being treated had lost their hair and were forced to sit with others without a hat or wig.

The changing and sub-waiting areas provided absolutely no ability for family to accompany the patient and remain with them in privacy inside the facility. If a spouse did enter the facility with the patient, they were left standing in the hallway outside the sub-waiting area and decreased the privacy of other cancer patients in the room waiting for their treatment.

Conference Zone

A final physical privacy constraint in Radiation Medicine was located in the conference room. This room is most often used when physicians need to consult with patients and their families regarding treatment plans and also to update patients on their prognosis throughout their course of treatment. The conversations occurring in this room can be extremely personal and highly emotional, therefore the room was located in the farthest corner of the facility in the most private and removed space within the treatment zone.

Upon observation of this room after a few patient consults, it became clear that the room may not have been intended for such private and intimate purposes when it was originally designed. The room was extremely dark and dreary because the walls were paneled with grey fabric which made the room very dark. The length of one entire wall of this triangular room was windowed but the blinds remained down after every patient visit. After inquiring about this, a nurse opened the blinds and revealed that the conference room looked out onto a main hospital entrance/exit pathway. The pathway was less than thirty feet from the conference room and pedestrians could see directly into the conference room during these most private moments. As a result, the blinds were hardly ever lifted in order to protect patient privacy and the room remained dark and depressing.



Wall-length window allows patients exiting and entering the radiation department and the main hospital direct visual access into the conference room



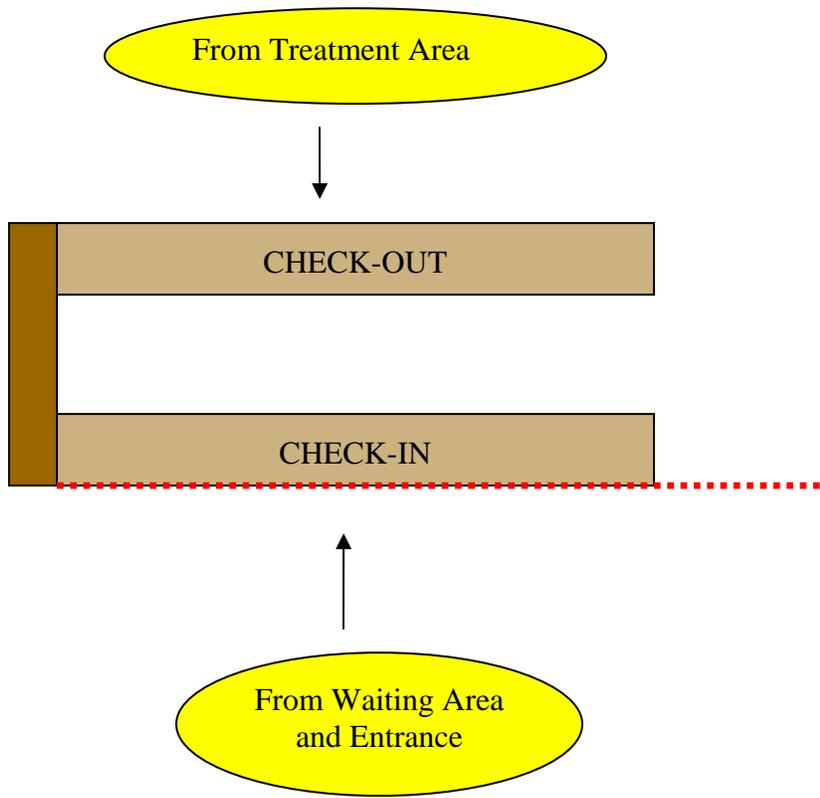
Auditory Privacy

Reception & Waiting Zone

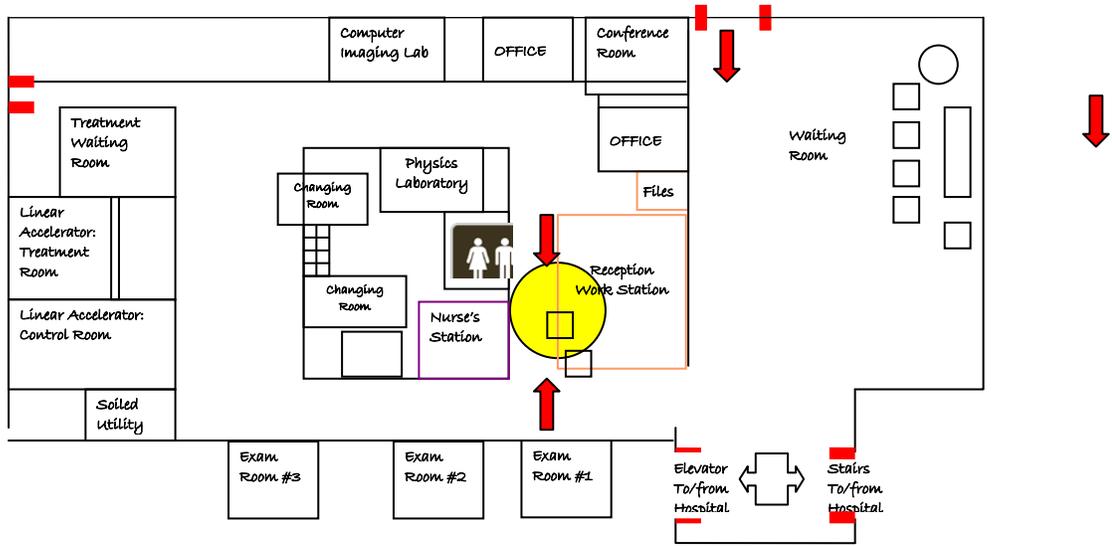
Although beautifully designed with a waterfall, natural woods and other luxurious features, the waiting room was extremely large. The waiting area, which was larger than the entire treatment area, offered numerous seating options which were spread throughout the space. Although this spread-out design did provide a sense of space and separation from other ‘waiters’ in terms of spatial privacy, it compromised auditory privacy within the facility. When the receptionist needed to call patient’s name, it required her to yell across the entire room. Although the nurses in the facility stated that they attempt to use first names only in order to enhance patient privacy, they were often forced to resort to using last names in order to communicate and identify patients on deck for treatment in such a large space.

Check-Out Zone

Namely the biggest privacy issue plaguing the Radiation Medicine Department is the lack of privacy when the nurse/receptionist wants to discuss appointments, payment plans and treatment options with patients at the reception station after treatment. Currently, one reception station functions dually for checking in arriving patients in the waiting room and conducting check-out consults with patients after their treatment. The reception station is a “U” shaped desk; one side is designated for check-in and the other for check-out, as illustrated in the following diagram.



Although check-in is done standing in front of the desk, the check-out consult takes much longer. It includes a discussion of the billing procedures and insurance plans, scheduling of appointments, discussion of treatment regimens and other personal medical and paperwork functions. This process takes significantly longer than check-in, and the new unit designed thus incorporated a seating window for patient interaction with the receptionist during this process. This cut-out, however, was not deep enough to allow for a chair to properly fit and left the patient sitting in the middle of the hallway. Not only did this location obstruct patient and physician flow through the hall, but also was in an exposed area that offered no verbal privacy during the communication process (see diagram below).



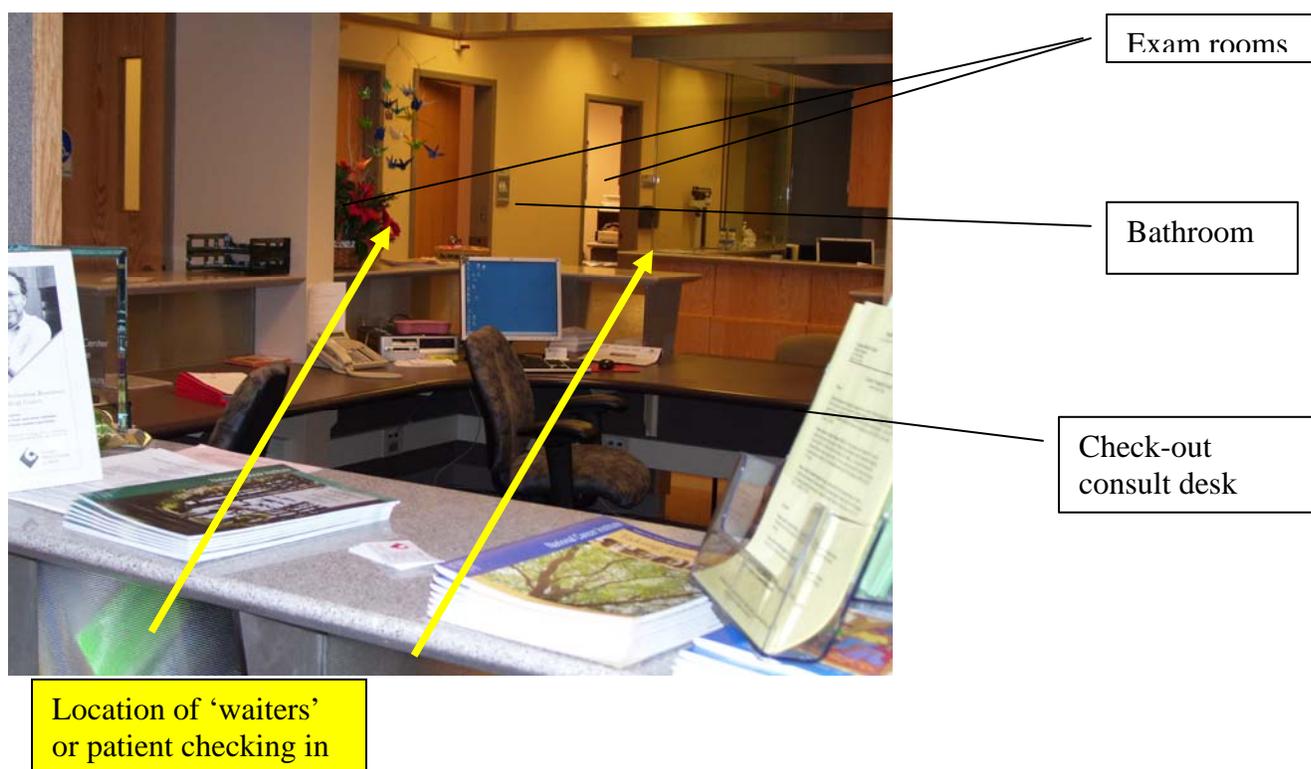
Patients checking in on the other side of the desk, entering the treatment room, and in the hallways were all privy to the entire conversation. Both nurses interviewed complained about the lack of privacy when conducting these check-out consultations and suggested that the design should have been better thought-out in terms of auditory privacy during these communications.

During the observation period it became apparent that this check-out consultation was not solely a one-on-one function between the receptionist and the patient. On a number of occasions, the physician came out from his office to deliver paperwork, speak to the patient, follow up after treatment and speak to the family. In order for the family to participate in this process and stay informed of the patient's health status, one of two things occurred. Either 1) the family tried to crowd around the desk, increasing the volume of the conversation and drawing attention to private medical information or 2) the physician walked out into the waiting room to follow up with a family member and shared medical information in a public setting with little auditory privacy. It was clear that the current seating arrangement for the check-out process does not allow for the confidential sharing of personal medical and financial information.

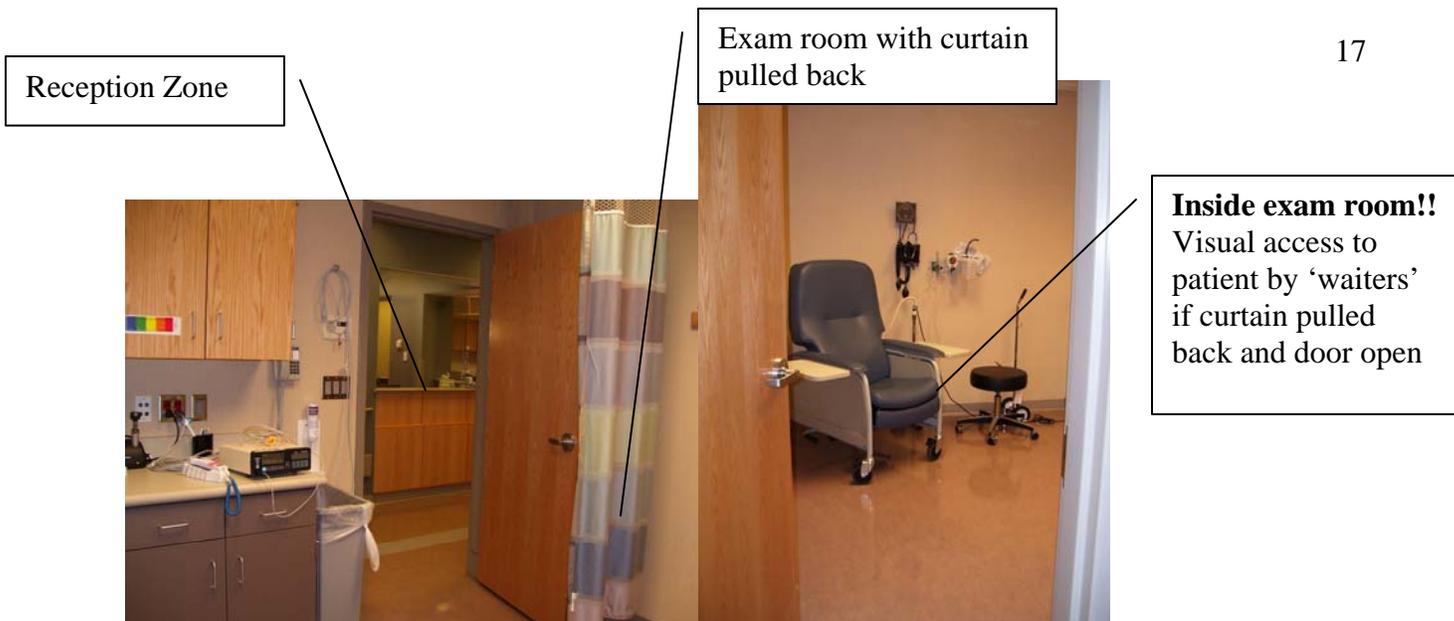
SYNTHESIS

Visual Privacy*Reception and Examination Zones*

The current layout of the reception and examination zones is not ideal for privacy reasons. Although it was ideal for these two zones to share physical adjacency in the design plan to improve patient access and flow, their visual adjacency to one another decreases the privacy of patients in the first two examination rooms.



This privacy violation was exacerbated during the observation period when many nurses and doctors left the exam room doors open or when family members opened the door be with their loved one. As such, patients standing at the check-in counter or 'waiters' meandering the waiting space have direct visual access to patients in the first two exam rooms and the patient bathroom. In addition, any patient completing a check-out consult on the other side of the reception station also had visual access to these rooms and often turned their head this way when doors were opened or movement was occurring in that direction. Even though a curtain was provided for enhanced privacy, it was only utilized before the physician entered the room or to separate the patient from their family while they were undressing. The privacy curtain was never utilized after the exam, because each time the physician exited and left the door open the patient was exposed.



Patients were unsatisfied with the current level of privacy offered in the exam rooms. On one occasion, a female patient wearing only a head scarf and hospital gown opened the exam room door in order to request a magazine from the nurse. As she did so, she immediately noticed people standing in the reception zone staring directly at her. The woman quickly covered her head and chest with a sweatshirt she has taken off and shut the door almost completely so that she had to whisper to the nurse through a crack in the door in order not to be seen by onlookers.

The need for physical visual privacy is particularly important in the radiation medicine setting. First, a majority of the patient population seen in this department are either female breast cancer patients or adults or elders with various types of cancer. Studies of hospital privacy have revealed that women and elders are most sensitive to privacy violations (1). In addition, the consequences of cancer treatments, which include radiation and chemotherapy, may alter the perception of body image among these individuals (7). Many cancer patients experience weight fluctuations, hair loss, pain, fatigue, rashes, disability and other physical side effects of their treatment. These alterations in physical appearance can significantly influence people's perceptions of their sexuality, attractiveness and worthiness (7). As such, decreasing their physical exposure to strangers in the facility is a priority re-designing this space.

Establishing medical privacy during the physical exam is critical proving gaining patient satisfaction and ensuring patient loyalty to the hospital for future sustainability. Studies have shown that physician attempts to establish privacy during an exam (pulling the curtain, shutting a door and other such factors) were positively correlated with patient satisfaction (11).

There was a clear tension between the desire for family to be involved in the care process and the violation of patient privacy. Families were often sighted standing outside the exam rooms because there was really not enough space in the exam rooms to allow for a family to comfortably fit with the patient. This caused families to loiter in the halls and look into patient rooms, decreasing the privacy of other patients in the treatment area. When the family did enter the exam room, they tended to sit or stand in the physician work area while the privacy curtain was shut. When the physician entered, his work space was crowded and family members often exited the room. In certain cases, nurses reported that families and patients seemed to feel awkward because they were forced into a space in which they may have violated the patient's privacy due spatial constraints of the exam room. As such, nurses claimed that they often suggested that only one family member enter and the rest remain in the waiting area.

The importance of family involvement in the care process cannot be underestimated. Patients diagnosed with cancer have demonstrated a strong need for social support in the form of empathetic understanding, respect and constructive discussion with family members. Anxieties

evoked by cancer diagnosis showed an enhanced need for social support from family, friends and health care professionals (8). Therefore, an environment in which family support and privacy can both be maximized is warranted.

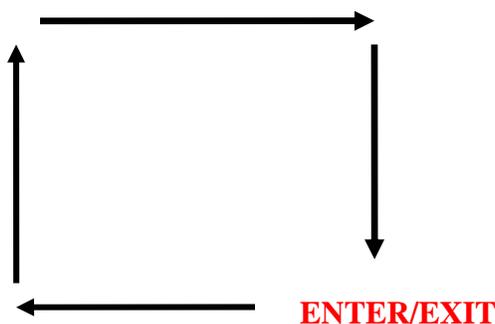
Changing and Sub-Waiting Zone

Similarly, observations made in the changing and sub-waiting zone suggest a similar tension between the mutual desire for social support and privacy. In the changing and sub-waiting zone, however, patients seemed to experience a more severe form of discomfort with privacy issues.

Patients in this zone exhibited behaviors that signified embarrassment in front of other patients and individuals circulating through the facility. Significantly, patients never chose to sit next to each other as evidenced by the aforementioned seating preference observations. In addition, they rarely spoke to each other but rather chose to speak with their family members or read a magazine. Many patients tried to cross their legs and hold their gown together in certain areas so that they did not expose themselves to others in the sub-waiting waiting room. On one occasion, a younger woman remained in the changing room and had her husband stand outside the door, occupying it until the nurse came to find her for treatment. In this way, she was able to remain in a private area until it was her time for treatment and she scurried across the hall to the linear accelerator. Her husband then walked through the facility and back out to the waiting room, decreasing the privacy of other patients in the facility and in the exam rooms which he looked into as he passed.

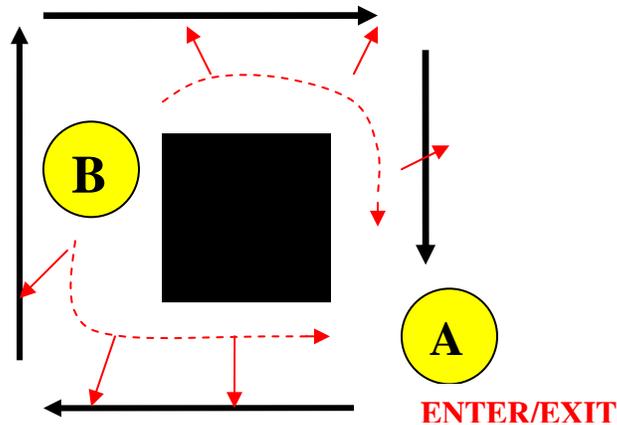
The clear expression of embarrassment in the changing and sub-waiting zone is a serious concern that needs to be addressed in this facility. Embarrassment in nursing and health care is seen as deterring patients from seeking treatment and adopting protective health measures and adds to the discomfort of chronic illness (12).

A new dimension presented in this space is the tension between access and privacy. The clockwise racetrack design of the radiation unit provides a circulation pattern that is convenient and highly accessible but not optimal for patient privacy. Any family that enters the treatment area with the patient can view into patient rooms and is exposed to other cancer patients who are ill and often indisposed.



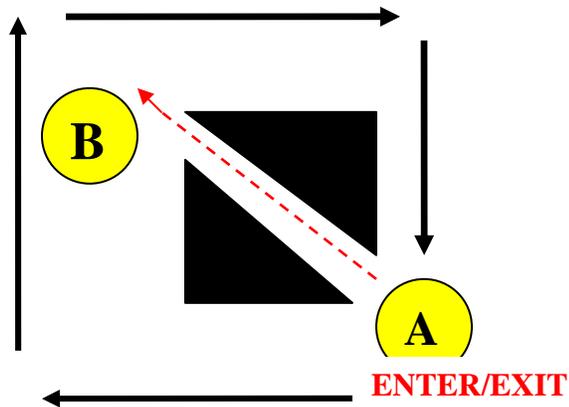
In order to exit the facility or reach another zone, family members have visual and auditory access to other patients and confidential medical information. For example, in order to go from point A (entrance to the treatment area) to point B (changing and sub-waiting zone), a

family member would have to travel around half of the facility in either direction in order to reach the exit since these two points are located on opposite sides of the racetrack. Even though these areas are adjacent to the linear accelerator and thus ideal for patient flow, providing access has thus compromised privacy.



In addition, patients can also violate each others' privacy since the current racetrack design forces all of the patients into one communal sub-waiting room; if they are not undergoing treatment, there is simply nowhere else in the facility where a patient may escape and find any privacy or solitude.

An ideal design solution would allow for isolated pathways by which patients could access their family at different stages in the treatment area without violating the privacy of other patients in the facility, as shown below.



Currently, some of the patient rooms and treatment functions are located in the central island so a path through the facility is, at present, not available as currently designed.

Since certain functions in the treatment process are highly private (i.e. dressing, toileting) and others lend themselves to family support and interaction (waiting, consult, examination), adequate space is required for both family and patient in the treatment area. This space must allow patients to have control over their privacy both in front of their families, staff other patients and public (other families, bystanders) at the proper times during the treatment process.

Conference Zone

In designing the radiation facility, Joe Fitzgerald intentionally located the conference room in the back corner of the facility strictly for privacy reasons. The possible spaces for this important room were limited, and this was deemed the best location for confidential communication physicians and patients, particularly since meetings in this room are of a serious and often sad nature when patients discuss prognoses and treatment options. As illustrated in the first figure (page 5), the conference room was strategically placed within the facility so that it was equally accessible from both physician and patient areas.

The conference zone presents another tension between the need for communication versus the need to ensure patient privacy. Although this space is ideal for communication, it did not offer privacy as originally designed. Since the conference room backs up onto the entrance to the facility, there is direct visual access to this space by anyone entering or exiting the facility or the adjacent main hospital. Fear of being seen in treatment facilities or taking certain medications is sufficient to deter a substantial number of people from seeking care (15). This is particularly true with cancer, since there is a stigma that the disease is often associated with death.

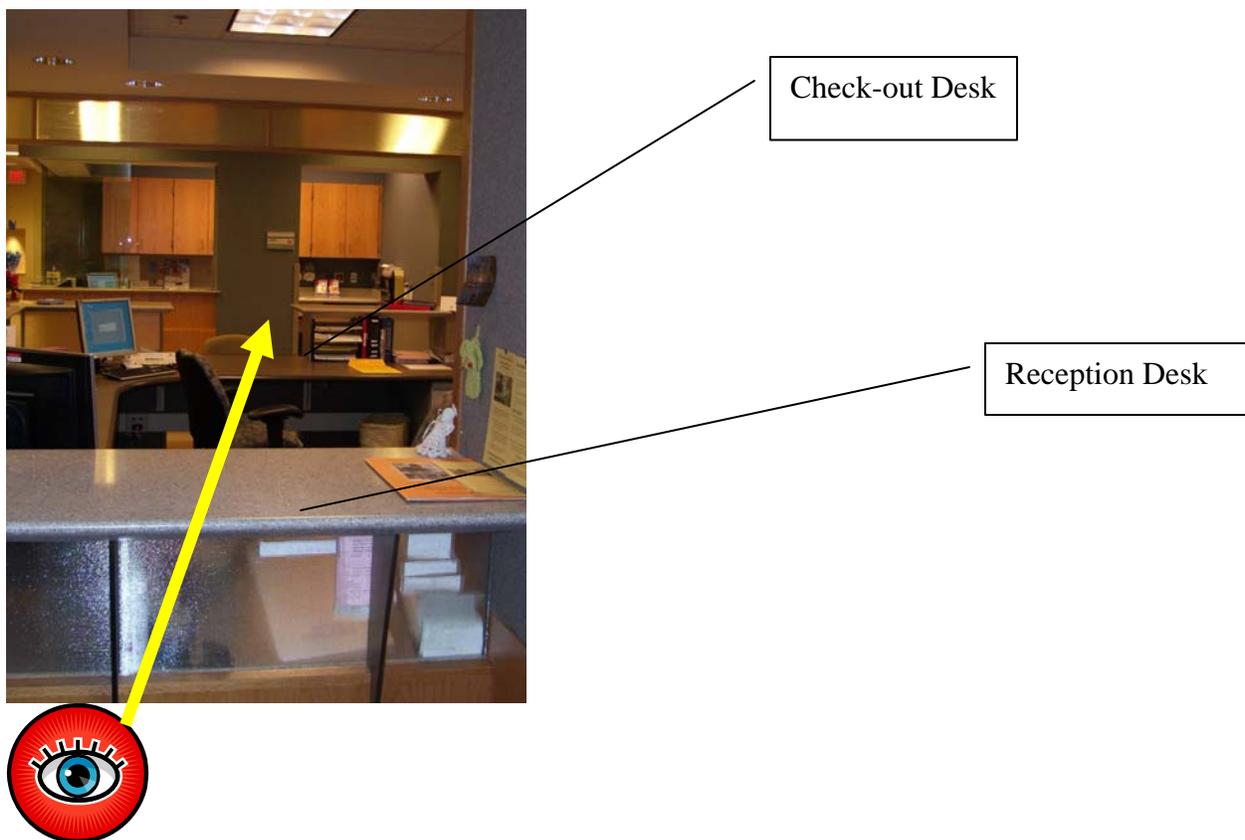
This user design gap necessitated the installation of blinds in order to enhance family and patient privacy in this space. Interestingly, observation revealed that this space was used more often as a break room for nurses eating lunch or reading the newspaper. Due to the removed nature of this room from the rest of the facility, physicians more often consulted with patients at the check-out counter. This may have occurred because this space was more accessible in the center of the facility and was the intersection of patient and physician space within the unit.

As a result, the check-out zone became a conglomeration of both check-out and conference functions. As described, this area remains very open to visual and auditory access due to a simple half-wall separating this area from the waiting and reception zones. The re-use of space differently from its original design intentions allowed for a violation of auditory privacy, as described below.

Auditory Privacy

Check-Out Zone

The check-out zone, now housing both conference and check-out functions (scheduling, billing, etc.) is awkwardly located at the intersection of three different zones; reception, waiting, and examination (refer to Fig.1). As such, it is positioned in a highly-trafficked area and provides almost no privacy from bystanders in the hallway and 'waiters' checking in on the other side of the desk.



Due to the positioning of this conference/check-out zone, private medical information was audible to everyone in the vicinity. Nurses also expressed concern and difficulty with this process, reporting that they often had to whisper or write things on paper in order to communicate with patients in a confidential manner.

The breach of medical confidentiality between patient and provider has significant and powerful implications. First, this is a violation of HIPAA privacy regulations for which the involved employees could be terminated and faced with legal repercussions. Since it is the hospital's responsibility and ethical code to uphold patient privacy in their bill of rights, the hospital is also responsible for this violation as an organization. Equally as important, patient perceptions of medical confidentiality have a significant impact on health services utilization and outcomes. Confidentiality concerns have been shown to influence care-seeking behaviors. The effects of confidentiality concerns lead individuals to withhold vital information from clinicians (15). Since the withholding of medical information can decrease the ability of providers to appropriately treat their patients, clinical outcomes may be directly compromised. This evidence calls for a space in which providers, receptionists, patients and their families can discuss information with both visual and auditory privacy from others.

INVENTION

A number of design innovations will allow Radiation Medicine at Cayuga Medical Center to enhance patient privacy in ways that continue to promote access and communication. The most effective design solution for this unit involves redesigning the unit floor plan. Although this is a long-term and costly solution, it solves almost all of the aforementioned privacy issues. In addition, multiple short-term design inventions may enhance patient privacy and medical confidentiality in this unit.

Short Term Inventions

Soft Music

In order to enhance auditory privacy, one simple short-term recommendation would be to play tranquil music in the waiting room. Currently, the design has aimed to provide a tranquil setting with a waterfall and little other disruptive noise. This tranquility may be a detriment to patient privacy, however, because it allows ‘waiters’ to focus on private patient conversations and staff discussions and constitutes a privacy violation. Research has demonstrated that speech privacy is best achieved using a meaningless steady masking noise (22). As such, relaxing music would not detract from the soothing environment and would help to maintain the privacy of medical conversations taking place in the facility.

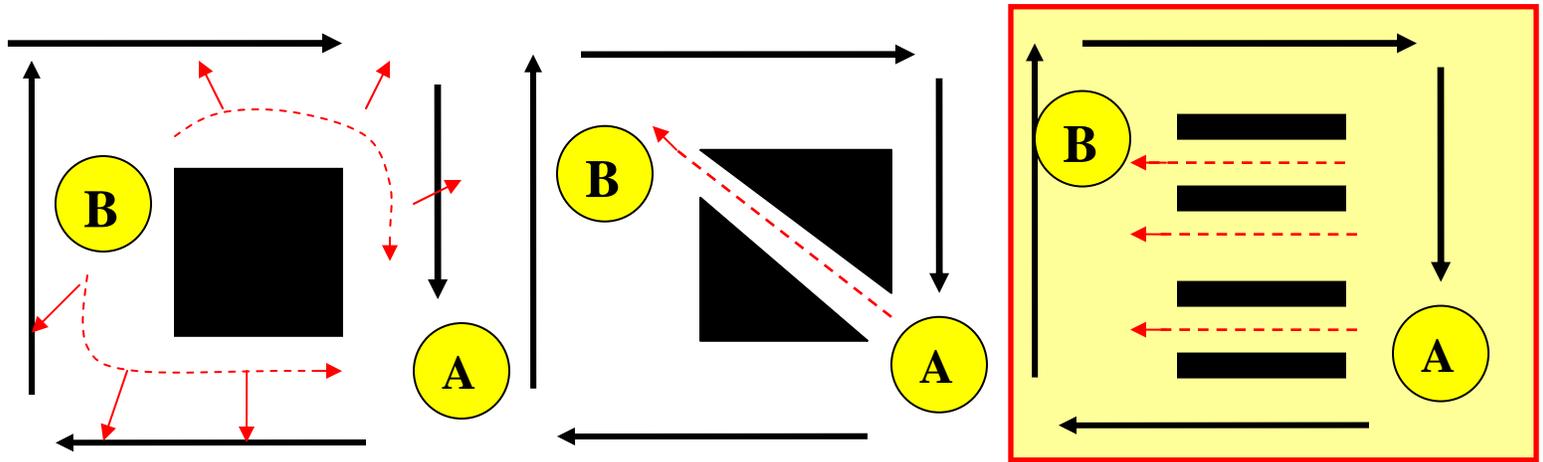
Restaurant Table Buzzers

A technology similar to that employed by restaurants could be used in the Radiation Medicine waiting room to enhance patient privacy. Upon entering and check in, each patient will receive a handheld buzzer which they will keep with them during the waiting period. The base station will remain at the reception desk and can be controlled by the nurses. Instead of shouting the patient’s name across the waiting area to get their attention, the nurse will simply need to ring their buzzer. The buzzer will light up and vibrate, indicating to that patient that they should proceed towards the treatment area to meet a nurse. Attempts to conceal patient identity during the hospital experience (ie. using only first names) has been shown to increase patient satisfaction with the hospital (11).

Long Term Inventions

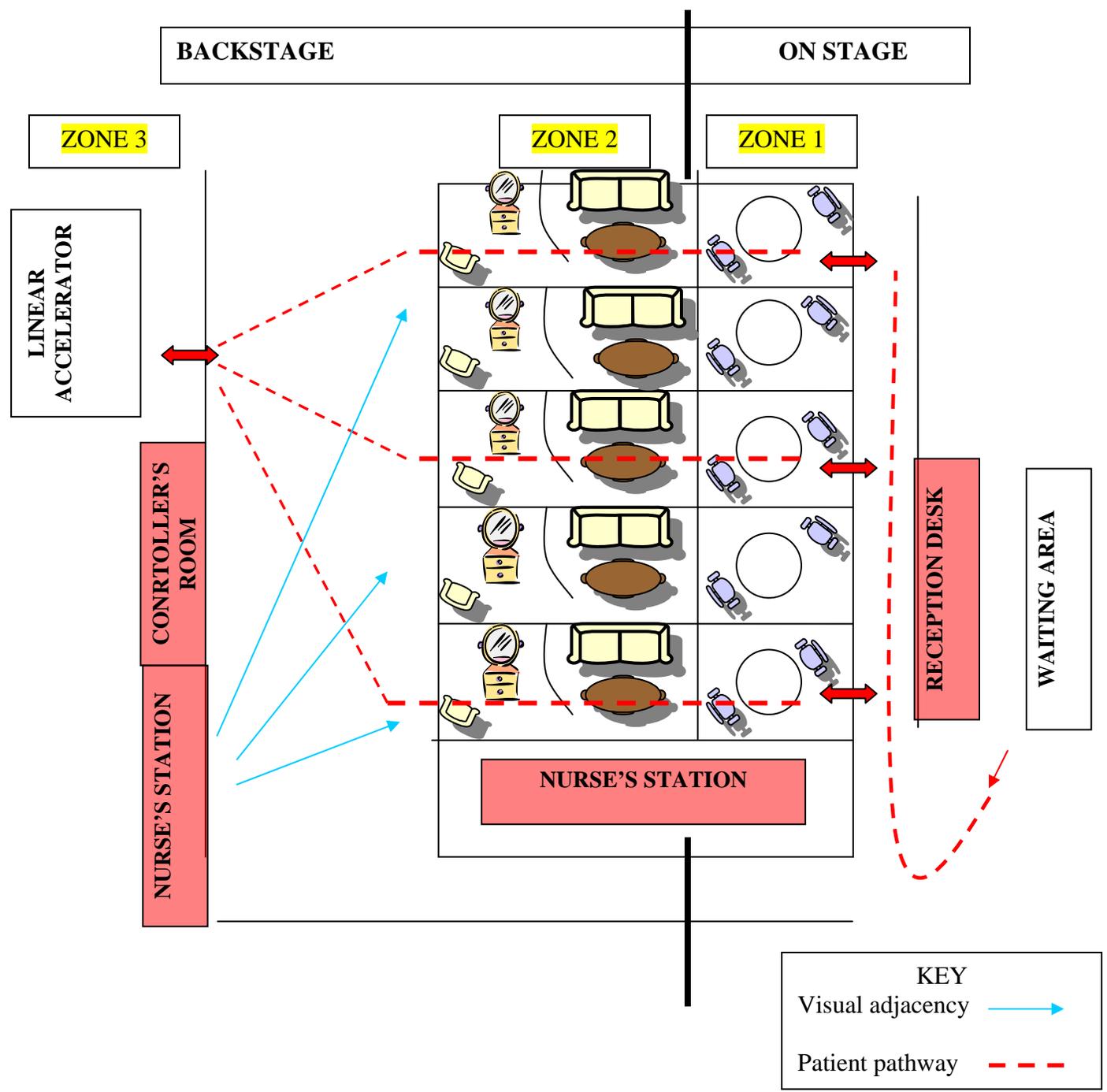
The strongest design invention for this unit would be to redesign the floor plan in the treatment area to facilitate privacy in each of the zones utilized during the treatment process. As discussed, patient flow through these zones proceeds as follows: reception/waiting, examination, changing, treatment, conference, check-out. Thus, a new floor plan would allow for a continuous patient flow through each of these zones without compromising patient privacy, access or communication.

The ideal floor plan concept would provide continuous access to patient services in a bowling alley design, where each patient in the treatment area can access all of their services along a path that minimizes exposure to other people in the facility. Although there is only one linear accelerator (at point B in the diagram) which all patients must share, patients can access all of the pre-and post treatment service zones in privacy using this model (highlighted at the far right).



The proposed floor plan model utilizes the work of Goffman which argues that privacy be maximized when social interaction is viewed as a function of “on-stage” and “backstage” activities (16). Although privacy is required in both phases, the functions occurring in each stage have different implications for privacy. “Backstage” functions are the most private and subject to embarrassment. Therefore, they should be subject to a ‘black-curtain’ of privacy that is not penetrable by others in order to maintain privacy.

The diagram on the next page illustrates a birds-eye view of the proposed floor plan.



When a patient enters the facility, they will be escorted to a private “bowling lane” of services. They will enter zone 1 and travel through zone 2 to zone 3 where they will receive treatment. They will then return back through zone 2 and then zone 1 as follows:

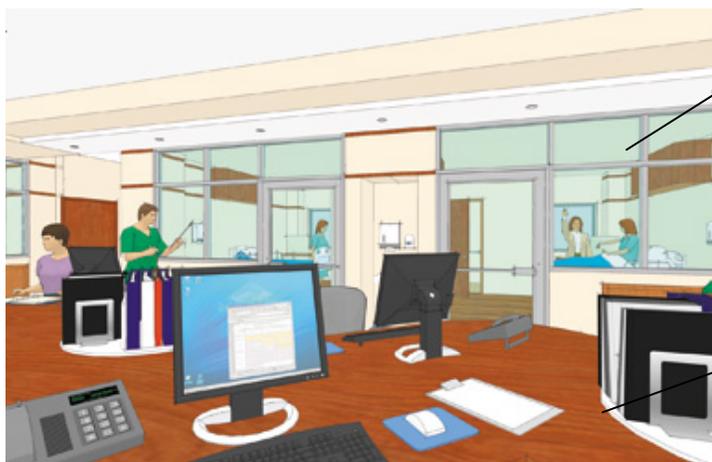


ZONE 1:

First the patient will enter the “on-stage” portion of the lane. These will be private rooms that are adjacent to the reception desk. As opposed to the original open check-in area, will be that these rooms will be each enclosed with glass above the half-wall. This space will allow patients to be called back into to the facility with their families to complete registration and paperwork in private instead of standing in the waiting area to do so. This recommendation is supported by research showing that perceptions of privacy and satisfaction with privacy issues increase when communication occurs in enclosed office settings rather than in open areas (18).

This space will have a table and chairs to accommodate a patient’s family and will allow nurses to consult with the family before treatment. This recommendation is vital because social support at the time of diagnosis and treatment during has been associated with better levels of adjustment as well as improved prognosis (9). Moreover, the quality of social support from the family has been shown to improve recovery and increase longevity (10). This space will also allow families to remain in proximity to the patient in the treatment area without them loitering in the halls and violating the privacy of others in the facility, minimizing the amount of time spent in the public waiting room.

The reception desk will be circular so that computers and medical paperwork will lie perpendicular to the reception counter in order to maintain medical privacy and confidentiality (illustrated below).



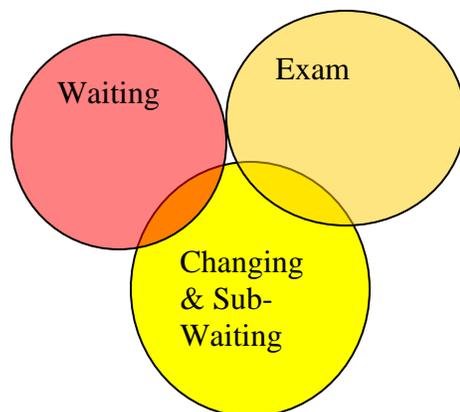
ZONE 1:
Glass-enclosed
conference rooms

New Circular
Reception Desk
Concept behind
the half-wall

(NOTE: This desk design could also be implemented in the current facility as a short-term privacy solution. Currently, certain computers and paperwork are directly visually accessible to ‘waiters’ at the reception counter.

ZONE 2:

Next, the nurse will escort the patient into the main room, where they change clothes and wait for the physician. This room will be equipped like a standard exam room, with lockers for patient belongings. Thus, it in essence combines the changing, waiting and exam functions in one room to enhance privacy.



Additionally, it will have an added family waiting section separated by a curtain. This way, certain family members may accompany the patient during the exam, but the patient can retain privacy during changing and personal examination by drawing the curtain. If the family does not want to remain for the rest of treatment, they may exit the glass room directly out into the waiting room without passing any other patient exam rooms (since they are hidden within the lanes). Physicians and nurses will enter and exit each exam room through the “backstage” entrance so that patients are not exposed to people in the waiting room. These measures, designed to enhance physical patient privacy, have direct implications for patient health. Lack of physical privacy contributes to a loss of sense of control in hospitals (19). Lack of control has been associated with depression, passivity, elevated blood pressure, and decreased immune response (20).

In order to ensure privacy of patients in zone 2 from bystanders and staff in the hallway, automatic doors will be installed at the backstage entrance/exit to the exam room. This way, doors will automatically shut after physicians and nurses enter and exit the room to enhance privacy. NOTE: Automatic doors with motion sensors can be a short-term solution in the current facility as well in order to prevent ‘waiters’ from viewing into exam rooms when nurses and physicians leave them open.

Tinted window applications used in the automotive industry will be applied to the doors in order to maximize patient privacy inside the room. The patient will still be able to see out so that they may see the nurse’s station and any nurse or physician that is approaching their room.

In order to maintain nurse access to patient rooms for safety and communication, an intercom system will be installed in each zone 2 room. These systems are commonly used in residential applications, with a base and interfaces in each bedroom. Thus, the base stations will remain at the nurse stations which are located backstage for auditory privacy. In addition, a more recent version of this intercom system allows both communicators to wear wireless headsets to communicate. NOTE: For short-term immediate application, wireless home intercom systems are available commercially and could be installed in the current facility. Each set allows for two-way communication with a 2,000 foot range and they are portable. This way, if the patient wanted to communicate with the nurse from another location, these units would allow flexibility while maintaining private communications.



Another possible option for enhanced auditory privacy is the gooseneck AudioCom™ by Telex. It is currently used in casinos theatres and has been shown to provide high levels of privacy and reduce ambient noise (21). Uniquely, it offers a program audio input which enables users to program audio or cue feeds when a button is pushed from any central hub. This would allow for nurses and physicians at their desks to push a button and notify the patient they are coming into the exam room in order to ensure that the patient is dressed and prepared for the visit.

In addition, one nurse's station will be repositioned next to the controller's room so that nurses can have physical and visual adjacency (blue arrows in diagram, p. 24) to the patient exam rooms for safety reasons. Thus privacy can be enhanced in this space while maintaining access and safety.

ZONE 3:

When patients are called for treatment by the nurse, they will exit the exam room through the backstage exit and go directly to the treatment room across the hall. This design eliminates waiting in public waiting areas while only wearing a hospital gown and tremendously enhances privacy.

ZONE 2:

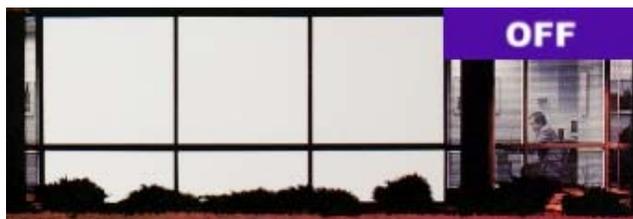
After treatment, the patient will go directly back through the backstage entrance into the exam room in zone 2 to change back into their clothes and freshen up.

ZONE 1:

Finally, the patient will proceed to back to the glass conference room "on stage" to meet with their family and physician for conference. A recent study revealed that the ability to speak to physicians and nurses in private was the most important determinant to privacy in the hospital setting (2). In order to maximize the privacy of this setting, carpeted floors will provide auditory privacy from those in the waiting and hall areas. In addition, a special type of privacy glass will be used in order to provide visual privacy from those in the waiting area. Designed for business and residential privacy needs, Switchlite™ has designed flexible glass that can become translucent at the push of a button to afford maximum privacy (17). This special privacy glass will be controlled by remote. One remote will remain in each conference room so that physicians and families can fog the glass when desired. In addition, nurses at the reception station will also retain a master switchboard so that they may control the glass features if they need to get someone's attention or check which rooms are occupied. This will enhance safety, communication and privacy between providers, family and physicians.



Privacy glass **deactivated** allows visual access for safety and communication between staff and patients on opposite sides of the glass

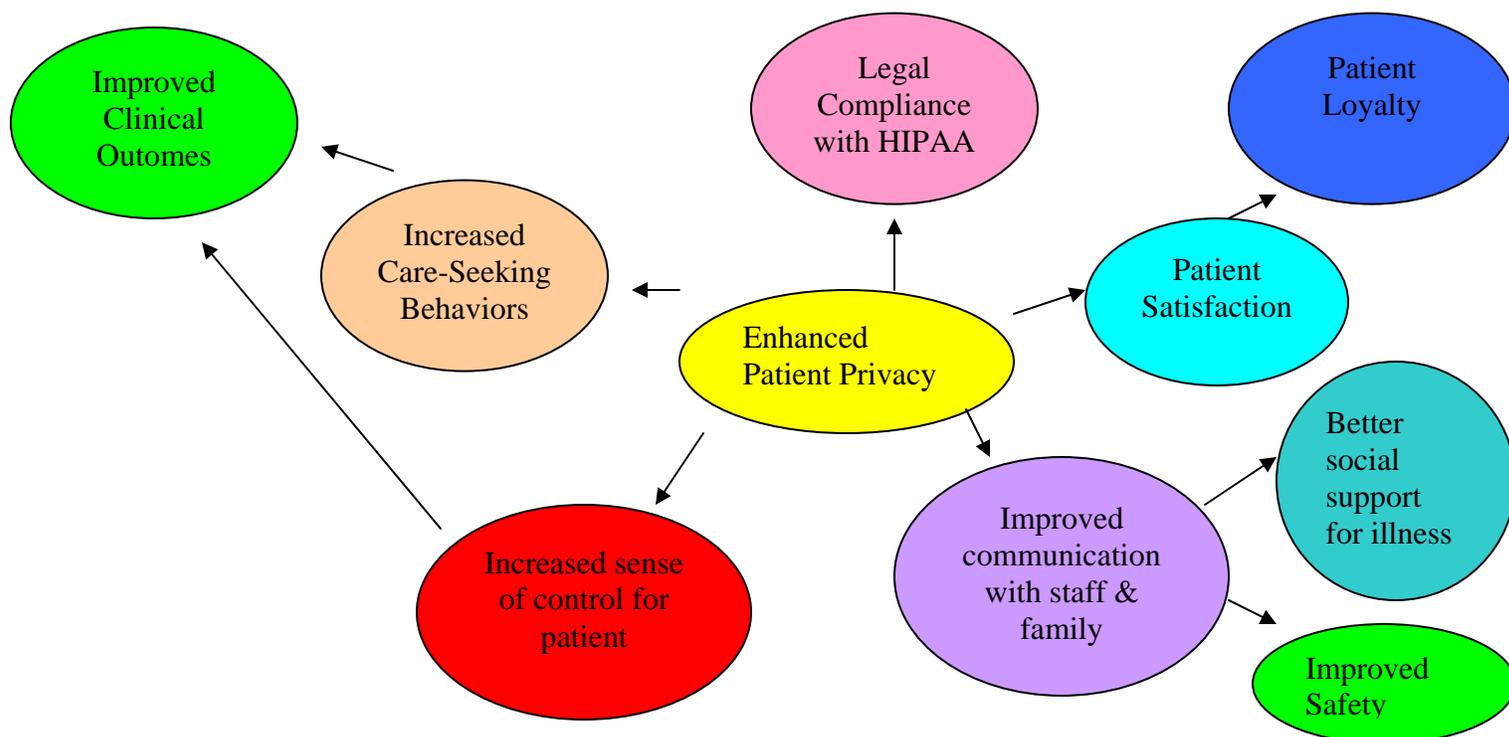


Privacy glass **activated** allows for patients, family and providers to communicate openly with visual and auditory privacy

Conclusion

Despite stringent regulations regarding medical privacy and recent design changes that have attempted to enhance privacy in Radiation Medicine at Cayuga Medical Center, significant barriers to privacy still exist with this space. One main contributor to such privacy violations is the tension between other forces that must also be maintained within the unit; these include issues of patient access/visibility for safety and efficiency as well as issues of communication. Since all of these interdependent factors have been correlated with quality of care, it is important to understand how design solutions can maximize privacy in addition to these other factors in order to improve clinical outcomes and patient satisfaction.

The design recommendations included in this report will provide a protective and private treatment setting so that patients can obtain the medical care they need unhindered by fear of exposure. Making people feel comfortable within hospital spaces will directly impact their care seeking behaviors, facilitate honest communication with providers, and improve overall health status in a number of ways. This will not only contribute to greater population health, but will ensure patient satisfaction and long-term loyalty to the hospital.



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