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Design Dilemmas

DEA 453: Planning and Managing the Work Place

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Cornell University, Fall 2009

Crowding and Prolonged Waiting Time in the Emergency Department

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Introduction

- This report will explore the issues associated with prolonged waiting time *(perceived and actual)* and overcrowding in an Emergency Department setting.
- Research on both waiting and overcrowding is used to determine not only **WHY** these issues are problematic, but also **WHAT** factors may lead them to arise.
- Finally, research will be applied to uncover **WAYS** in which these issues can be dealt with from a spatial layout and design, technological, and organizational/administrative point of view while benefiting all stakeholders.

Overcrowding

“ ‘ED overcrowding’ refers to an extreme volume of patients in ED treatment areas, forcing the ED to operate beyond its capacity”[12]

WHY is overcrowding problematic?

For Patients:

- **Patients** leaving with out being seen (LWBS)
- Increased **patient** complaints and decreased **patient** satisfaction
- Decrease in the quality of **patient** care and increased medical errors
- *Prolonged **patient** wait times *(actual)*

"Overcrowding usually leads to extremely long wait times, especially for those patients who are not critically ill, which leads to patient dissatisfaction, patient walkouts, and the potential for compromised medical care." [12]

(p.1, **Wiler et. Al) and** (p.234, Polevoi et al.) and [8]

For Patients:

a) Patients leaving with out being seen (LWBS)

- Overcrowding is correlated with patients leaving the ER with out being seen- however the crowding factor doesn't become significant until the crowding reaches over 100%. [14]
- The number of patients who LWBS increased by approximately 67% between 1995 and 2002 [10]
- Many LWBS patients do not have an alternative source of healthcare and may not receive needed treatment [9]
- Patients have a poor experience with overcrowded ERs and are likely to LWBS. Furthermore, they are less likely to return to the Emergency Department in future situations. [8]

b) Increased patient complaints

- When there is overcrowding, doctors have a lot more on their hands and have less time to spend with patients. When caregivers and doctors are not as available to patients and their families, there are more complaints and questions unanswered by caregivers [7]
- With crowding being a factor highly associated with stress level, patients level of satisfaction with the health care diminishes [13]

c) Decrease in the quality of patient care and increased medical errors

- Medical errors tend to increase with elevated stress levels (correlated with crowding) for acute care nurses [13]

d) Prolonged patient waiting times *(actual)*

- Actual waiting time is highly correlated with availability of a nurse and the availability of an examining room. The more crowded an emergency department is, the less likely one or both of these things are to be available to a patient in need hence waiting time increases. [2]

WHY is overcrowding problematic?

For Caregivers (Nurses, Doctors, and Hospital Administrators):

- Decreased staff satisfaction and increased staff turnover
- Decreased physician productivity
- Increased distractions for nurses and doctors (e.g. families bombarding them with questions and complaints)
- More pressured decision-making
- Decreased hospital revenue with diminishing patient satisfaction
- Increase in medical errors

For Caregivers (Nurses, Doctors, Hospital Administrators):

a) Decreased staff satisfaction and increased staff turnover

- One study reported that time pressures are a major factor associated with physician satisfaction. Thus, the more crowding, the more likely there is to be increased time pressure which can decrease satisfaction for physicians. [16]
- Decreased job satisfaction is likely to decrease productivity which in turn increases job turnover among health care workers [8]

b) Decreased physician productivity

c) Increased distractions for nurses and doctors (e.g. families bombarding them with questions and complaints)

Seeing the staff at work is comforting to patients and families who feel more assured that they are being taken care of. Over crowding makes it more difficult for patients to watch the busy staff as they are tending to more patients and on the move much more. The sheer volume of people also makes visibility less easy. [7]

Emergency physicians are interrupted on average around 15 times per hour which limits their ability to be productive. [18]

d) More pressured decision-making

e) Decreased hospital revenue with diminishing patient satisfaction

f) Increase in medical errors

- The additional patient load makes it hard to provide the adequate staffing, facilities and finances to care optimally for each patient. [4]
- Medical errors increase due to the sheer increase in number of patients requiring care, the lack of available resources (consultation opportunities inpatient beds and medicines), lack of complete/reliable medical histories of each patient, the complex needs of the various patients and their families (social, economic, clinical, psychological). [11]

WHY is overcrowding problematic?

For Families/ people accompanying the patient:

- Busy doctors and nurses are less attentive to questions and concerns
- Crowding, waiting and uncertainty is associated with increased stress and anxiety levels [13]

WHAT factors contribute to ED overcrowding?

Internal Factors	External Factors
* *Processes holding up patient input, throughput, and output...* -Slow or inefficient triage -Bottlenecks with lab testing for diagnostics -Hold ups with patient discharge -Physical laycut of space	-Too many patients -Lack of inpatient capacity -Inappropriate use of the ED -Emergency Medical Treatment and Active Labor Act (EMTALA) -Lack of access to health care for the uninsured

* " •**Input**- affecting flow of patients into the department
•**Throughput**- affecting flow of patients once in the department
•**Output**- affecting flow of patients after the discharge/admit decision was made." [7]

A closer look at some external factors of overcrowding:

- Emergency services were originally intended for the seriously ill and injured but now more than half of those receiving care in ER facilities have NO urgent medical problem.
- The ER has to bear the burden of being a primary physician for many patients who are not covered by health insurance. This puts a heavy patient load on the ER for non-urgent situations.
- With this as the case, hospitals are required by law to care for all patients regardless of their ability to pay. They must maintain expensive standby-by equipment and specially trained staff to handle complicated serious cases- all driving up operating costs. Since the majority of patients that come to the ER are non-urgent cases, a lot of this expensive equipment isn't used most of the time.
- Hospitals have traditionally stayed away from outpatient clinics that provide care for non-urgent cases out of fear of competing with the physicians who send/refer their patients to the hospitals
- One study suggests crowding from elevated ED attendances are correlated with limited bed access. This study also illustrates that emergency and elective admissions compete directly for hospital beds over all and when there are inadequate resources to accommodate the both elective and emergency bed demands, crowding can result. "As ED occupancy increases, the number of available treatment areas decreases and it becomes increasingly difficult to find appropriate areas to treat new patients. In addition, the need for ED staff to provide care to admitted patients unable to be discharged from the ED reduces staff availability to attend to new patients" [17]

[4], [1], [17].

Waiting

"To remain stationary in readiness or expectation"

[31]

• **WHY** is long *(perceived and actual)* waiting time problematic?

For Patients and their families/support system:

• "Perceptions regarding waiting time, information delivery, and expressive quality predict overall **patient** satisfaction, but actual waiting times do not." [15]

•Long actual waiting times contribute to **patient** LWBS cases. In one study, it was found that the majority (~77%) of patients said they left because of the long wait. Evidence suggests that reducing wait times will reduce the number of patients who LWBS. [10]

•Lengthy waiting times can affect **patients** by creating low compliance with the provider recommendations, deterioration, and dissatisfaction with care. [2]

•Anxiety and stress due to long, unexpected or uninformed wait periods can result in an increased risk for **patients** health [11]

•"Stress management theory suggests that people under physical and/or emotional stress tend to feel any wait to be longer than usual." [23] Hence, **patients** and their **families/support system** in Emergency waiting rooms are most likely experience both physical and emotional stress.

"Decreased waiting times should ultimately lead to increased patient satisfaction and better patient care" [7]

WHY is long *(perceived and actual)* waiting time problematic?

- **For Caregivers (Nurses, Doctors, and Hospital Administrators):**

- Increased waiting time and increased patient dissatisfaction make it more likely for the hospital to lose patients and thus lose revenue.
- "Patients whose wait to see the doctor was 'shorter than expected' were more likely to recommend the **ED**." [15]
- Inefficient processes in the ER that cannot keep up with patient load at its peak can lead to loss in revenue, poor community image, concern for patient safety.
- "Patient satisfaction has been shown to correlate with improved medical compliance, decreased utilization of medical services, less malpractice litigation, and greater willingness to return to the health care provider." [30]

"Patient satisfaction is a concept that has been receiving increasingly more attention in the literature of emergency medicine, reflecting an evolving focus in the service-oriented health care market. Waiting time is considered to be an important determinant of patient satisfaction." [6]

The Client

- **Auburn Memorial Hospital (AMH)** is a not-for-profit Hospital in Auburn, NY.
- It serves a population of approximately 80,000 and is the sole provider of acute and general hospital services in Cayuga County and the surrounding areas.

•EMERGENCY DEPARTMENT:

•18 beds

•Use of **Ultrasound Technology** for diagnosis

•Use of **Fast Track system**- a system that quickly attends to minor emergencies. AMH has its own staff for Fast Track service, allowing for ECU physicians to spend more time with serious or critical cases and cut down on the waiting time for minor emergency patients.

After a triage nurse determines the appropriate level of care for a patient, he/she is taken directly to a room and for bedside registration. The patient is then cared for by a Physician Assistant or Nurse Practitioner, highly trained health care professionals who treat and medicate patients under the supervision of an ECU physician. [26]

"Our Mission is to provide compassionate, quality care."

Recommendations

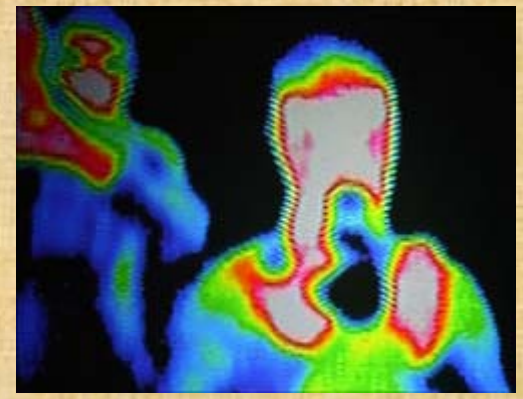
Recommendation

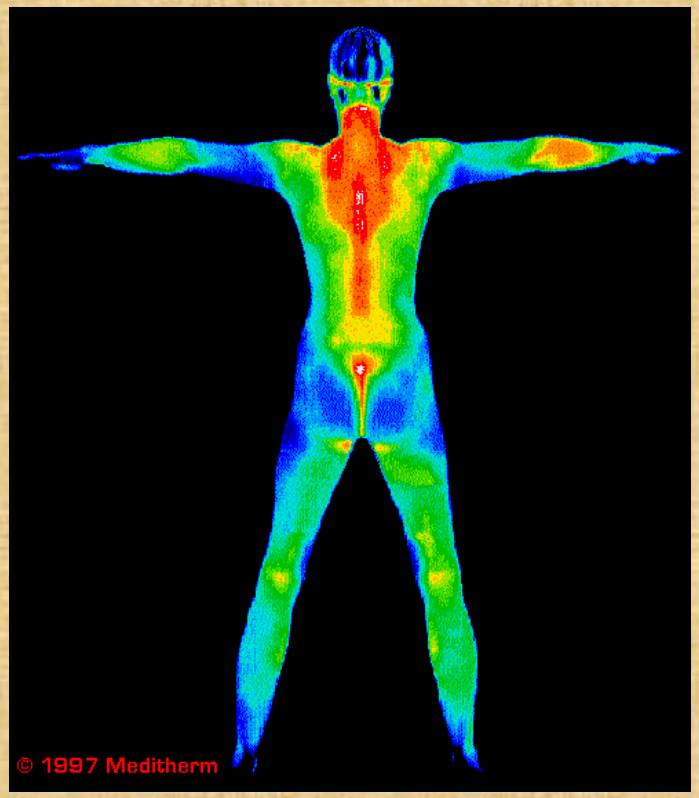
I

Technological Recommendation:

- Decrease waiting time by reducing the extent to which nurses have to walk around the ER while monitoring bed vacancies, doctors, procedures and their patients, with the use of

Infrared Technology.





Application of Research:

One study illustrates that nurses prefer to see their patients from one localized space so that they don't have to walk all over the ER. In that study, the nurses moved all the patients in to a localized patient room to be monitored. "Combining patient places was shown to have significant effects on efficiency of the ER." [19]

This study is helpful in recognizing the goals of the nurses (being able to see all of their patients at once), however, the means in which they achieve this goal could be improved.

Combining patients in to a localized space contradicts the findings of several studies that show that increased noise, lack of control, and lack of privacy which is found in multiple occupancy rooming situations like the one suggested above, can be detrimental to a patients mental and physical recovery. [9]

Instead, installing an infrared technology system will allow the nurses to monitor not only their patients, but doctors, equipment, and the waiting room while keeping track of which beds are occupied so that they can make quicker decisions from one location (by watching the monitor).

This solution still affords the patient privacy by only showing a colored figure where the body heat is detected, as opposed to a full detailed image of the person (like that of a surveillance camera). The occupied beds will be indicated by the body heat detected from the technology so that nurses are provided accurate, quick information on bed vacancies.

One hospital who uses infrared technology states uses the system to automatically track doctors, patients and nurses while using a time stamp system that can determine when a patient was last seen by a doctor, how long a patient has been waiting in the waiting room and even report things like when an MRI is finished. [21]

Staff/organizational implications:

- Staff should be divided in to teams, groups or zones to facilitate teamwork, communication and efficiency with in the ED. Each group ideally should consist of a medical provider (physician, Physician Asst, or nurse practitioner) one or more nurses and a technician. One study integrated this approach in to their hospital and quoted, "Paths crossed frequently as they (nurses and doctors) migrated back to the nurses' station in their zone[7]

Design/ Layout implications:

- A few decentralized nurses stations with the infrared technology monitors, which receives all input data from the technology would work well here. These stations should be available to nurses and doctors to check information when necessary to save them a walking time.

Additional Technological implications:

- Having a simple communication system such as **Vocera** will facilitate information transfer between staff members.
- Vocera is a two-way communication device that allows people to directly communicate through their badges all over a building. The technology allows for live messaging, and text messaging can be voice activated. Its exterior surface is made with a silver-ion technology which inhibits the growth of microorganisms which is important in a hospital setting. [24]

Recommendation II

Spatial/Layout and Organizational/Administrative Recommendation:

- Decrease waiting time and patient overcrowding by physically breaking up the patient load.
- Have a system, similar to the Fast Track idea which is already in place, that separates emergency cases from non-urgent cases in to two different care centers with two different entrances and two different check-ins.
- Keep the expensive stand-by equipment in the emergency center
- Have staff of different skill levels and specializations work in the appropriate centers
- Have an opening to connect the spaces that allows for patient transfer if need be.

Application of Research:

- Over loading the ED with patients can be detrimental to the quality of care patients receive.
- Many of the patients that contribute to the crowding in the ED are non-urgent cases.
- "75-85 % of hospital ER visits are for non-urgent health problems" that could be treated by an outpatient facility separate from the ER. [1]
- Many patients who cannot get insurance coverage use the Emergency Department's services to replace their primary physicians. This puts a considerable load on the ED for non-urgent cases. [4]
- Most patients fall in to the "fast track" category. [11]
- Hospitals are required by law to stabilize all patients regardless of their ability to pay under EMTALA.
- The inspiration for the recommendation comes from the Fast Track system employed in some Emergency Departments across the country and also Free Standing Emergency Centers (FECs).
- FECs are similar to EDs in that they are open 24/7, however they are operated by private physician practices which are independently run from hospitals. They don't have to abide by the same laws and therefore generally require cash, check, or credit card payment only. They are know for having reduced wait time, lower patient charges than a traditional ED and tend to show profit after three years.
- Many people claim to use FECs over the ED because it is a less anxious environment. [11]
- The idea of separating the two spaces physically with separate entrances, ambulance drop-off points, waiting rooms, triage areas, and overall staffing is grounded in the idea of reduce visual and physical crowding, reducing noise, and reducing waiting times. It will allow the staff in each center to apply the appropriate level of care and assure the right equipment is available to treat patients. It breaks up the over all patient load on the ED so that the ED can focus on the more serious cases and all patients in both centers are tended to more quickly and are more satisfied over all.

"Perception of care and waiting time are strongly correlated with patient satisfaction.

Almost half (43.8%) of our patients stated that they might have waited longer if provided with some "comfort measures," such as analgesics, information, or initiation of diagnostic testing. [10]

Staff/organizational implications:

- Have an area and nursing for triage in both centers (same process just different levels of urgency)
- Have communication with the Emergency Vehicles to determine which center they bring their patient to and a protocol that is followed for initial drop off point.
- Bed side registration at the Urgent Care Center would expedite the process and provide immediate physical and emotional comfort to the patient. "Provision of immediate or temporary treatment would decrease the number of people who leave [with out being seen]." [14]

Additional Design/ Layout implications:

- Transparency between centers for easy transfers if need be
- Different ambulance drop off points to reduce chaos
- Get rid of all solid doors and use other means of privacy for patients (curtains, partitions etc), "Waiting time in an ER for physician assessment was shown to increase when architectural features such as doors were used to make patient rooms inaccessible and nontransparent." [22]

Technological implications:

- A smart card system A)
- Self check-in kiosks B)
- Vocera C)

(see next slide for addl info on these technologies)

C)

- A **Smart Card** system would be useful in this situation to quickly gather all relevant patient information. It is a card that a patient carries on them that, once swiped, a computer system can analyze the information and help nurses and doctors access relevant information about the patient such as allergies, insurance, info, and basics like their name. Some hospitals, such as Wellington Regional Medical Center in Wellington, FL, have secured the cards by having the magnetic strip work only in the hospital. These cards are most useful for repeat ER patients. [25] (Wellington has a similar size Emergency Department (16-17 beds) as Auburn Memorial Hospital (18 beds))

- **Self Check-In** areas would expedite the process for those capable and allow them to feel more in control of the wait. This system borrows the idea from grocery stores and airports. In settings such as those, research has shown that some pressure is taken off of the main waiting line making it appear smaller and actually cutting down waiting time for many customers and thereby increasing customer satisfaction. [23]

A)

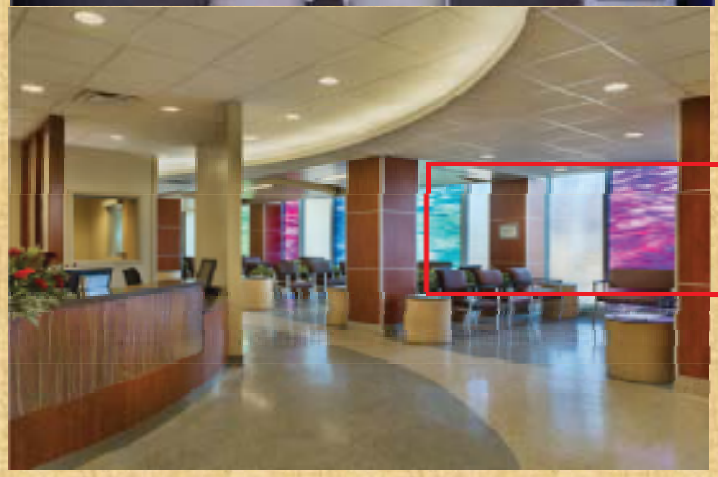
B)

Recommendation III

"The attribution theory argues that people want to know the reasons or causes for any undesirable events. So, if customers know and understand why they are waiting, they tend to accept the wait." [23]

Design and Organizational/Administrative Recommendation:

Make the waiting experience comfortable and supportive for patients and their families: Have caregivers frequently inform patients and families about up to date information on their condition, and wait time while providing various elements of soothing distraction in the ambient environment.



Application of Research:

- Studies have indicated that the perceived waiting time and not the actual waiting time is a predictor of patient satisfaction, " Therefore, it is important to provide effective diversions so that patients do not feel that they are waiting that long." [27]
- More attractive waiting areas are associated with higher quality of care [28]
- In a study at Cornell Weill Medical College, it was found that "overall, patients in more attractive environments perceived shorter waiting times than did patients in less attractive environments." [28]
- Patients who received more information, explanations or instructions were more likely to be satisfied with the ED visit, and more likely to recommend the ED. Furthermore, lack of information magnifies patients' sense of uncertainty and increases their psychological distress." [15]
- Studies have shown that patients stress levels can be reduced by social support from nurses, families and significant others. Furthermore, the support positively affects both the patients and the families. [13]

"There is growing support for the belief that 'as healthcare facilities strive to satisfy their consumers in a competitive healthcare market, attention turns to the patient perceptions of their physical surroundings…'" [28]

Staff/Organizational implications:

- Staff need to be Informative, attentive and comforting to patients and families
- Caregivers should rotate to do rounds every half-hour to patient rooms and or the waiting room inform patients and their families about any new information, the remaining wait time, and check in to see how they are. This personalized contact shows that the hospital is concerned and on top of their patients health (this would be easier in the work zones/teams as suggested previously).

Additional Design/ Layout implications:

- Natural daylighting
- Art displays [13]
- Views and access to nature to reduce stress [13]
- Natural elements of distractions like plants and water features *(biophilia theory)* [13]
- Design that encourages family involvement- "the need for social support increases when an individual experiences changes such as an unexpected situation or stressful event."[13] e.g. For families, supply chairs that can recline if needed for over night stays. (A)
- Provide an updated magazine rack and educational information for distraction (B)
- Noise reduction is beneficial in reducing stress improving and patient satisfaction [13]

Technological implications:

- Smart card
- Self Check-in Kiosks

(A)

(B)

Or…Get rid of waiting all together?

- **One hospital dealt with waiting times by bringing patients directly from Triage to a Bed. This is called "The Straight Back Approach"** [29]

- Some challenges that must be overcome include, "On the process side, care cannot begin until the patient has gone through a minimal registration procedure."
- Patient information and their chart needs to quickly become available in the care area.
- This is a culturally radical change to implement in an ED and all staff need to be on board.
- Allow for input and control from the nursing department so that nurses can help shape the change by defining all of the detailed processes and practices. This was effective in William Beaumont Hospital-Royal Oak

- "The straight back system, as implemented by William Beaumont Hospital-Royal Oak, has succeeded in reducing the LWOBS experience from 4.5% to 0.5%, has increased patient satisfaction scores significantly, and has enhanced patient safety. Financial costs of these changes was, indeed, zero. Estimated net revenue impact for the hospital is approximately $40 million per year."

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