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DEA 453

Reducing Waiting:
Rethinking ER design to decrease waiting

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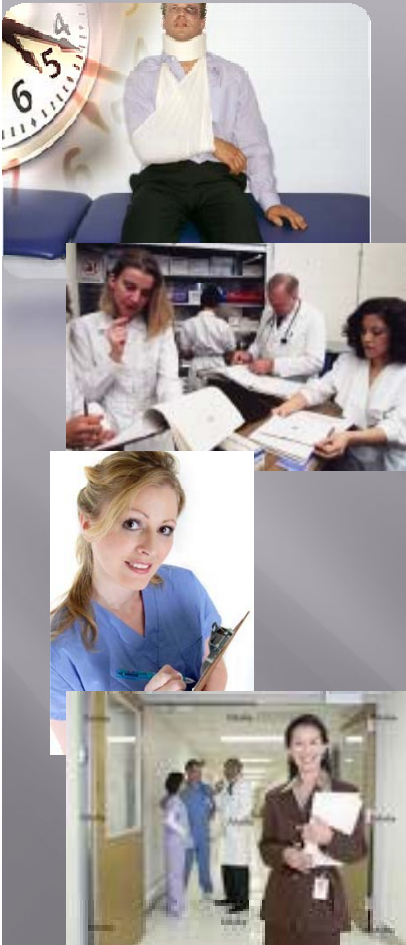
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Research

Examine

Analyze

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- The overall focus of this project was to research, examine, analyze and come up with new design ideas to alleviate the issue of waiting time in the emergency department at Auburn Hospital. Research for this project was composed of case studies of other hospitals and research of other literature, no on-site observation or archival data of this specific hospital was available.

- **Auburn hospital** is a small non-profit rural hospital that has approximately ninety nine beds. This hospital serves a non-affluent community. The hospital has come to face tough competition with larger, newer, facilities. The issue of waiting has a direct impact on patient satisfaction and this is a hospital that needs to improve its image to the community. By improving waiting time, it would be taking the first step towards doing so. This project will explore the possible opportunities and design ideas to reduce both actual time spent waiting as well as perceived time spent waiting.

- **Patients**—*Patients care about how their time is spent in the ER and want their time to be valued. These users want to feel as if they are being treated as a person and not just a number.*

- **Doctors**—*Waiting is important to doctors because the less time a patient is waiting is equivalent to more efficiency within the ER and more patients being seen, which is good for the doctors.*

- **Nurses**—*Nurses are the frontline staff for the patients, and the better mood the patient is in the easier it is for the nurse to do their job. Therefore less waiting typically leads to a better mood. Less waiting time can also leave less time for anger to escalate and a security threat to become an issue.*

- **Administration**—*Decreasing waiting time shines a positive light on the hospital as a whole, and this in turn shines a positive light on the administration who run it. Therefore, the administration cares about waiting.*

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"'The real concern is you sit out in the waiting room with some vague back ache, and you could be sitting on a heart attack or a leaking aneurysm,' said Dr. Peter Viccellio, clinical director of the emergency department at SUNY Stonybrook. " *(Brownstein, 2007)*

"Patient stress has a variety of negative psychological, physiological, and often behavioral manifistations that work against wellness." (Ulrich, 2009)

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- Waiting leads to possibility of acquiring infections or for the current ailment of worsening or going undiagnosed
  - Patients who are seen as being "ok" could have underlying problem and the extended waiting time could allow this problem to grow.
  - In one LA Hospital a woman **died** waiting to be treated without even seeing a doctor.
- Waiting produces <u>stress</u> on the patient
  - This stress can lead to other problems
    - *Stress* can add to an already weakened immune system
    - *Stress* can also create tension in relations with others and create security issues, so while security is a concern in the ER; reducing waiting time could be considered benefit to increase security.
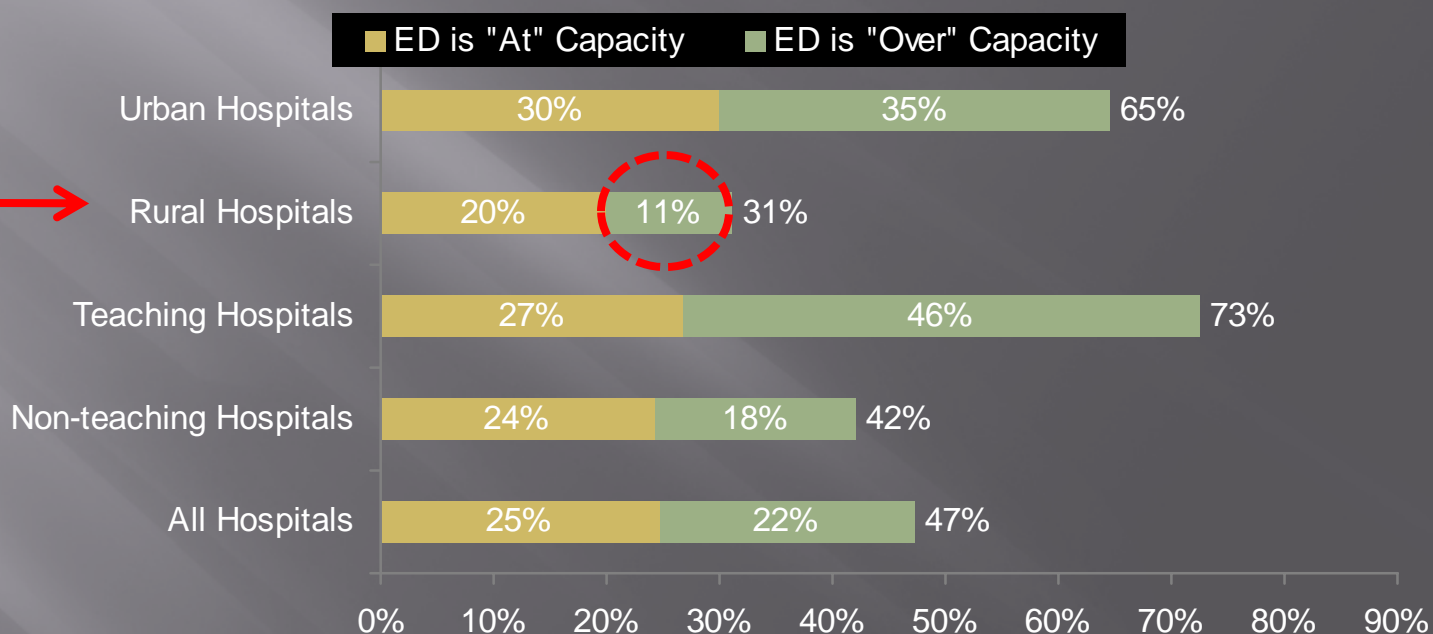
"ED overcrowding has been reported to cause delays in diagnosis, delays in treatment, decreased quality of care, and poor patient outcomes" (Trzeciak and Rivers, 2003)

"Prevalences of overcrowding were similar in academic, county, and private EDs" (Derlet et. al. 2003) This statement was taken from a study of overcrowding done recently and shows that overcrowding is an issue no matter what type of hospital it is.

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Chart 3.9: Percent of Hospitals Reporting Emergency Department Capacity Issues by Type of Hospital, 2007

Legend: ED is "At" Capacity | ED is "Over" Capacity

Hospital Type	ED is "At" Capacity	ED is "Over" Capacity	Total
Urban Hospitals	30%	35%	65%
Rural Hospitals	20%	11%	31%
Teaching Hospitals	27%	46%	73%
Non-teaching Hospitals	24%	18%	42%
All Hospitals	25%	22%	47%

As this chart (from trendwatch chartbooks) shows, capacity is exceeded at every hospital type and while Rural hospitals may seem to be the least affected by the problem, none-the-less it is a widespread issue.

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WHY WE CARE

"Upon her admission, Green waited nearly 24 hours for treatment" (Snow and Fantz, 2008)

This photo is taken from a surveillance tape and shows Esmin Green on the ground. This woman died in a NYC hospital from a blood clot as she waited for nearly 24 hours in a chair

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Examining the issue:

<u>Waiting Time in the Emergency Department</u>

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This is a picture of an elderly patient being boarded in the hall

"For all hospitals in the US, the average waiting time for an inpatient acute or critical care bed is over three hours, but the average waiting time is 5.8 hours in hospitals with overcrowded EDs" (Trzeciak and Rivers, 2003)

"Boarding causes the ED to be filled beyond capacity with the highest acuity patients. The ED is neither designed nor equipped to provide longitudinal care, and patient safety may be compromised" (Walsh et. al. 2008)

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An act known as "boarding" causes a large number of problems in the ER

•**Boarding**- this occurs when a patient in the ER is kept there after ER treatment is complete because there are no inpatient beds available in other places in the hospital

•This causes the ER waiting room to fill up with other patients and can also lead to patients being placed in hallways or other non-sterile areas of the emergency department, this can lead to harm or possible death of patients because of the wait.

"In a poll of emergency physicians in New York, New Jersey and Connecticut conducted by ACEP this past February, just under 65 percent of physicians said they had personal experience with a patient being harmed by boarding -- and 23 percent said they had personal experience with a patient dying because of it." (Brownstein, 2007)
"It is highly disruptive to ED operations, has been implicated in medical error, delayed care, and even the hospital-to-community spread of severe acute respiratory syndrome" (Walsh et. al. 2008) In reference to boarding in the ED

"The most important factor in the genesis of overcrowding was increasing patient acuity and Complexity" (Derlet et. al. 2003)

"The potential impact of overcrowding on patients is most worrisome. The largest impact was the long waiting times that patients experience. This not only results in frustration to patients and their families and friends, but can prolong pain and suffering."(Derlet et. al. 2003)

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<u>Supply Decreases while Demand Increases…</u>

•Emergency Rooms continue to close around the country while at the same time the population continues to age this is another factor which contributes to waiting.

•So, as supply is decreasing, demand is increasing, which inevitably will lead to this issue.

•Patients will crowd these existing facilities. Because many of these patients will be older as the years go on they will have even more complex needs and this will make waiting a more delicate issue as something that may seem ordinary may be tied in with other issues that would be unforeseen.
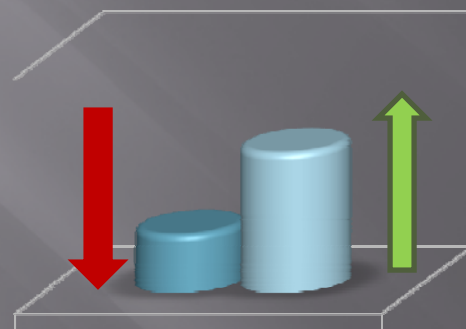
■ Supply

■ Demand

Current Situation

This cartoon pokes fun at the issue that is plaguing many waiting rooms across the country, with the aging population, the amount of people who come into an ER with just "3 ailments or less" as this cartoon calls it, is quickly becoming the minority.
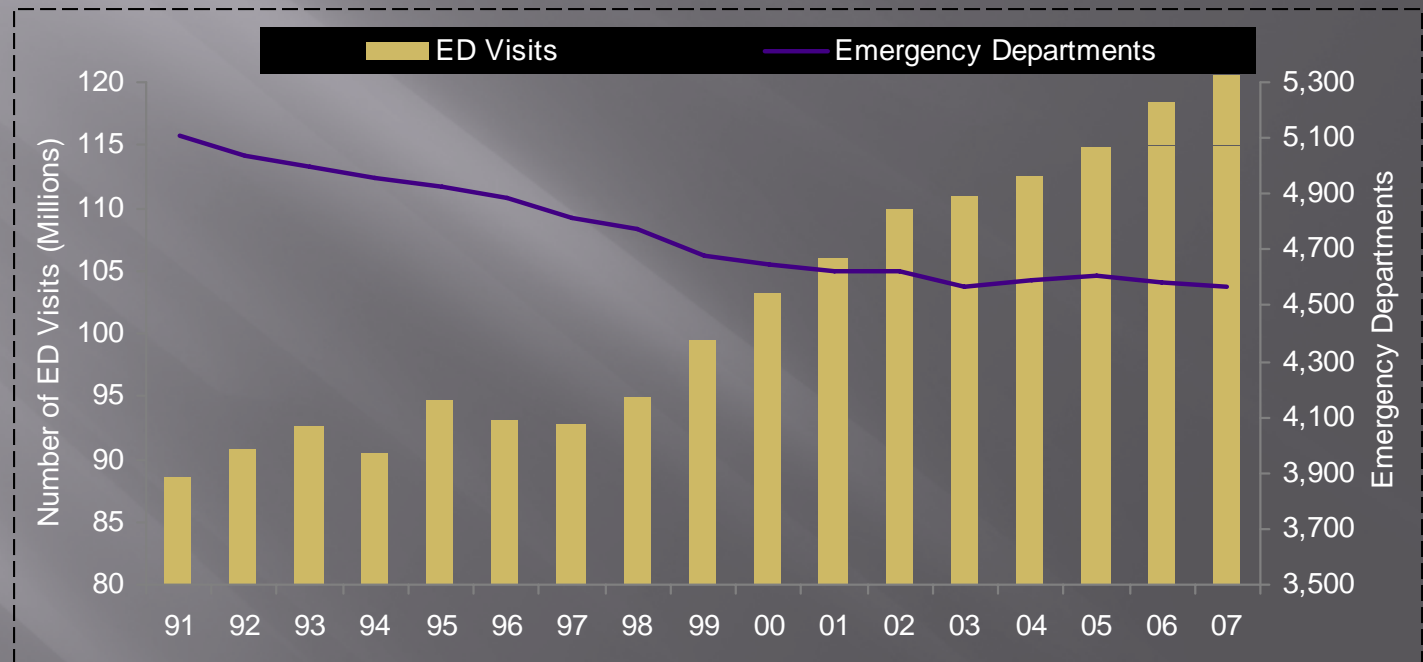

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"Everyone in the United States acquired a legal right to emergency care. But no funding was provided to pay for it. Not only did this unfunded mandate contribute to the closure of numerous emergency departments and trauma centers" (Kellermann, 2006)

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This chart (from trendwatch chartbooks) shows that as Emergency Departments decrease over the years (purple line) the number of visits continue to increase, which would increase the waiting time in the remaining Departments.

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The ER has changed in its function as a facility, it used to function as a last resort for its patients and now often acts as a primary care option for many of these patients.

| Last Resort | → | Primary Care |

This change in role has had a negative result for the environment that the ER's are able to provide for these patients. This change has lead to more crowding and more waiting and will lead to more tragedies like the one that occurred in LA.
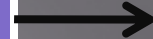
"'The global solution is better access to primary care -- most patients in ERs don't need to be there,'said Dr. Antonio Dajer, acting chief of emergency medicine at New York Downtown Hospital." (Brownstein, 2007)

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Why?

Last Resort	→	Primary Care

The reason for this shift in function from a Last Resort facility to a Primary Care facility is different for the different users.

• For some users it is simply because they have no where else to go — the ER is their only option for health care because they have no health insurance

• For others they feel as though they can get multiple tests done quicker at the ER than at their primary care physician

• For yet others, they are insured but don't have a primary care physician so they only go to the hospital when something is really wrong, which is an issue in itself.

All of these issues compound the problem of waiting and make it even more pertinent of an topic to focus on now.

"'We can get tests done…within the space of a few hours, even though we have more patients than we can handle,' said Dr. Gabe Kelen, chair of emergency medicine at Johns Hopkins Hospital." (Brownstein, 2007)

"We've become victims of our own success in that regard," (Brownstein, 2007)

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Waiting is both a result of the changes in the conditions that have been identified in the previous slides as well as a break down in the *process* within the ED

The process: all the steps and intermediate steps that need to be accomplished in order to get the patient through the ED create a lag time which makes waiting time a bigger issue. Through all of this, paperwork needs to be filled out, which creates the problem of communication.

Communication is another issue in the ED but I felt that confronting and improving the issue of waiting would in turn advance the issue of communication.

How Bad It Gets: *The median number of empty beds in the ED at 10 p.m. was 0. The mean number of patients in makeshift beds was 3.1 (95% CI 2.4–3.8). The mean time to get from the ED waiting room to an ED bed was 209 min (Steele and Kiss, 2008)*

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Waiting—where it happens:
The Emergency Room Process

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Waiting occurs in two main areas of the ED

•The "waiting room"

-This is where most patients think of when they think of waiting in an ED, here there are patients with all different degrees of ailments waiting to be seen by a nurse and can be waiting here for hours. The waiting often begins after checking in with a triage nurse and often patients are not told how long the wait will be, although it has been found that the knowledge of this information makes for a better experience.

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Waiting occurs in two main areas of the ED

- **The examination room**

-After a patient has waited their time in the waiting room they may have to continue to wait in an exam room to see a doctor or after they see one doctor to see another doctor or a specialist or to have a **test done**.

-Getting tests done and waiting for radiation equipment is a common area for time to get lost, bottlenecks often form here.

-They may also have to wait here to be moved into an inpatient bed which can take up to a day and causes the issue of "boarding" in the ED.

While each ER may have different specific procedures the following procedures come from a sample hospital, **The Childrens Hospital of Eastern Ontario**, and they give a pretty good sense of how many different parts go into getting a patient from step A when they first walk in the door to step Z when they are finally discharged.

This will help show how the process, and not just the physical setting can cause the increase in wait time.

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This case comes from the article by Blake and Carter, 1996.

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- Upon entering the hospital the patient will present themselves to the triage nurse who will perform a brief assessment of their condition
- Any patient who is "gravely ill" or seriously injured would be taken to a separate room for immediate treatment
- During regular office hours-patients with simple medical conditions would be redirected to a pediatric clinic in the hospital
- All other patients would be directed to the registration desk
- Once at the registration desk they get an <u>Emergency Patient Record</u>
- The EPR then goes into an "in-basket" and is ranked according to medical priority (making those with lower priority wait longer)
  - They are ranked- *Emergency, Urgent, Defferable*

Complicated Process **➕** Added Paperwork **🟰** Longer Waiting Time

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This case comes from the article by Blake and Carter, 1996.

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•The nurses then select these EPR's out of the basket and the patients go from the waiting room to the nurses station, if a treatment room is available the patient will go there where history and assessment are completed, if there is no treatment room available, then the patient goes to a "pre assesment room, has his/herself assessed and then goes back to waiting in the waiting room

•The EPR's then go into another pile on the "physicians' case review room" they are ordered by acuity and time of arrival

•This hospital is a teaching hospital so residents often take the top EPR and will asses the situation and write down recommendation and discuss this with the staff physician (*the patient waits in the treatment room at this point*)

•The physician will reassess the patient, write out orders for nursing staff to follow—involving tests or other treatment

•The patient must then wait for tests and then for the results to come back, the doctor to look at the results, and then if they do not need to be kept as an inpatient, they are discharged …they are step Z

This case comes from the article by Blake and Carter, 1996.

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Mapping this out Graphically

Entrance

Path taken after their EPR is called

Path taken if treatment rooms

Path taken if no treatment rooms

Indicates it is a location where the patient will most likely be waiting

Triage Nurse

not gravely ill

If gravely ill/injured

Separate Room for treatment

Registration desk

*EPR's created at this point

Waiting room

*Patients wait for their EPR to be called

Pre-Assessment Room

Treatment Room
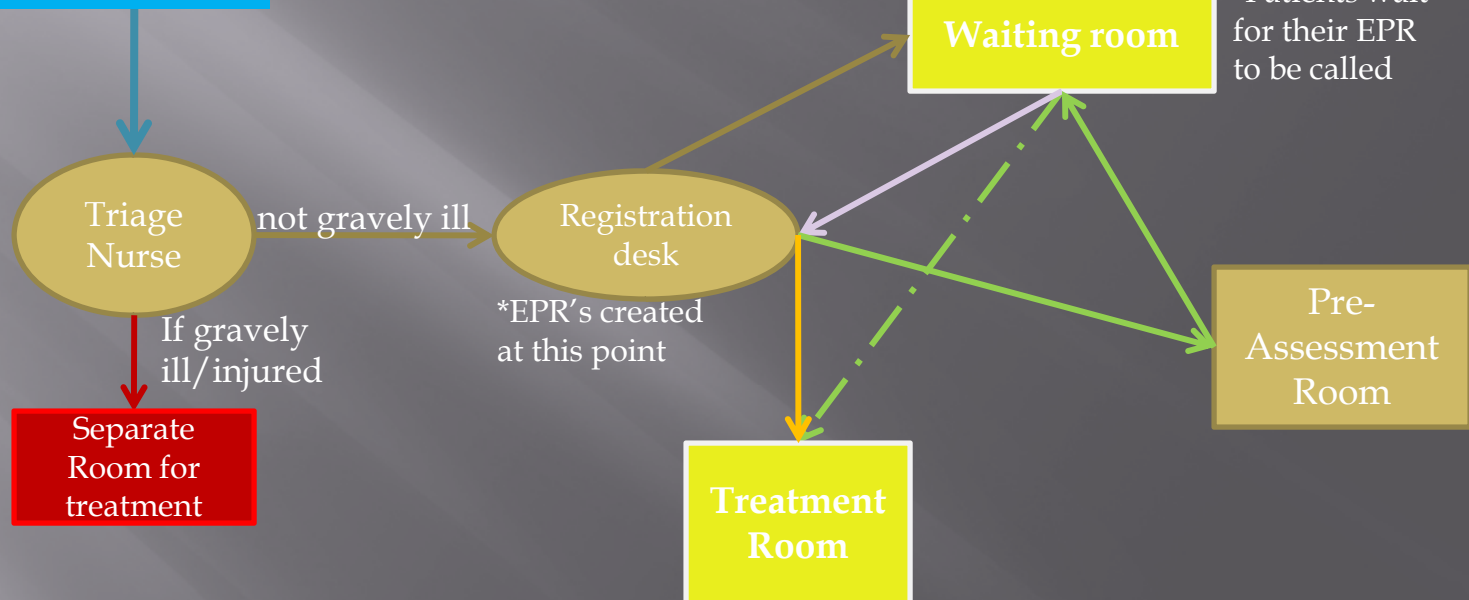
This map highlights the fact that for a patient who enters the ER appearing to not be gravely ill the ER can be a complicated place with a lot of waiting and paper work- this also depends on the time of day or season (how crowded it is)

(Crowding is another issue that was not explicitly addressed by this project but is seamlessly tied to this problem)

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"Research has linked poor design to such negative consequences for patients as, for instance, anxiety, delirium, elevated blood pressure, and increased intake of pain drugs (e.g., Wilson, 1972; Ulrich, 1984)" (Ulrich, 2009)

While waiting- the design of the physical space is an important component in the experience for these patients that effects their experience in the space.

This is important because a good design can work to:
- Reduce stress
- Reduce perceived waiting time
- Decrease Security threats
- Decrease potential infection transmission from other patients
- Increase patient satisfaction

All of this can be done by evaluating how people interact with design and bringing these ideas into the construction of a redesign for the space.

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These concerns will be addressed through re-design possibilities later in the project…

When looking into a redesign of a Waiting Room there are certain factors to consider:

• <u>**Diversity of patients**</u>

• Patients entering into this waiting room will have a diverse range of injuries, ranging from a child with an ear ache to a homeless man with a broken leg that is bleeding.

• *This range of differences attests the need for privacy and ability to separate yourself from others who you may not want to have contact with. (The inability to do so could elevate stress levels)*

• <u>Patients Stress Level</u>

• Its important to keep in mind the psychological state of the patients entering the waiting room and how they will feel as they wait in the various rooms they enter, both the waiting room and the treatment room. These patients most likely are anxious and stressed upon entering the ED.

• *This psychological state should can affect security as well and is therefore an even more crucial factor to consider.*

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Current waiting room designs:

As pointed out in the previous slide, this waiting room does not allow for any room to separate from the person seated next to you.

While this is not a photo, this cartoon is a good depiction of what could occur in any ER, with a variety of ailments all lined up in a set of chairs if no design change is implemented.

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Re-Examining and Re-Designing:

Decreasing Waiting Time in the Emergency Department

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Waiting occurs due to both physical issues in the space as well as process issues in the Emergency Department, therefore potential solutions will be looked at for both their **physical** impact as well as their impact on the **process**.

The first option to be introduced will be the relocation of the Emergency Department from the Auburn Hospital Campus to an Auxiliary Location (to be determined later)
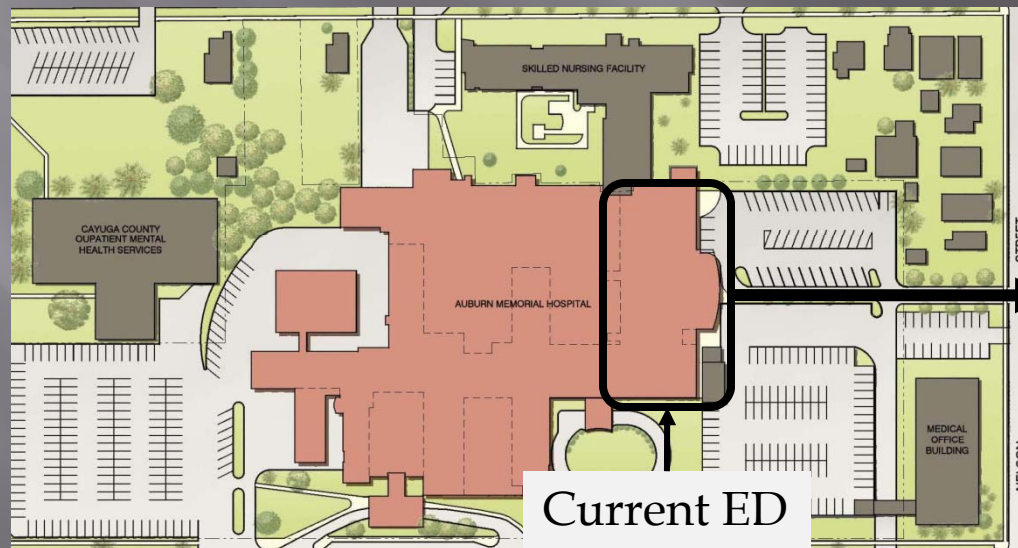
Some Auxiliary Location (<10 mi away)

Current ED

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These options are not being introduced in any specific order

"We can do everything here that a hospital can do from an ER perspective," (Boodman, 2008) *says a nurse who works at* **HealthPlex** *a detached Emergency Department like this*

"'All the diagnostics are cooking' by the time a doctor first examines a patient, Mooney said." (Boodman, 2008) — *When referring to Advance Triage*

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What this facility would entail:

- Creating an independent, emergency department away from the hospital
- This facility would be able to treat everything from a simple deep cut to a gun shot wound or a heart attack
- The facility would be equipped with its own lab department as well as radiology department on site.
- **Advance Triage** could be used in this situation
  - Advance triage includes ordering tests for certain stereotypical ailments such as abdominal pains before the doctor even arrives to see the patient

What this facility would not entail:

- Would not have any inpatient beds
- Would not complete any surgeries, any patient who needs surgery or further hospitalization would be transferred to a the hospital (this would take less than 10 minutes by ambulance with the close proximity)

*These options are not being introduced in any specific order

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"'To sit here and wait, and the only contact I have with the staff is when they carry out tests on me, you feel that you're not being seen as a person…'" (Kihlgren, 2004)

"'freestanding' emergency rooms trumpet shorter wait times and a more pleasant environment and, at their best, bring much-needed emergency diagnostic and clinical expertise to underserved areas" (Andrews, 2009)

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Pros of this Design:
• Overall there becomes less waiting in this design
• There is less waiting for the use of the radiology and laboratory testing—which is usually the source of bottlenecking
• There is less of an issue with boarding
• Allows for minor wounds to be treated quickly
• It will be easier to design a more patient friendly center in an area that is separate from the Hospital

Cons of this Design:
• Communication issues can arise when patients are transferred
• There will need to be additional staffing for this facility
    • Radiologists and laboratory staff will be needed
• Lack of accessibility to adjacent hospital facilities
• This design will be costly to the administration

*These options are not being introduced in any specific order

The second option will be to add a Fast Track Area to the current Emergency Department in the Auburn Hospital unlike the previous option this will involve a renovation of the current floor plan to add a new section of exam rooms for this "Fast Track Area" which will be described further.

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*These options are not being introduced in any specific order

"FTA opening was able to reduce both WT and LOS for the total patient population by 50% and 9.79%" (Sanchez et. al. 2006) taken from a study of a Fast Track Area opening at Hartford Hospital WT=Waiting time LOS=Length of Stay

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What will a Fast Track Area mean?
- **The new area would be renovated space adjacent to the current Emergency Department so that patients, after seeing the triage nurse, if deemed non-urgent could be directed here for treatment**
- **This area would allow for less critical patients to be seen quickly in such designated areas**
- **Due to the lesser severity of these injuries doctors would be used on an as need basis for patients in this area**
- **Physician Assistants and nurse practitioners would be utilized for these treatments**
- **With the use of the ED changing from last resort to primary care for some uninsured patients, this type of area may be helpful in alleviating both crowding and waiting time by opening up beds in the ED that were previously used by non-urgent cases.**

*These options are not being introduced in any specific order

"Only 13 patients (12%) indicated they would be willing to wait longer to be seen primarily by an EP rather than a PA" (Sanchez et. al. 2006)

From a study of a Fast Track area where patients indicated satisfaction –

EP=emergency physician

PA=Physician's Assistant

Downsides of the Fast Track Area

•Some feel that the addition of a Fast Track Area decreases the patients satisfaction with service provided because they do not see a doctor in their visit there

   •However due to their greatly decreased Length of Stay often this outweighs this concern and makes their satisfaction level off again

   •*This data can vary from study to study but it is an important item to point out and is important for the Physician Assistants to focus on how they interact with the patient for the short time they are with them, since that patient is not seeing a doctor*

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*These options are not being introduced in any specific order

This option would be less involved in terms of the physical building design and would involve the addition of more technology to the current system. This would improve the process flow so that the waiting time due to information transmission is decreased. *This can also decrease communication errors between transmission of information from one staff member to another.*

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These options are not being introduced in any specific order

"'With the white board you didn't know the department was getting crowded until it was crowded,' says Larry Nathanson, M.D., an emergency physician who designed the system.'" (Greene, 2003) *the system referred to in the quote is for Beth Israel Deaconess Medical Center and is shown in the picture to the right.*

"Patient tracking boards have become an essential instrument for clinical and operational management in the ED" (Aronsky et. al. 2008)

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What Would these Changes be?

•*Advanced Patient Tracking System*
   •Include a large digital screen that allows doctors and nurses to know patient information (through codes which keeps privacy) quickly and it would update approx every 60 seconds automatically through the integrated tech system. The board will show patient's status as well as how long they are waiting so that patients are not left unattended for long durations of time.
   • The board also allows staff to foresee when a department is getting crowded.

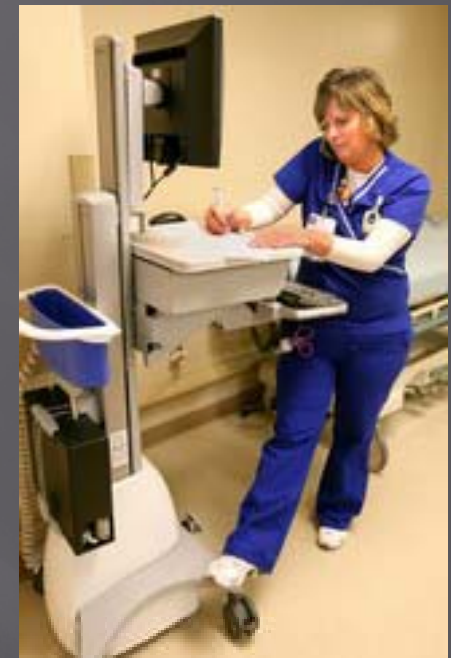**These options are not being introduced in any specific order*

What Would these Changes be?

"In fact, bedside registration using portable computers is allowing emergency departments to use more space on treatment areas and less on paperwork." (Greene, 2003)

•*Bedside Registration and Improved "Cows"*

•Another technological improvement which will speed up the process would be to register the patient at their bedside using improved "cows" (computers on wheels.) The integrated system will reduce communication errors and can link into the patient board.

•This will allow the hospital to work as a system so that the patient is at the center of the system and the technology is working out from that center

*These options are not being introduced in any specific order

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"Funding infrastructure, the software, hardware, networks, and standards, is by itself not enough. Health care workers require formal training in using information systems and analyzing data as well as learning to use information tools to manage information and create knowledge." (Cordell et. al. 1998)

"EDs need to join collaborative research networks seeking to identify or develop evidence-based clinical practices and policies. These efforts will capitalize on the emergence of computer-based ED records" (Cordell et. al. 1998)

Where This Design Falls Short:

• Although these technological improvements do decrease time spent in the process, the use of them requires training for staff and if training is not done properly the use of them can take longer than expected
• The cost of this design is high
• This is not going to perform best as a stand alone design, the software within this hospital should be integrated as a systems design with researchers and other outside information sources.

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The last option would involve redesigning the waiting room space so that it is more conducive to the patients and any other people that may join them as they come into the Emergency Department (family or friends.) This will include changing the physical layout of the space (walls, windows etc) as well as the furniture layout.

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These options are not being introduced in any specific order

"Findings from the physiological and verbal measures converged to indicate that recovery was faster and more complete when subjects were exposed to natural rather than urban environments" (Ulrich, 2009) *While this study is related to healing after already been treated, it is considering stress, which is an issue in the waiting room as well pre-treatment*

"Notable evidence
of negative effects of windowless healthcare environments on outcomes has emerged from studies of critical-care patients "(Ulrich, 2009)

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How To Change The Physical Layout?

• As pointed out earlier the high diversity of patients shows that there is a need for the physical layout to divide up the space into some smaller alcoves to allow for people to divide themselves up as they wish and to allow people to have privacy in the space while waiting.

- *This could include half walls and small partitions into the waiting area space*

• Another change to the physical design would be to allow more access to out door views—more windows could put patients at ease.

•In addition to changing the physical aspects, changing the furniture can help. By creating conversation areas and allowing people to separate themselves from the other people in the waiting room (especially if they are visibly sick/injured.)

These options are not being introduced in any specific order

This is an example of varying furniture to allow for patients to either group with their families/friends while they wait or be isolated from others, all the chairs are not lined up in a row as you would see in a bus station, there is also good visual access to nature while maintaining privacy.

This example shows how partitions and columns can be used to split the waiting area into separate sections, there are also both single chairs as well as larger benches which is useful for both families as well as people who may need the extra space.

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Sorting through the Options:

What Option Fits for Auburn Memorial Hospital?

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1. **Relocation of the Emergency Department to a Near by Location**

2. **Creation of a Fast Track Area Within the Current Emergency Department**

3. **Addition of Advanced Technology within Current Emergency Department**

4. **Redesign Physical Layout of the Waiting Area**

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These options are not in any specific order

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Patients

Staff

Community

Financial

Relocate

Fast Track

New Tech.

Redesign Physical

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Relocate

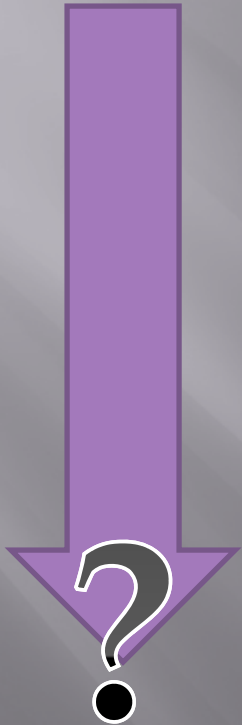- **Option 1- Relocation of Emergency Department**
    - *While this option has been shown to increase effectiveness of the ED in the community for the patients and would decrease wait time, in this context the capital required to build this along with money needed in the future for additional staff support for this facility seems illogical for Auburn. Keeping the ED within the current setting and sharing resources such as labs and radiology keeps costs down (this may cause some wait issues, this can be solved through other design changes i.e. technology improvement) It is for these reasons that this option was filtered out at the financial level of the chart.*
    - ***However-*** *the current ED could use the idea of **Advance Triage** that was introduced in this recommendation and use it in their current facility, this would certainly be possible with the addition of heightened technology.*
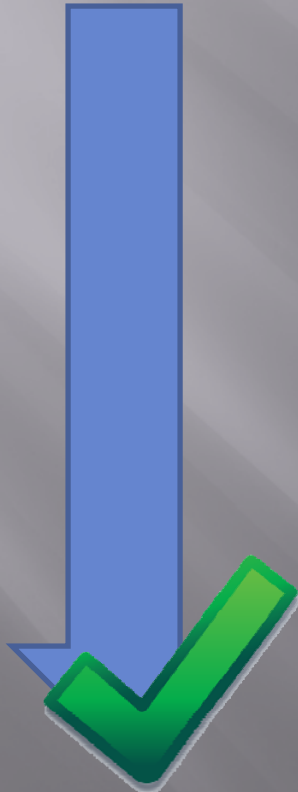
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Redesign
Physical

• **Option 4- Redesign of the Waiting Room**

   • *This option was given a question mark at the financial stage because although it would help patients through the waiting process and ease stress and psychological factors, if administration were considering using funding for this renovation versus advancing technology, it is the recommendation of this project that they use the funding for the other options, rather than this one.*

   •*It is also possible to do this redesign half –way, that is, to not physically change the space (not spend as much) but redesign the furniture and change artwork (being budget conscious-for example utilizing local artwork from schools.)*
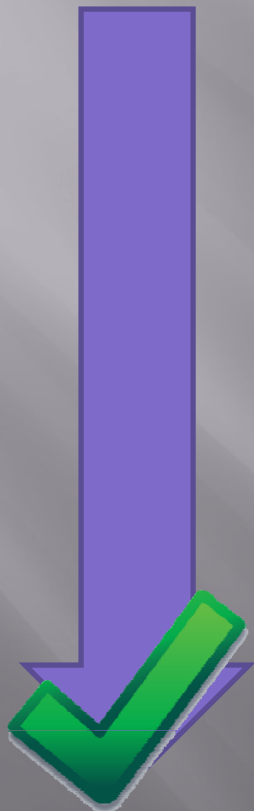
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Fast Track

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- **Option 2- Addition of the Fast Track Area to Current ED**
  - *Although this option will be a large financial investment, it seems that it is a wise investment because this area will be beneficial to all stakeholders. Patients would benefit from shorter wait time as well as shorter length of stays. With more and more patients coming to the ED as a primary doctor, and often this means having less serious injuries, this area would be advantageous for this user group. Doctors would be helped, they would be seeing less of these patients and could focus on the critical patients that no longer have to wait for hours. The administration would benefit by the attention this new area would get from the community and would help them compete against the larger surrounding hospitals.*

New
Tech.

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- **Option 3- New Technology Added to Current ED**
    - *This option was chosen because it not only helps with the issue of waiting but will also help with the issue of communication. New technology will improve the functioning for all stakeholders and will again help Auburn compete against the bigger hospitals. This option can be done in stages so that it is financially viable, not all technological changes need to be done at once. Once the overall system is in place, new technological additions can be added to the system to continually improve the hospital, each improving waiting as they improve efficiency.*

How It All Comes Together:

Closing Summary

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While there may be no "golden solution" to this complex problem, the recommendations of implementing new technology along with a fast track area and a potential redesign of the waiting area in the future are what will help to solve this issue in the future. Unfortunately these three recommendations for this individual hospital are not going to help to solve the underlying political issues that have created this issue in the first place, they can only help control and deal with the state of affairs. By doing so and creating an environment that benefits the patients to the best of Auburn's ability they can better compete against the larger hospitals in the region and can emerge as a leading hospital in the area with better customer satisfaction with decreased waiting time.

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