Zero Waiting Time at the Emergency Room

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Abstract *— Long waiting times at the Emergency Rooms are a problem that affects every hospital in Puerto Rico. The main causes of this problem are the lack of patients understanding the purpose of the ER and the inefficient use of the personnel throughout the process or workflow of the Emergency Department. The processes in three Emergency Rooms were studied in an effort to reduce waiting times. It was found that by creating a shorter process of categorization, integrating the end of a process with the beginning of the next one and the ability to inform the patient of the process and it purpose, a zero waiting time for patients that arrive at the Emergency Room is possible.*

Key Terms *— Emergency Room, Electronic Medical Record, Healthcare, Patient Flow.*

INTRODUCTION

One of the biggest challenges facing any Hospital's Emergency Room in Puerto Rico is minimizing the waiting time of the patients. Over the years more and more patients are relying on the use of an Emergency Room (ER) to receive all sorts of treatments (including non-emergency services) and this has caused an overflow of patients in the waiting rooms. During the last decade, the Health Department of Puerto Rico has established that every patient that exceeds six hours of overall stay in the ER must be reported to their central offices for quality purposes. All these factors, combined with the fact that every hospital is acquiring an Electronic Health Record system, is guarantee to affect even more the wait time of patients.

BACKGROUND

Managing an Emergency Room is not an easy task in the healthcare industry because every patient's emergency is different, there are no patterns and every situation has to be treated differently. In Word War I, due to the thousands of injured soldiers that were in need of medical attention, French doctors developed the concept of Triage. The triage method was used to classify patients depending on the medical resources and their probability of surviving. Little probability of surviving was given a black tag, medium probability was given a green tag and the ones that were almost guaranteed survival were given red tags. The purpose of this method was to save as many soldiers as possible. Nowadays the process is a little different, yet the concept is the same. Each patient that arrives at an Emergency Room is given a severity index or a priority from 1 to 5; 1 being the patient that is in desperate need of medical attention for survival and has a huge possibility of not surviving, while 5 is the patient in no imminent emergency. Here is the main difference of the present triage with respect to the one developed for World War II: patients are treated beginning with the category 1, then 2, etc., while lower category patients are left to wait for available staff. The objective is to save everyone and not just a few. The main difference is due to the fact that resources are more available than in warfare and that specialized physicians are available to further attend to extreme situations. Physicians in the Emergency Room are only there to stabilize and take a course of action: discharge home, transfer to a more specialized institution or transfer to the care of a more specialized physician (hospitalization).

Every ER in Puerto Rico and the US operates this way or in a type of variation of triage, with the difference being in the process which undergoes each patient to reach a categorization. There are Emergency Rooms that prefer to classify just in a 3-acuity level, while other have more than 5. It all comes down to how many patients are expected to arrive in a given day, staffing, and methodology being used.

In Puerto Rico the model is always similar and is usually a 5-level acuity level triage. Even if using the same system for classification, the patient flow and the process that undergoes a patient to reach a doctor and receive treatment can differ from Emergency Room to Emergency Room. Some Emergency Rooms prefer the traditional method of having multiple Triage stations in the front of their department or close to their front desk and having nurses categorize the patients as they arrive. The main problem of this method is that patients are standing in line or waiting for an available nurse in order to get categorized, which means that the patient that is a category 2 or 3 might wait while a 5 is being triaged. Even though some hospitals refuse to see this as a problem, a great percentage of patient get worse waiting in line and the concept is not being used correctly.

Three Emergency Rooms with different methods of patient classification were analyzed in order to develop a zero waiting time solution. In all of the cases there are only two methods of arriving to the Emergency Room: the patient arrives through the front door (walk-in) or the patient arrives through the use of an ambulance. In the case of ambulance arrival, the patient is automatically categorized as a 1 or 2 and this cannot be altered. For the purpose of this study, ambulance cases were not considered because they are supposed to already have a zero waiting time.

THE BEST METHOD

The first Emergency Room studied in this paper is the traditional method and the most commonly used across Puerto Rico. The Patient flow is very simple, (see Figure 1). In this first method, when the patient arrives, if a nurse is available, the patient is asked information of his/her medical history, current medications, allergies, conditions, primary doctor and chief complaint. Also basic vitals signs like temperature, pressure, weight, height, and oxygenation of blood are taken. Usually the information is collected in a paper form in which the nurse writes down everything as the patient states it, even if the information has nothing to do with a given condition. Once all these details have been written down, the nurse proceeds to determine a category for the patient.

After the nurse has established the category, the medical staff then sees each patient starting with the ones categorized as 1 and that has been waiting the longest. Since this method is all in paper (medical orders, medical notes, nurse assessment, etc.), the details are a honor code in which each employee writes the date and time of events and everyone else accepts them as the correct one. This method also has a major flaw and it is that there is no form of tracking the patient. There is no way for the supervisors to know the time that the patient has been waiting to be seen other than opening the record and seeing the date of the triage, but then again the triage was made after the patient waited on a line, so there is no exact time.

The second ER studied is one which has implemented the Electronic Health Record. In 2009, president Barack Obama signed the HITECH Act which states that, by the year 2014, every hospital accepting Medicare or Medicaid must have all of its patient record in electronic form (the year has been pushed back a couple of times because of the economic crisis). This new law affects greatly all of the Emergency Rooms in Puerto Rico because the government public healthcare insurance (known locally as “Reforma”) receives all of its income from Medicaid funds.

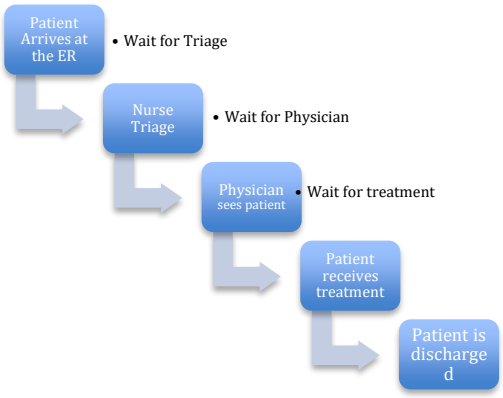

Figure 1
Basic Patient Flow

In this research, the second ER is the smallest one of the three studied. Here the patient doesn't wait on a line to be seen by nurse, rather it writes his/her name into an auto-registration kiosk and proceeds to sit down in the waiting room. When a nurse becomes available, the patient is called to a triage station and specific questions are asked and documented into the system. An Electronic Medical Record is capable of presenting the nurse with alerts and possible actions in order to categorize correctly the patients. After the nurse finishes, the medical staff calls the patient just like in the first method by category and the longest wait time. Even though this method corrects the major flaw that the paper based system presented (not recording accurately the arrival time of the patient), the system does not offer any solution toward reducing the waiting time. In the first months of being implemented, this method presented longer wait times for patients because nurses and medical staff were not accustomed to using computers.

The third method is an experimental method. It is a variation that tries to correct the problems of the other two previous methods. In this design the patient won't stand in line and won't write his name on a kiosk and wait to be called. Instead a physician greets the patient asking him/her only questions that are absolutely necessary for the assessment and categorization (like chief complaint and age) and takes only the vitals signs that are referent to the condition being presented by the patient. This quick medical assessment will provide the ability to determine if this patient will be attended in a "Fast Track" area of the Emergency Rooms (Fast Track Areas: physicians in cubicles and no infusion necessary; this method is commonly used for category 4 and 5) or if the patient is a growing emergency and needs to be treated in the acute ER (patients are laid on stretchers and other physician takes the case). The upfront physician operates as a coordinator for all the other physicians.

Every up-front physician is accompanied at all times by an assisting nurse. If when doing the initial assessment the physician realizes that the patient might need a lab for further evaluation, the order is placed and the nurse proceeds to take the sample eliminating the need for the patient to wait once evaluated for a test.

This third method actually presents the alternative of a zero wait time for the patient that arrives at the ER, but it is not perfect. A major disadvantage of this method is that it actually requires one or two physicians up front, which means increasing the payroll. Due to the different problems surrounding the income of hospitals, it was not a viable option to increase expenses.

All three methods are affected by the same surrounding problems:

- Lack of knowledge of the patients and accompanying members of the correct use of the ER.
- Lack of knowledge of the patients and accompanying members of the way an ER operates.
- Inefficient use of clinical personnel (no line of production methodology is being used).

These problems are discussed in the following section.

COMMON PROBLEMS

Lack of patient knowledge of the correct use of an ER is demonstrated by the fact that more than 50% of all patients that are coming daily to the ER are categorized in a 4 or 5 triage level. What this

data tells us is that a patient categorized as a triage level 5, for example, might be a patient who could have been attended at a primary physician office. Commonly known cases being treated as a level 5 are, for example, patients that are coming down with flu. If the flu has caused dehydration, the patient is categorized as a 4, but if the patient is not presenting a sign of prolonged dehydration, the patient is categorized as a level 5. This is the patient that, when seen in statistics, has been waiting in the ER for 6 hours for the discharge of a prescription, a medication or a rest order. This patient would have been better off going to a primary physician office, but the patients are so used to going to the Emergency Rooms when feeling sick that they prefer to wait 6 hours. In a study done by the San Francisco Hospital in California, the data showed that many patients that had arrived at the ER could and were categorized as non Emergencies, the main problem presented is that there is no way for a triage nurse to know or predict a discharge diagnosis, therefore all patients must be treated if they arrive at the ER [1].

The incorrect use of the ER presents a problem of overflow. The whole purpose of trying to eliminate wait time is to be able to create a production line capable of handling these cases without making these patients wait 4 to 5 hours just for a prescription. The Emergency Medical Treatment and Active Labor Act (EMTALA) signed in 1986 () states that all the Emergency Rooms in the United State are responsible for giving medical attention and taking care of every patient that has arrived to the Emergency Room stating a condition. No discrimination of race, religion, gender can be taken into consideration. No patient can be rejected if it doesn't have insurance. It is the responsibility of the Emergency Room to attend the medical emergency. So, the problem is not getting people out of the Emergency Room or stopping them from coming in, but to be able to attend the emergency as quickly as possible.

The other major problem is the lack of understanding of how does an ER operates. Many patients and their accompanying members believe the ER operates in a first come first serve type of method. They are often aggravated by the realization that someone who has been waiting less is being attended first. The Emergency Rooms works based on the previously discussed triage approach and most of the ER this author has visited lack posters that present this information for patients to be informed.

The third major problem is the incorrect use of personnel regarding the patient flow or production line. In all of the ERs, the production line is affected by the previous step and alters the next one, but nothing is being unified to prevent bottlenecks. There is a common problem regarding personnel just trying to get their process completed with acknowledging that the next process is not available. If the process to categorized a patient happens quickly then the next process, the medical consultation, has to be available and after that the ER needs to have an available nurse for treatment otherwise the bottleneck that was presented at the beginning is moving to another process and the wait time is not eliminated.

THE RESULTS

After monitoring the Emergency Room's patient flow in all three ERs during four months, the results were unexpected. In order to complement the data, basic questionnaires were developed. The clinical staff was asked about their overall satisfaction regarding their workload, their supervision and how they thought the hospital was working for them. Another questionnaire was developed and given to patients asking about their overall view of how the service was offered and a space for suggestions for future improvement.

In the ER with the paper-based approach, the staff was the less satisfied one, the patient satisfaction was also the lowest. In terms of the overall wait time of a patient in the ER, the average was within what the Health Department states as approved, but the patient was found to be waiting in line for almost 15 minutes (not documented, but measured by sample of supervising hours). After the triage, the patient waited almost another hour

for a physician. This is the worst scenario that any ER wants to have.

The ER with the electronic approach was the one with the shortest overall wait time, the patients waited less for a triage nurse and less than 45 minutes for a physician. This ER actually was able to have an overall wait time of 4.5 hours; that is an hour and half less than required by the Health Department. Still, the patient waited to be seen by a triage nurse because there is a "line" because of the auto-registration approach.

The ER with the physician up front approach did as expected and eliminated the wait for a triage, the staff was the happiest working and the patient satisfaction was also the highest. Still, in the first three months of implementation of the physician up-front approach, this ER did not have an overall wait time of less than 6 hours, it actually came at 6.5 hours. The administration of this ER decided that the increase of payroll did not justify the change and abandoned the physician up-front approach to go back to a paper-based approach, this way guaranteeing their license to operate as an Emergency Room. The main reason that the overall wait time was affected was because the production line was not analyzed completely and, even if the patient was coming in to the system more quickly, the lab couldn't process the samples as quickly and the physicians attending to the patients did not have the resources to make their physician assessments as quickly. No other changes other that the triage process was affected.

Figure 2 shows the comparison of all times in the Emergency Rooms and the results of the research. In the figure, the control is the paper-based approach, which is the most commonly used in Puerto Rico. The figure shows the main three times: the wait of the patient from the moment it arrives in the ER to the moment it is attended by the nurse, the time it waits after the triage up until the moment it is seen by the physician and, lastly, the overall time the patient was in the ER from the moment it arrives in the ER to the moment it is discharged.

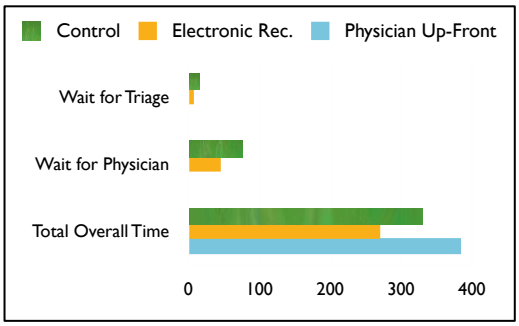

Figure 2
Patient Wait Time in minutes

FORECASTING FUTURE

Even though the research did not present any complete solution to all of the problems it did present an alternative option for the future. In the physician up front approach there were major flaws, mainly that after the patient was seen, there was no physician available to take the case and the patient waited. Yet this approach did as promised and eliminated the waiting time of the patient as the beginning. The process did guarantee that the patient was triaged and did not wait for the nurse for this process, yet the patient ended with a more overall time in the ER.

As part of looking for an improvement of all three ERs and after analyzing all the data presented in this research, the following method is being implemented, combining the best of all three designs. An experienced nurse will greet and receive a patient as it arrives in the Emergency Room. Since this nurse will be able to make an assessment without using any system (paper or electronic), this nurse will function as a coordinator. The nurse will ask the patient what is the reason for coming to the Emergency Room and, depending on the answer of the patient, one of the two options will be available: send the patient to an auto-registration kiosk and wait for the next available triage nurse or direct the patient to the acute Emergency Room area in which personnel dedicated to this patient will proceed to do an assessment. This nurse will be responsible to do a pre-triage classification that even though it will not

be documented it will help in the separation of the workload for Triage.

Everything on this method is electronically being documented. This will help the staff know what it has to do without actually having to wait for a record to be handed or being communicated that a lab order is pending or that a result has arrived correcting major flaws seen on the first method studied.

This approach will give more responsibilities to the upfront nurse. This nurse, who will function as the coordinator, should be the most experienced nurse in the ER. Experienced nurses are able to quickly classify correctly a patient and determine if a patient is an immanent emergency. This new position also creates something to look forward to less experience nurses because it creates levels between personnel.

In order to prevent situation with patients and in case the coordinating nurse is not available at the moment the patient arrives, security officers in the waiting room will have the responsibility of greeting the patient and giving orientation about the triage process. If the triage nurse is occupied (there are only two triage stations when 3 or 4 patients can arrive at the same time) the security will direct the patient to an auto-registration kiosk, provide wheelchairs if needed and any assistance. Integration of all the personnel in the ER would create a better environment between them.

Since a short triage based on 3 or 4 questions is being made, each nurse will be done with a patient in less than 5 minutes, which means there is a high probability that the patient has a zero wait time. And in the case that three or four patients arrive at the same time, patients will wait at the most 5 minutes for a classification. This approach combines the best of the electronically medical record and the best results presented by the physician upfront.

In order to prevent the problem presented by the third method on the study in which overall time was greater than 6 hours, if one of the triage nurses becomes available, only one remains as triage and the other one will give extra support to the Fast Track patients (category 4 or 5). A nurse has been designated as a phlebotomist and in charge of all blood samples, opening more time to the other nurses to assist the physicians in the treatment. Medications stations have been located closer to the patient's area instead of having one central warehouse and Physicians are assigned to areas and not patients. Patient distribution is then equally distributed between physicians making the line of production complete. Figure 3 shows the new list of changes being made to create a production line.

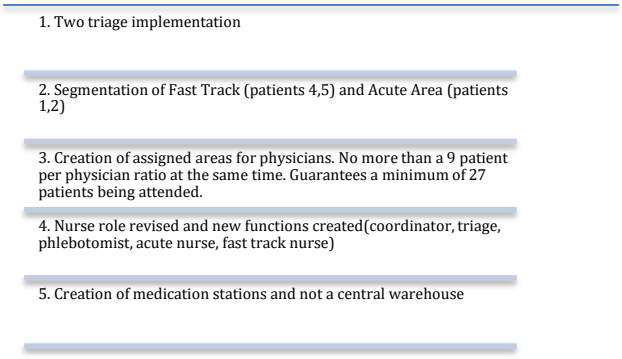

Figure 3
Major Changes implemented

CONCLUSION

With the Puerto Rico population growing every day and economic crisis affecting every family, people see the preventive healthcare more as a luxury than as a necessity, causing the complication of more medical conditions and rely on Emergency Rooms for rapid attention. The Emergency Rooms in Puerto Rico must be prepared for every situation including the overflowing of patients coming in each passing day.

No Emergency Room in Puerto Rico has ever been known to have a zero waiting time for patients, but the research presented here demonstrates that it is possible and it only needs a small effort to achieve it.

The decision to apply an Electronic Medical Record is not optional, but the transition can be made more easily if the patient flow in the Emergency Room protects the line of production no

matter the consequences. Exceptions will always occur, but is important to have a strong design in patient flow that can respond to any situation.

In this paper three common models of ERs were studied and they all shared the same problems and consequences, but the overall problem is the lack of assigned tasks and assigned areas to the personnel. Effective use of personnel guarantees a better overall flow and a lower waiting time for patients.

REFERENCES

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