

## Measured Time and Perceived Time: Crucial Data in Reducing and Managing the Time Spent at the Emergency Department

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ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p> <hr/> <p><i>Article History:</i> Received: 06-Nov-2018 Accepted: 22-Jan-2019</p> <hr/> <p><i>Key words:</i> Emergency department Measured time Perceived time Quality improvement Waiting time</p>	<p><b>Introduction:</b> Wait time at the emergency department is a global issue. However, most studies have relied on measured times to reduce and manage wait times at the emergency department.</p> <p><b>Materials and Methods:</b> A quality improvement project using a mixed-method was conducted to reduce and manage the time patients spent at the emergency department.</p> <p><b>Results:</b> In-depth interviews with the business team staff showed that pharmacy was perceived by them as taking 30 minutes to complete the medication orders. Pharmacy was therefore seen as the bottleneck within the patient flow at the emergency department by these staff. However, when the times pharmacy completed the orders were measured using time stamps, the measured times were found to be 10 minutes. The business team staff found the measured time data as failing to capture their interactions with pharmacy. Hence, observations were further conducted with the business team staff to understand their perceptions. These observations found that patients were constantly approaching the business team staff for updates on their pharmacy orders which added anxiety to the business team staff. The led them to continuously check the hospital information system for any updates on the completions of the pharmacy orders as this was needed to finalize the bills and discharge the patients from the emergency departments. These anxiety and workload led to the perceived time to be 30 minutes among the staff.</p> <p><b>Conclusion:</b> The combinations of perceived time and measured time data were used in this quality improvement project to advocate to the nurses and emergency department physicians to inform the patients that pharmacy would take time to thoroughly check and complete the orders and that they would be called to the counter by the business team staff when the orders were completed. This helped to manage the expectations of the patients and reduce the anxiety and workload of the staff.</p>
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### Introduction

Reducing the time spent by the patients at the emergency department (ED) has been an important quality improvement project in many hospitals around the globe. This is because the time spent at ED affects patient safety, quality of care and patient experience (1, 2, 3, 4). The time

spent at the ED also contributes to loss wages among the patients (5).

As hospitals partake in the quest to reduce the time spent at ED, they rely heavily on measured time gathered either by using clock or stopwatch to measure the time spent by the patients.

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However, there is another method to articulate time in quality improvement projects which is equally important and currently missing in the literature—perceived time. Perhaps this is because perceived time is within the realm of psychology and could be viewed to be too convoluted and theoretical for something as practical as the quality improvement projects (6). However, quality improvement projects are also dependent on perceptions to guide their continuous improvements and for the setting of their key performance indicators (7,8). Hence, both data on measured time and perceived time should be gathered in any quality improvement projects that are trying to reduce the time spent in any setting or procedure.

Perceived time in the context of reducing the time spent at ED is the duration of time spent at ED as perceived by the staffs and patients. It is a subjective measure of time based on the perceptions rather than measured using stopwatch or clock like for measured time. These perceived time data help us to 1) attach subjective ideas to measured time such as whether the measured time is too long or too short and 2) explore and understand the cultural and environmental contexts that lead to the perception. The former helps us to recognize that measured time by itself is not devoid of ideas fed by perceived time. The latter is about recognizing the underlying causes that lead to the perception. For example, many hospitals have set aside key performance indicators which include seeing patients within certain time frames at ED. However, very few hospitals are able to articulate the rationale for choosing these time frames. Additionally, different patients and staffs might perceive time differently at ED and the underlying reasons for the differences in those perceptions should be understood to better allow us to determine the appropriate time frames at ED and the most effective interventions needed to improve the waiting time experience at ED (9).

These are the valuable lessons learned in a quality improvement project conducted at a leading private hospital in Malaysia. The data gathered on measured time and perceived time have allowed for the creations of better recommendations to reduce the time spent at the emergency department. This project started from a very purist notion that the data should guide to the discovery of the root causes that prolong the time spent at ED. Hence, the data gathering process had been very explorative and iterative and led to the discovery about the importance of both measured time and perceived time.

## Methods

A quality improvement project using a mixed-

method was conducted to reduce and manage the time patients spent at the ED. In-depth interviews were first conducted with the business team department because this department was involved in the registrations of the patients and finalization of the hospital bills once the pharmacy had checked the prescriptions thoroughly and completed the pharmacy orders on hospital information system. It is the second department (after the triage nurses) and the last department (as it finalizes the bills) to interact with the patients at ED. These interviews were conducted to explore the patient flow at ED as this was an important department tracking the patient flow at ED. Additionally, the department was situated in the emergency department which allowed its team members to be continuously present at ED despite being a non-medical department.

Based on the initial data gathered with five business team staffs until reaching saturation (10), pharmacy was concluded to take a very long time to complete the order. The business team staffs perceived pharmacy to take up to 30 minutes between the time the prescription was faxed to the pharmacy and the time pharmacy updated the “completed” status for the prescription orders in the hospital information system. Without the “completed” status appearing next to the prescription orders in the hospital information system, the business team staffs could not finalize the patients’ bills and discharge the patients from ED. The business team staffs, therefore, viewed pharmacy as the department that prolonged the time patients spent at ED. Changes, they argued, should take place in reducing the length of time pharmacy took to complete the prescription orders.

In order to affirm this perception and initiate interventions with the pharmacy team, the time the prescription was faxed to the pharmacy from the ED until the time pharmacy completed the order was measured using the time stamps on the faxed prescriptions and the times the “completed” status had been updated by the pharmacy appeared on the computer screen of the business team staffs. These measured time data were then presented first to the business team members and later compared with their perceived time using in-depth interviews with them and by conducting observations in ED.

## Results

Based on the interviews with the business team, all five members perceived that pharmacy took up to 30 minutes to complete the order and this prolonged the time spent by the patients at the emergency department. These initial data identified pharmacy as the bottleneck of the

system. Hence, in order to affirm this perception and identify the appropriate interventions, measured data of the pharmacy processing time were gathered with the help from the business team staffs themselves. Based on 600 measured time data gathered throughout various shifts for almost 6 weeks, the median measured time pharmacy took to complete the order was found to be 10 minutes or a third of the perceived time. When these data were presented to the business team, the team felt this measured time data had failed to capture their interactions with pharmacy. This, despite, the business team staffs themselves who gathered these data for six weeks in various shifts including during the shifts when they said pharmacy took too long to complete the orders. Hence, the measured time was seen as failing to tell their sides of the story and their experiences at ED. In order to consider the perspectives of the business team staffs, in-depth interviews with five business team members and four hours of observations in their department and ED were later conducted until saturation (10) to better understand the business team's interactions with pharmacy.

These observations and in-depth interviews led to the recognitions that the business team proactively engaged in various tasks including calling pharmacy to check the status of the prescriptions. They also continuously monitored the computer screen to get the updated "completed" status of the prescription orders. Furthermore, they sat facing the patients who usually came toward them and asked them about the status of their prescription orders. These patients were often sitting by either interacting with their smartphones or watching the television at ED. All of these added to the anxiety of the business team. Even as an observer, this anxiety was palpable and every minute passing seemed to be very long when observing from the business team department.

Based on these data, the measured time data were further dissected. Based on this dissection, about 20% of the order took more than 18 minutes to complete. The 18-minute was used as the cut-off points because 18-minute was perceived to be the ideal time for pharmacy to complete orders and had been set as part of the key performance indicators by the pharmacy. This time was an arbitrary time and had never received any input from the patients or the business team staffs. The analysis of the data using this time frame did indicate that one fifth of the prescription orders took longer than 18 minutes.

These 20% orders typically demanded active and continuous interactions between the business team with the pharmacy team for status

**Table 1.** Measured time for the Pharmacy Processing Time

Pharmacy Processing Time (n=600)
Range: 1 minute to 84 minutes
Average : 12:59 minutes
Median: 10 minutes
123 out of 600 orders took more than 18 minutes (20% of the order)

updates. This further led to the perception that the pharmacy took a very long time to complete the orders despite the median measured time painting a different picture as shown in Table 1.

## Discussion

One could easily use the median measured time to deflect the idea that pharmacy is the bottleneck of the system and ignore the experiences of the business team. If this were to be done, valuable data from the business team interactions with the pharmacy and patients would be missing and the opportunities to better structure their interactions would not take place.

The differences between the perceived time with the measured time also help us to recognize the cultural and environmental contexts that led to the differences. Quality improvement projects should not view perceived time as false time but rather as mutually important data with measured time. These data would provide us with crucial cultural and environmental contexts either to define and categorize measured time as in the case of deciding the appropriate time frame at ED or to explain the discrepancy between measured time and perceived time by the patients and staffs at ED.

Just like previous studies comparing perceived time and measured time, this study also found that perceived time is an overestimation of the measured time (8,9). Additionally, perception of time spent performing the task is influenced by social conditioning (11,12). Some societies, class of people or generations might be more open to longer time spent at ED than others. Business team staffs who had to face anxious patients might be prone to overestimate the time taken for pharmacy to complete the orders.

It is very difficult to decide whether the measured time is much more valid than the perceived time as the perceived time, despite its subjective nature, is what might be used to define the time spent at ED by the patients. Regardless of how many quantitative data are gathered to prove or disprove perceived time, the perceived time also deserved our attention as perceived time might triumph measured time for the staffs and patients.

Based on the data gathered for perceived time and observations conducted with the business team, recommendations were made to the nursing team to manage the expectations of the

patients once they left the consulting rooms by informing the patients that the pharmacy would need to thoroughly check the patients' prescriptions before the business team could finalize their bills and discharge them from ED. This recommendation to manage the expectations of the patients is an important communication and behavioral intervention that is crucial in reducing the anxiety of the patients and limiting them from approaching the business team to know the status updates about their prescription.

Finally, perceived time allowed for exploring the rationale behind each key performance indicators set at ED. The 18-minute target set by the pharmacy to complete the order was arbitrarily decided. Hence, before setting any key performance indicators dealing with time, it is crucial to carefully examine the underlying context leading to the measured time becoming the source for the targeted time.

## Conclusion

While perceived time data led to the identification of pharmacy as the contributor to the length of the time spent by the patients at ED, measured time data led to a different conclusion. Hence, the reasons for these perceptions were explored. The perceived time by the business team contradicts the measured time because of the amount of workload performed by the business team and the anxiety fed by the patients to them. Instead of using measured time to ignore the perceived time, both data were used to create the recommendations in this project. These data were helpful in creating more diverse set of recommendations and solutions to manage and reduce the time patients spent at ED.

Therefore, future researchers who are working on quality improvement projects should gather perceived data and understand the rationales for such perceptions. This would allow them to observe the multiple factors that are influencing the time spent in any setting or procedure. This is especially true for projects at ED as the determination of the appropriate time spent at ED demands understanding of the environmental and cultural contexts of various stakeholders.

Finally, perceived time might be more important than measured times for our patients and staffs as their perception guides their

interpretation of the clinical pathways they have to follow in our healthcare settings. Hence, it is imperative that we gather both perceived time and measured time data in any quality improvement projects that wish to explore and change the length of time spent in our healthcare settings.

## References

1. Trzeciak S, Rivers EP. Emergency department overcrowding in the United States: an emerging threat to patient safety and public health. *Emerg Med J.* 2003; 20(5):402-5.
2. Wellstood K, Wilson K, Eyles J. "Unless you went in with your head under your arm": patient perceptions of emergency room visits. *Soc Sci Med.* 2005; 61(11):2363-73.
3. Johnson M, Myers S, Wineholt J, Pollack M, Kusmiesz AL. Patients who leave the emergency department without being seen. *J Emerg Nurs.* 2009; 35(2):105-8.
4. Donnelly L. Man dies due to A&E overcrowding, says hospital trust's medical director. *The Telegraph.* Available at: URL: <https://www.telegraph.co.uk/news/2018/03/09/man-dies-due-ae-overcrowding-says-hospital-trusts-medical-director/>; 2018.
5. Authier P. Quebec has worst emergency room wait times, health and welcome commissioner say. *Montreal Gazette.* Available at: URL: <http://montrealgazette.com/news/quebec/quebec-has-worst-emergency-room-wait-times-health-and-welfare-commissioner-says>; 2016
6. Roeckelein JE. *The concept of time in psychology: resource book and annotated bibliography.* Connecticut, USA: Greenwood Publishing Group; 2000.
7. Khalifa M, Khalid P. Developing strategic health care key performance indicators: a case study on a tertiary care hospital. *Proc Comput Sci.* 2015; 63:459-66.
8. Brabrand M, Folkestad L, Hosbond S. Perception of time by professional health care workers during simulated cardiac arrest. *Am J Emerg Med.* 2011; 29(1):124-6.
9. Kelly C, Shulman V, Khine H, Avner JR. Parental perception of the passage of time during a stressful event. *Pediatr Emerg Care.* 2007; 23(6):376-9.
10. Saunders B, Sim J, Kingstone T, Baker S, Waterfield J, Bartlam B, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Qual Quant.* 2018; 52(4): 1893-907.
11. Ferreira VF, Paiva GP, Prando N, Graça CR, Kouyoumdjian JA. Time perception and age. *Arq Neurol Psiquiatr.* 2016; 74(4):299-302.
12. Vasile C. Time perception, cognitive correlates, age and emotions. *Proc Soc Behav Sci.* 2015; 187:695-9.