

# The Effects of Computerized Triage on Nurse Work Behavior

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*The complex work processes and communication patterns exhibited in Emergency Medicine may be effectively managed through the use of information technology. These tools must be evaluated within the work environment to understand their effects on work flow, information flow, and patient safety. In this study the efficiency of the Emergency Department triage process was evaluated pre- and post-implementation of a computerized triage system. Time-and-motion analyses revealed no changes in triage documentation time; however, the duration of interruptions and the number of tasks decreased significantly.*

## INTRODUCTION

Efficient work and communication processes are essential for the management of time-critical activities in the ED. Information technologies are being developed and integrated into ED settings to meet these demands; however, few studies have quantified their impact on work processes and clinical outcomes.

Triage is a critical initial step in the health care of ED patients. The main purpose of triage is to prioritize patient care for ED clinicians. This prioritization is achieved by assigning an acuity score (highest=1, lowest=5) to each patient arriving to the ED. The triage nurse assigns the score on the basis of the patient's chief complaint and other clinical information. It is recommended that a triage assessment be completed in 2 to 5 minutes.<sup>1</sup>

The ED of a level 1 trauma center replaced its paper-based triage system with a computerized triage application (CTA) in June 2005. The CTA was implemented to streamline the triage data collection and storage process. The objective of our study was to evaluate the impact of the CTA on ED triage nurse work and communication efficiency.

## METHODS

Two trained observers conducted fourteen time-and-motion, primary task analyses of the ED triage process. Each observational session was performed by a single observer on consecutive days and lasted 180 minutes in duration. Seven observations were

conducted pre-CTA (April 2005) and post CTA (November), respectively. The observers utilized a wireless handheld computer to record the type and duration of tasks and interruptions triage nurses experienced before and after CTA implementation.<sup>2</sup> Work and communication parameters were characterized and sample differences were tested for significance using the Student's t test.

## RESULTS

Results are reported in the table. Each calculation (mean  $\pm$  95% CI) is based upon aggregate information collected during each of the 180 minute observational sessions. Triage times did not change significantly after the CTA was introduced. Patient chief complaint, age, acuity score and nurse experience did not impact triage times. However, triage processes that were interrupted were considerably longer in duration. After CTA implementation the number of tasks each triage nurse performed and the average duration of interruptions decreased significantly.

Table: Triage Nurse Work and Communication Activity

	Paper Based (n = 7)	Computerized (n = 7)	Sig.
avg. interrupted triage time (min)	8.46 $\pm$ 1.49	7.96 $\pm$ 1.1	no
avg. uninterrupted triage time (min)	5.59 $\pm$ .61	6.29 $\pm$ .34	no
num. of interrupted triages	5.14 $\pm$ 2.63	5.43 $\pm$ 1.59	no
num. of uninterrupted triages	10.57 $\pm$ 3.06	12.29 $\pm$ 3.53	no
time triaging (%)	54 $\pm$ .15	65 $\pm$ .12	no
num. of tasks	68.57 $\pm$ 12.62	37.28 $\pm$ 7.71	yes
num. of interruptions	13.57 $\pm$ 9.41	10.00 $\pm$ 3.92	no
avg. interruption duration (min)	1.08 $\pm$ .30	.38 $\pm$ .27	yes
wait room count	6.61 $\pm$ 3.05	9.14 $\pm$ 5.62	no
average acuity	2.68 $\pm$ .15	2.87 $\pm$ .33	no

## DISCUSSION

The CTA did not change the duration of the triage process, it altered triage nurses work environment by significantly reducing task jumping and interruption duration. Triage times may be reduced by limiting the number of triage processes that are interrupted.

### References:

1. Travers D. Triage: How long does it take? How long should it take? J Emerg Nurs. 1999;25:238-240.
2. France D, Levin S, Hemphill R, et al. Emergency physicians' behaviors and workload in the presence of an electronic whiteboard. Int J Med Inform. 2005;74:827-37.