



## Comparing Update Assessment Results in EMRs between Inside and Outside the Patient Room in an Intensive Care Unit

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**SUMMATIVE STATEMENT:** The purpose of this study is to analyze the patterns of EMR charting for updating assessment results and how these patterns can be different inside and outside the patient room in terms of average process time and frequency.

**KEYWORDS:** Electronic Medical Record, Nursing Workflow, Human-Computer Interaction

**PROBLEM STATEMENT:** Electronic Medical Record (EMR) systems have been designed to process large amounts of information related to the patients' conditions in hospitals. The purpose of these systems is to support medical and nursing staff in their daily work by means of electronic data processing (Bürkle, Ammenwerth, Prokosch, & Dudeck, 2001). However, nurses' ability to provide appropriate and timely healthcare services has been limited since EMR systems deliver extensive data to nurses regarding patient conditions and treatments. Effective use of EMR systems directly relies on the nurses' process time distribution ratio between EMR documentation and direct patient care (Guo, Kim, Smith, & Despina, 2019).

**OBJECTIVE/QUESTION:** In this study, we focus on how the average process time and frequency of updating assessment results in EMRs will be different inside and outside the patient room. This study's findings will help us identify the areas where the EMR system can be improved by preventing disruptions, incompleteness, and inappropriate charting and optimizing the EMR process efficiency in a medical ICU.

**METHODOLOGY:** To achieve the study goal, we developed two hierarchical task analysis (HTA) charts (see Figure 1) by combining the data obtained from the time-motion study manual observation data, ICU nurses' real-time location data, and their EMR log data. Nine nurses from the University of Missouri hospital participated in this study for 15 days.

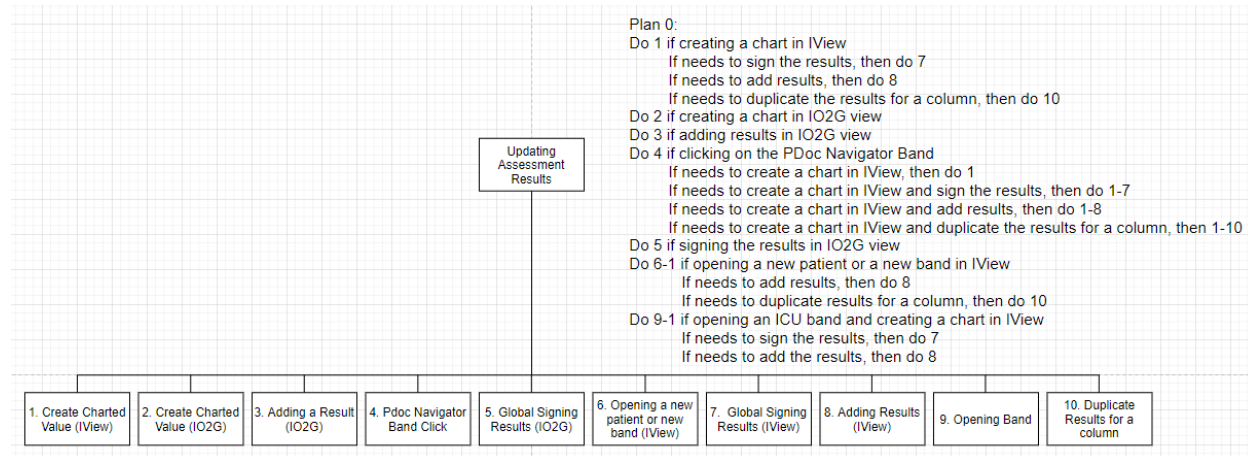


Figure 1: HTA chart for updating assessment results in EMRs

**RESULTS:** There are significant differences in average process time inside and outside the patient's room for tasks 2 ( $P = 0.006$ ), 4 ( $P = 0.012$ ), and 5 ( $P = 0.008$ ), sequences 1 - 7 ( $P = 0.011$ ), 1 - 8 ( $P = 0.023$ ), 1 - 10 ( $P = 0.021$ ), and sequence 6 - 1 ( $P = 0.025$ ). In all of these sequences, the average process time of updating assessment results outside the patient's room is bigger than the inside of the patient's room. Also, in terms of the frequency, there are significant

differences between inside and outside the patient's room for task 4 ( $P = 0.015$ ), sequences 4 - 1 ( $P = 0.022$ ), 6 - 1 ( $P = 0.012$ ), 9 - 1 ( $P = 0.008$ ), 4-1-7 ( $P = 0.036$ ), and sequence 9-1-8 ( $P = 0.028$ ).

**DISCUSSION:** Based on the results, we identified that ICU nurses preferred to update the assessment results in EMR when they were outside the patient room. One possible explanation for this is that a nurse station is close to patient rooms. They can easily observe all of their patients while doing EMR charting. Another explanation could be the different patterns of navigating EMR pages during their documentations. According to a study done by Guo et al. (2019), high-experienced nurses prefer to access more EMR pages to view lab results or read notes to understand patient conditions better. Furthermore, the results showed that ICU nurses frequently update assessment results outside the patient room. It could be possible while doing EMR charting outside the patient room due to ICU nurses' interruption.

**CONCLUSION:** The purpose of this study was to analyze the patterns of EMR charting for updating the assessment results in a medical ICU in order to have a better understanding of ICU nurses' EMR workflow between inside and outside the patient room. After developing the HTA charts for updating the assessment results inside and outside the patient room, we compared the patterns in terms of the average process time and frequency to find the differences associated with EMR charting inside and outside the patient room.

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