WTC Medical Monitoring and Treatment Program Clinical Studies Data Management System: A Usability Evaluation

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Abstract

This poster describes a process for analyzing and recommending improvements for the WTC Medical Monitoring and Treatment Program regarding its clinical and operational workflow as well as the user interface of its data management system, a customized version of TrialDB. Heuristic evaluation and workflow analysis were performed to identify problems and improve the overall system. Two biomedical informatics researchers used seventy-four heuristic evaluation questions categorized in ten principles in order to understand the capability features of the TrialDB user interface. Workflow analysis was undertaken with discussions with the Deputy Director and a system architect of the WTC Medical Monitoring and Treatment Program to determine the redesign of data collection procedures. Overall, the evaluation methods were instrumental in identifying the problems that need to be resolved and recommending features that need to be integrated into the system, and the methods of analysis are applicable to the evaluation of other HIT systems.

Keywords:

Usability engineering, Human factor engineering, User experiences, Heuristic evaluation, Workflow analysis, Clinical studies data management system, Medical monitoring and treatment program, World Trade Center.

Introduction

Successful EHR applications should not only satisfy functionality requirements but also employ user interfaces that are designed to simplify the user experience, minimize the learning curve associated with human-computer interactions, and consequently streamline the clinical workflow. The World Trade Center Medical Monitoring and Treatment Program (WTC-MMTP) was implemented in haste to accommodate 9/11 responders and as a result, system usability was never evaluated. As the concept of quality assurance and quality management are taking central roles in health care agenda, users, including public health scientists, biomedical informatics researchers and clinicians, reached a consensus that it is critical to initiate an analysis of the effect of systems usability on clinical care processes and to create usability requirements for these systems. This poster describes a series of processes used to assess the usability of WTC-MMTP patient data management system and its effect on clinical work flow.

Materials and Methods

Clinical workflow analysis of the WTC-MMTP with regards to (1) Patient trajectory workflow and (2) Data entry workflow utilizing TrialDB was undertaken to highlight ways in which processes may be improved or redesigned to ensure clinicians, staff members and researchers perform their jobs effectively and efficiently. Heuristic evaluation was conducted by two biomedical informatics researchers to analyze TrialDB. Direct discussions were initiated with administrative officers and program clinicians.

Results

Heuristic evaluation was instrumental in identifying problems and recommending features that need to be integrated into the system. Evaluators showed the most problems in the sections of "Error Prevention" (88%); both evaluators indicated that error messages were neither clear nor useful and that they did not provide a clear exit point or contact details for assistance. Additionally, the system failed in preventing, warning, or recognizing potential errors before these errors became a problem.

The **workflow analysis** was useful in identifying workflow inefficiencies; a unified EHR system for both the monitoring and treatment programs is needed in order to enhance the efficiency of the overall program and the quality of patient care provided to 9/11 responders.

Conclusion

The usefulness of electronic health records (EHR) is directly related to its application process. For this reason, understanding the clinical work flow is crucial for a meaningful EHR implementation. Utilizing systemic evaluations to analyze workflow and investigate the usability of the data management system, the authors successfully documented a range of usability issues regarding both data management and the organizational and clinical workflows that need revision or reengineering and recommended features

that need to be integrated into the WTC-MMTP to improve the quality of patient care provided to 9/11 responders.