Expert Validation of the Knowledge Base for E-CAD - a Pre-hospital Dispatch Triage Decision Support System

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Abstract: The knowledge base (KB) for E-CAD (Enhanced Computer-Aided Dispatch), a triage decision support system for Emergency Medical Dispatch (EMD) of medical resources in trauma cases, is being evaluated. We aim to achieve expert consensus for validation and refinement of the E-CAD KB using the modified Delphi technique. Evidence-based, expert-validated and refined KB will provide improved EMD practice guidelines and may facilitate acceptance of the E-CAD by state-wide professionals.

Introduction: Most healthcare organizations lack software development resources,1 and depend on commercial software with built-in KBs. However, often such KBs are developed without scientific peer-review or publication of the development and evaluation process. Additionally, often the commercial software continues to be used irrespective of unfavorable evaluation results of healthcare information system studies. Healthcare organizations, having invested heavily in implementation, cannot simply stop using the software systems. Furthermore, it is expensive for the vendor to repeat the knowledge base and software development process. Hence, use of evidence-based, expert validated and refined KBs can be a valuable first step in the development of software.

In our project, the KB, i.e. a set of trauma triage algorithms (TTAs), for E-CAD has been based on the National Highway Traffic Safety Administration (NHTSA) dispatch criteria, endorsed by Birmingham Regional Emergency Medical Services System, AL (BREMSS).2 Due to paucity of pre-hospital research, many of these EMD practices and guidelines are based on opinions of local experts derived from their experience. Expert-validation and independent verification is needed for explicit representation of medical dispatch knowledge in the KB. It also standardizes knowledge representation for ease of knowledge sharing and refinement by experts.

Objectives: To validate and refine the EMD KB by expert consensus. The goal is to integrate the validated KB into, and hence enhance, the CAD system.

Methods: Expert consensus has been recommended in fields where paucity of evidence demands development of best practice guidelines.1 Delphi technique has been chosen as it has been effectively used to reach consensus in such situations.4 The technique has been modified to include a questionnaire containing scaled responses as well as open-ended questions, for collecting quantitative and qualitative data confidentially. The expert panel will include emergency physicians, trauma surgeons, trauma researchers, paramedics, medical directors and EMDs from across Alabama. The questionnaires and TTAs will be distributed in rounds until consensus is reached. The resulting quantitative data will be analyzed to determine the level of agreement between the experts. Qualitative data will guide refinement of the TTAs. The refined TTAs will be sent to the experts for review in the next round. Quantitative summary of the responses from one round will also be distributed in the next, along with the experts’ initial responses. The experts will continually be asked to consider revising their opinion in view of the previous-round response summary until consensus is reached. The result will be a refined and validated KB. Evidence-based, expert-validated and refined KB will provide improved EMD practice guidelines that will be recommended for state-wide use. The KB will be integrated with the CAD system to enhance its effectiveness in the use of EMS resources.

References

Acknowledgements: The project is funded by Federal funds from National Library of Medicine, National Institutes of Health, Contract No. N01-LM-3-3513.