

On-line Decision Support for Emergency Trauma Management

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The overall goal of the TraumAID project is to improve the delivery of quality trauma care during the *initial definitive phase* of patient management. To this end, we are applying artificial intelligence techniques such as rule-based reasoning, planning, and plan inference. The current system, TraumAID 2.0, consists of (1) an electronic version of the standard *trauma flow sheet* implemented in HyperCard, that allows information to be entered by a dedicated member of the trauma team called a "scribe nurse" during trauma resuscitation; (2) a *rule-based reasoner* able to draw diagnostic conclusions from patient findings and test results, and identify what management goals they imply; (3) a *planner* that takes the set of currently relevant goals and identifies what (partially-ordered) sequence of actions is most appropriate under the circumstances; and (4) two complementary modes of information presentation – a *graphic display* of TraumAID's recommended management plan that can be shown on a monitor positioned in the trauma bay, and a critiquing interface (TraumaTIQ) that uses the goals and plans computed by TraumAID 2.0 to interpret physician orders and comment on them when appropriate. Because both interfaces can present information at a time and place where it could make a difference to the quality and/or cost of patient care, both implement the ideal of *real-time quality assurance*.

Papers describing TraumAID have previously appeared in the literature [1, 2, 3, 4, 5, 7]. TraumAID 2.0 has been validated retrospectively, and its management plans found significantly preferable to actual care [1]. The system is about to be field-tested in the Emergency Center at the Medical College of Pennsylvania (MCP). The system to be field-tested links our HyperCard interface asynchronously to the core system executing in Macintosh Common Lisp on a Quadra 700. The development version, implemented in Lucid Common Lisp within X-Windows on a SPARCserver 690MP, interacts with the developer through a simple Tk/Tcl interface.

With respect to our proposed demonstration, we will use segments from videotapes of trauma resuscitations to convey the environment and activities of a trauma team in an Emergency Center, and demonstrate TraumAID's support for data entry during patient management, its capabilities for reasoning and multiple-goal plan formation, and both its graphic and critiquing

approaches to real-time information delivery. Such videotapes have been used for educational purposes at the MCP Emergency Center for several years [6].

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