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POET: Procedure Outcomes Evaluation Tool

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Background: Surgical patient safety depends on several key factors, including the patient's preoperative assessment, ready access to the best available medical evidence, appropriate application of clinical knowledge, and the technical outcomes of the surgical intervention. This information is managed and presented to health care providers at the point of care through locally available knowledge management systems. Clinical decision support systems (CDSS) have the potential to generate timely case-specific advice that may influence surgical recommendations, especially in patients with multiple comorbidities presenting for complex surgical procedures. Moreover, CDSS supports evidence-based practice, which can potentially improve perioperative patient safety by facilitating pertinent clinical assessment of the risks and benefits of procedural outcomes.

Purpose: The procedure outcomes evaluation tool (POET) is a health informatics assessment tool that provides clinicians with rapid access to national clinical data related to inpatient surgical procedure outcomes. The evaluated outcomes include: mortality, length of stay, and the patient's disposition status. The tool presents a repeatable procedure outcomes assessment process that links the patient's demographic and comorbidity information to procedure-specific information and hospital characteristics. POET can also be used to understand the national impact of comorbidities on the probability of selected outcomes for specific procedures to provide a patient-specific assessment of surgical risk.

Description: POET follows a flexible three-tier architecture that provides a user-friendly interface for preoperative practitioners to submit ad hoc queries about inpatient surgical procedures from prepopulated menus. The ad hoc query will access POET's database, which includes the largest inpatient discharge data from the Nationwide Inpatient Sample (NIS), Healthcare Cost and Utilization Project (HCUP), and Agency for Healthcare Research and Quality.[1] The tool's logic-tier extracts meaningful user-oriented results about procedural outcomes that can inform the practitioner's decision-making process.

Results: The database contains approximately 8 million hospital stays each year. POET is performance-tuned to analyze and evaluate surgical procedure outcomes within a few seconds. Five-year mortality rates are generated and presented to the user in less than 10 seconds to facilitate patient risk assessment at the point of care. The execution time of repeated queries is significantly less as results are cached for future use.

Conclusions: POET provides a potential means to better inform surgical risk for both practitioners and patients. It supports evidence-based medicine and surgical patient safety and provides a mechanism for personalized risk assessment. Future work involves the incorporation of additional clinical databases and the addition of outcomes prediction models.

1. *Overview of the Nationwide Inpatient Sample (NIS). HCUP Web site. http://www.hcup-us.ahrq.gov/nisoverview.jsp. Updated July 21, 2010.*