VISUAL ANALYTICS TOOL FOR PERIOPERATIVE TRANSFUSION ANALYSIS IN A PEDIATRIC HOSPITAL

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Introduction: Transfusion guidelines for pediatric patients undergoing surgical procedures vary widely among providers and institutions[1]. There is scant literature evaluating actual practice of blood bank resource allocation and utilization in pediatric settings. Evaluation of transfusion practices at the institutional level can be useful to optimize resource utilization [2,3]. A specific challenge lies in identifying (a) those patients who are at high risk for requiring perioperative blood transfusions but adequate preparations have not been made (i.e. blood products not readily available during surgical procedure), and (b) patients who have blood products prepared but rarely require blood transfusions.

Visual analytics methods and techniques can be applied to manipulate and dynamically interact with large data-sets in near real-time. This can enhance the user’s understanding of the inherent relations among the different data sets [4,5]. This analytical reasoning is supported by data visualizations that enables users to gain better insight into not only the data distribution, but also the data quality, which facilitates the development of hypothesis testing within the knowledge discovery process[4]. Visual data modeling and exploration of very large data sets has been applied to evaluate business processes in several industries in order to prompt users to think in new ways about their data[6].

Methods: With approval of the institutional review board, we queried the anesthesia record data warehouse (Compurecord, Phillips, USA) and the blood bank database (Meditech, Meditech, Westwood, MA) from October 1, 2001 to December 31, 2010 to identify patients who received a blood product transfusion during surgery or within 72 hours of the operation. We stratified patients by age, weight, surgical procedure (based on CPT-4 codes) and diagnosis (based on ICD-9 codes). The databases were aggregated using a visual analytics tool (Qlikview, QlikTech, Radnor, PA), and a novel user interface was developed to identify trends, patterns and data distributions in transfusion practices.

Results: We retrieved 227,191 records from the Compurecord data warehouse. Patient age ranged from premature neonates to 33 years of age. Table 1 (see poster) includes a breakdown of surgical procedures (inclusive of all surgical procedure types performed
during the study period), patient age, gender and duration of procedure. The visual analytics user interface will be available for display to accompany the presentation.

**Conclusion:** We present on the novel use and application of visual analytics methods and techniques to perform an audit of perioperative blood product transfusion practices over a 10-year period at a tertiary pediatric hospital. Visual analytics methods and techniques have the potential to allow for real-time manipulation of very large data sets to assist in evaluating practice patterns and generate study hypotheses[5].

**References:**