Electronic health record (EHR) database analytics: applications for the identification of best perioperative practices

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Electronic health record (EHR) databases represent an increasingly valuable resource for biomedical researchers seeking to identify best perioperative practices via retrospective analysis of real-world patient data. EHR databases provide a unique source of aggregated point-of-care data covering all aspects of the patient encounter, thus allowing researchers to investigate clinical and administrative outcomes during and subsequent to the surgical visit. In-depth comparative effectiveness studies comparing two or more interventions are facilitated by the availability of admission/discharge, diagnosis, procedure, laboratory, medication, and clinical assessment data. In addition, a wealth of patient demographic and facility data allows investigators to stratify patients into relevant risk groups. A range of validated statistical approaches support quantitative comparisons between interventions.

Recently, the Boston Strategic Partners team used data from a large de-identified US EHR database to conduct a retrospective comparative effectiveness study examining the impact of intravenous fluid choice on postoperative outcomes in patients undergoing on-pump coronary artery bypass graft (CABG) and/or valve procedures. Outcomes examined included clinical complications such as pneumonia, acute kidney injury, and electrolyte imbalances, as well as key administrative outcomes such as readmissions following surgery. This study identified significant differences in outcome rates based on intravenous fluid choice. In light of these outcome differences, an economic model was subsequently developed to examine the economic implications of fluid choice (5% albumin plus crystalloids versus crystalloids alone) in this patient population. The results of this comparative effectiveness study reveal a key application of EHR databases for the identification of best perioperative practices.

Biography
Fred Peyerl is a Partner with Boston Strategic Partners, Inc., a dedicated life science and healthcare consulting firm. Dr. Peyerl holds a PhD in Virology from Harvard University Medical School, and an MBA from the University of Colorado. Dr. Peyerl has authored over 20 peer-reviewed scientific articles, including articles in the field of health economics and outcomes research (HEOR).

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