Development and Validation of a Complexity Score to Identify Hospitalized Patients at High-risk for Preventable Adverse Drug Events

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Abstract of proposal

In response to emerging challenges in healthcare and pharmacy practice the American Society of Health-System Pharmacists (ASHP) has proposed a pharmacy practice model (PPM) that emphasizes pharmacists’ key role in medication therapy management (MTM). ASHP’s repository of tools to support the PPM initiative includes the development of a complexity score (C-Score) to support pharmacist allocation to hospitalized patients at greatest need for pharmacist MTM.

We propose to develop the C-Score with data from the two largest University of Florida-affiliated hospitals representing a diverse case mix with good representation of pediatrics, indigent patients, and minorities. The score will utilize readily available discrete fields from the hospitals’ EHR to predict the risk for preventable adverse drug events (pADE) that are amenable to pharmacist intervention. Once finalized the score will be validated in 13 field testing hospitals which vary in case mix, geographic location, teaching affiliation, and EHR system. In the retrospective validation component, field-testing hospitals will provide UF with a comprehensive database extract that will include all variables to construct the C-Score and validate its ability to predict target pADEs. The prospective validation component will test C-Score feasibility via implementation into the EHR rules engine of the two EHR systems with largest market share for daily identification of patients at high-risk for pADEs. The validated C-Score will be made available with fully specified variable value sets and model parameters for prospective implementation in any EHR system with standard query capabilities.

Specific Aims and Hypothesis

Following the explicitly outlined expectations in ASHP’s request for applications we propose the development and validation of a complexity score that will prospectively flag patients at greatest need for pharmacist MTM. We have operationalized the “need for pharmacist MTM” as a composite construct, including risk for a variety of preventable adverse drug events (pADEs). Accordingly, this study’s overarching objective is to develop a C-score that allows ranking of admissions according to their predicted risk for pADEs that are amenable to pharmacist intervention. This objective relates to the following specific aims:

1. To identify all prevalent hospital-acquired pADEs and to operationalize each for automated measurement using hospital billing and EHR data.
2. To identify a set of risk factors for each pADE based on published literature, medication error reports, and expert opinion and to operationalize each risk factor for automated measurement in EHR data with special focus on data elements defined under meaningful use to facilitate universal implementation.
3. To develop dynamic risk models for each pADE in pediatric and adult inpatient populations of two development hospitals, and to consolidate risk information of each model into a single C-score that allows prioritizing specific pADEs according to individual preferences.
4. To validate the complexity score model in 13 testing hospitals with diverse geographic location, EHR systems, and case mix, and to provide fully-operationalized specifications for prospective and retrospective implementation.