MEADERS: Medication Errors and Adverse Drug Event Reporting System
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Abstract
The Agency for Healthcare Research and Quality (AHRQ) recently funded the PBRN Resource Center to develop a system for reporting ambulatory medication errors. Our goal was to develop a usable system that practices could use internally to track errors. We initially performed a comprehensive literature review of what is currently available. Then, using a combination of expert panel meetings and iterative development we designed an instrument for ambulatory medication error reporting and created a reporting system based both in MS Access 2003 and on the web using MS ASP.NET 2.0 technologies.

Introduction
Medication related errors and adverse events are daunting national problems. In one report, error rates were as high as 19% and these are likely to be underestimates. Most of the studies of medication errors have been conducted in the inpatient setting. Ambulatory medication errors probably account for a far greater number of errors but are largely undocumented. Recently, AHRQ funded the PBRN Resource Center to perform a literature review and develop a new ambulatory medication error reporting system based on successful strategies as referenced in the literature. The premise is that if the system is self-contained, providers could use it internally to document and track errors and take appropriate corrective action.

Methods
We initially performed a literature review of relevant articles describing error reporting systems and the lessons learned (ex: references 1, 3). We subsequently identified national experts and convened a panel to assist with design issues, question selection and reporting methodologies. These experts included representatives from both national agencies (FDA, MedMarx/USP) and academic institutions doing research in the area of medication related errors. Based on feedback from this group we designed a pilot instrument for error reporting. The instrument contained elements from several reporting systems including the FDA MedWatch System and the USP MedMarx System. We iterated over the design of the instrument over several months. We then programmed the instrument into both an MS Access Database and an ASP.NET 2.0 and JavaScript based web-form.

Results
Our comprehensive literature review found approximately 1100 articles that directly mentioned ambulatory medication errors. These were categorized by type and stored in an MS Access database for easy reference. Our medication error instrument contains 16 questions that can be efficiently completed within the span of 30-45 seconds online, given the demands of busy clinical workflows. The questions are divided into 7 categories including identifying information, patient demographics, category of event, medications involved, reasons for the event, contributing factors and final comments.

Discussion
We had several challenges in building the system. First, designing the questions to feel and sound correct required expert input and took several months and repeated iterations to accomplish. We also faced some technology challenges such as designing auto-complete web-controls in JavaScript to accommodate medication name lookup and interface and layout design issues. We are piloting the program now with clinics in Indianapolis and will soon start trial testing within the PBRN community. The full version of the toolkit including the literature review and the web and MS Access based software will be available to clinicians at no charge.

Conclusion
We have designed and are testing a new ambulatory medication error reporting system. It incorporates best-practices in terms of interface design and efficiency of use. We encourage clinicians to try it and provide feedback to us.

References
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