

Ensuring Safer Prescribing for Children: AAP Members Funded to Launch the STEPSTools Project

Electronic (e) prescribing systems are computer programs designed to create and transmit complete, accurate, legible and safe prescriptions and associated transactions (such as refills and forms related to prescribing.) These systems have received national attention by groups such as the Institute of Medicine and the Centers for Medicare and Medicaid Services, and have been endorsed by most of our professional societies. They promise to address safety issues associated with ambulatory medication ordering, including errors related to dosing in children. These systems rely on four sources of knowledge to help a prescriber construct a prescription:

1. the medication's age or weight-based dosing strategy
2. knowledge about potential interactions or adverse events that should change which drug is prescribed
3. knowledge about compounded forms of the medication that make a pill formulation suitable to give a young child
4. knowledge about the therapeutic window of each medication that allows rounding to a safe, but convenient dose for home administration.

Although many (but not all) e-prescribing systems have tools in place to help with dosing and to alert about potentially unsafe prescribing, virtually no systems have adequately dealt with compounded forms of medications (try ordering levothyroxine) or have addressed an even more common issue: should the calculated dose of Digoxin 3.2 milliliters be rounded up to 4, down to 3 or given as calculated?

The knowledge for the first challenge—compounded formulations—is often scattered among a series of books, and generally is not available to many pharmacists in the community. The knowledge about dose rounding, much like the early days of knowledge about dosing in general, is empiric and typically unavailable in written form.

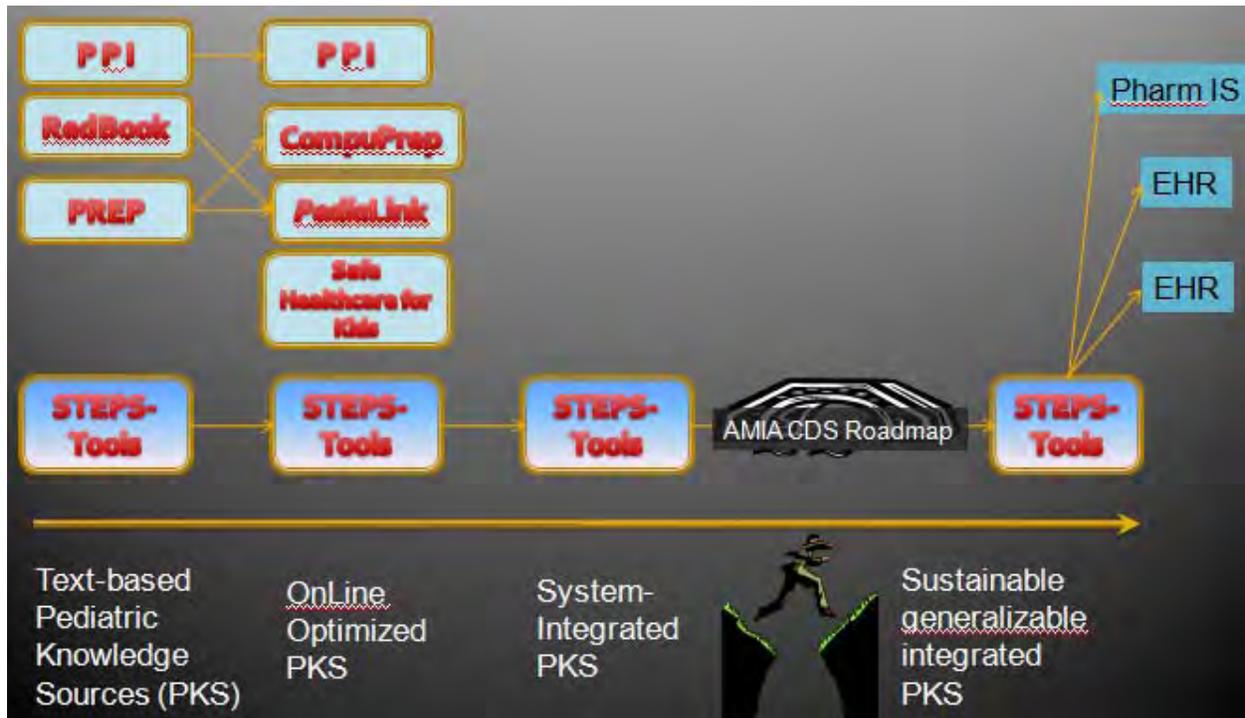
The goal of this project, creating Safety Through E-Prescribing System Tools (STEPSTools), is to build a small suite of tools that can be used **nationally** to provide a compounded formulation knowledgebase and to provide information about dose-rounding. These tools will be constructed in a way that facilitates the access to the knowledge for browsing/ education (as might be needed by community pharmacies) as well as for integration into e-prescribing systems (as will be required by e-prescribing vendors.) At the conclusion of the project, we will evaluate the usefulness of this knowledgebase by integrating it into e-prescribing systems at Vanderbilt (RxStar) Cincinnati Children's Hospital (Epic), and a set of NextGen sites, thanks to Jeannie Marcus. We are also in conversations with iScribe (CVS Caremark) to include them. We will conduct an evaluation to determine how often guidance from these web services is accessed as well as how often rounding recommendations are followed. We also will evaluate the utility of the extemporaneous formulation knowledge base to both community pharmacists and pediatricians.

To achieve these goals, our team is creating an expert panel to construct a knowledge base. This group is called the STEPSTools Working and Advisory Group (SWAG), and consists of pediatricians, pediatric informatics experts, knowledge management experts, and pediatric pharmacy experts, who will develop

consensus-based recommendation guidance for rounding pediatric doses. The names of many SWAG members will be familiar to us all:

- Kevin Johnson
- Stuart Weinberg
- Andy Spooner
- Richard Shiffman
- Chris Lehmann
- Bob Grundmeier
- Tony Luberti
- Mark Simonian (AAP Representative)
- Jeannie Marcus
- Ed Zimmerman
- And a host of others.

One of the initial activities of the SWAG has been to construct a schema for this specific type of knowledge. This process has begun informally through email discussions of the SWAG members. This is an opportunity for us to involve a series of key informatics innovations, including the National Library of Medicine's RxNorm project, HL7's clinical document architecture project, and most importantly for this work, web services using the WSDL framework to provide external systems with a way to integrate this knowledge.



This project also provides a tremendous opportunity for the AAP. As the figure above shows, the AAP has been providing knowledge resources to the world's child healthcare providers. This knowledge remains largely in print form (books, brochures) with more and more being converted to electronic formats, such as files available on PDAs, PDFs published on web sites, and now online optimized knowledge sources such as Safe HealthCare for Kids. What we plan to do, with the help of the Agency for HealthCare Research and Quality funding we have received, is to take STEPSTools from a text-based

knowledge source that we are currently creating, to an online knowledge source for pharmacists, and then across the wide chasm between a local implementation of this knowledge in an e-prescribing system and a national toolkit maintained by the AAP and in use by multiple e-prescribing systems and electronic health records.

Stay tuned for more information as we embark on this journey with the AAP!

Kevin Johnson, Stuart Weinberg, Coda Davison, and the STEPSTools Working and Advisory Group