

Electronic Implementation of Adolescent Health Guidelines for Preventative Care Transformation: Challenges for the Child Health Improvement through Computer Automation (CHICA) System

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Abstract

Adolescent health screening, particularly when targeted at mental health, substance abuse and sexual health, is a challenge for pediatricians. We describe how the Child Health Improvement through Computer Automation (CHICA) system offers a unique method of deploying guideline logic for a future clinical trial.

Body

Adolescent screening guidelines are an important component of health maintenance. In the specific areas of mental health, substance abuse and sexual health, they are not well followed. Screening is an essential element of the Patient Protection and Affordable Care Act, which mandates coverage of screening according to the American Academy of Pediatrics Bright Futures guidelines. Pediatricians may not be well prepared to care for this population. Few pediatricians provide comprehensive care to adolescent patients. In primary care, adolescent health service delivery is incomplete and of marginal quality as preventive care of adolescents is demonstrably difficult.

This project seeks to improve adolescent health services related to mental health, substance use and sexual health by implementing the *Bright Futures* guidelines. The Child Health Improvement through Computer Automation (CHICA) clinical decision support system (CDSS) has been effective for collecting structured clinical data and deploying pediatric guidelines, including maternal depression screening and improve targeted screening for disease. We are expanding CHICA to accommodate algorithms in *Bright Futures* for depression, sexual risk and substance abuse.

CHICA is unique in its workflow. It includes a tailored selection of questions to ask patients in the waiting room that inform alerts and reminders to the pediatrician that are selected based on the prioritized needs of the patient. CHICA uses clinical context to prioritize value-based decision support. This logic is achieved through the adaptation of the *Arden Syntax for Medical Logic Systems*. CHICA relies on a hybrid procedural/production rule-based implementation of medical logic modules (MLMs). This implementation allows for the greater facilitation of algorithm based guidelines and serial logic, as well as management of the institution specific "curly-brace problem." This allows for the capturing of clinical context in a data dictionary. Further enhancing the implementation is the use of *PRODUCE* and *CONSUME* modes, which allow for the definition, collection and deployment of structured clinical data and decision support logic, using the same MLM.

The deployment of the medical logic modules for adolescent screening is tied to the use of screening algorithms for requiring both sequential receipt and display of clinical data to perform logical operations. Expanding the CHICA system requires further creation of data which are persistent across instances of skip logic and multi-pronged forking algorithms. Given the automated prioritization of questions, the use of a context driven data model to deal with screening will be a core component of future work.

CHICA is a unique CDSS that uses an adaptation of Arden Syntax to deploy guidelines and store and display data incorporating clinical context. As CHICA is expanded to adolescent screening guidelines, it will be evaluated in a cluster randomized trial evaluating quality of care.