

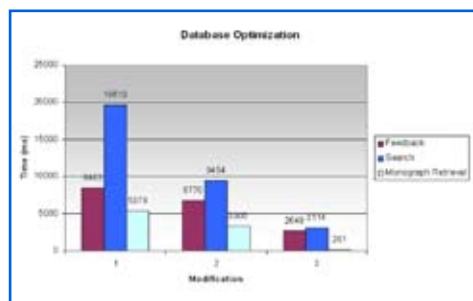
According to a 2006 report from the Institute of Medicine, medication errors result in more than 1.5 million injuries and cost billions of dollars each year in the United States. Miscommunication between physician and pharmacist due to illegible handwritten prescriptions has been cited as a contributing factor.

Computerized Physician Order Entry (CPOE) systems have been shown to reduce the number of serious medication errors when implemented and used properly. The Institute of Medicine recommends that by 2010 all health care providers write prescriptions electronically. Nevertheless, many physicians have been reluctant to adopt CPOE, citing a steep learning curve and a lack of efficiency.

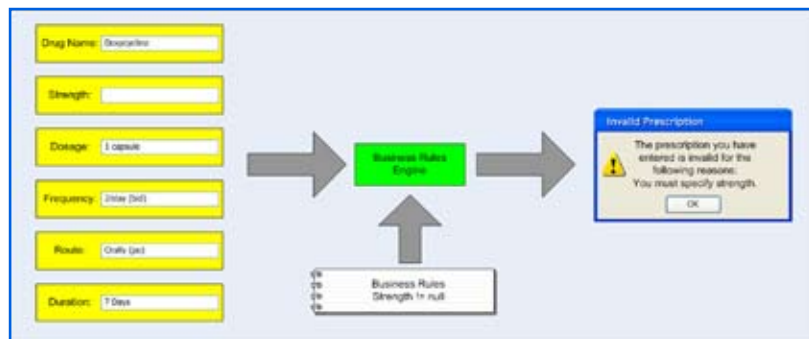
Southwest Research Institute® (SwRI®) is committed to decreasing adverse drug events by developing new technologies that improve the efficiency of CPOE systems and increase their adoption. SwRI applies innovative natural language processing technology to provide an intuitive, familiar interface for CPOE systems.

## Improved CPOE User Interface

SwRI engineers explored new technology in order to develop an improved CPOE user interface. In this improved process, the physician enters traditional prescription text into a user interface that is analogous to a prescription pad. The text is then automatically interpreted into an electronic format, resulting in a prescribing process that is more similar to past prescribing practices than CPOE systems currently available.



By optimizing the database configuration, the time elapsed between user action and system response is minimized.



By incorporating a business rules engine, changes to rules such as which components make up a valid prescription for a given facility can be made without having to write custom software.

Prescription text for analysis was gathered from physicians who were asked to write samples of typical prescriptions to treat hypothetical diagnoses. Proof-of-concept software was developed that:

- Actively assists the physician, providing immediate feedback with each keystroke that the computer is interpreting the prescription properly
- Provides the most relevant prescribing data at a glance
- Classifies partially entered terms so quickly that the user experiences no perceivable delay

## Innovative Parsing and Feedback Technology

The innovative parsing and feedback technology is designed to provide the physician with feedback regarding site-specific business rules and compatibility with existing systems. These rules are customizable and extensible without the need to rewrite the software. Once validated, the output from the system is provided in Health Level Seven (HL7) format – providing the capability for integration with existing clinical decision support and fulfillment systems.

Additionally, the technology incorporates several techniques that allow it to “learn” or improve with use. Advantages of the innovative parsing and feedback technology include:

- More frequently used terms appear higher in the list of auto-completion choices
- Auto-completion choices are improved by tracking frequently used prescribing patterns
- New patterns are incorporated into the parser on a per-user basis to improve with use

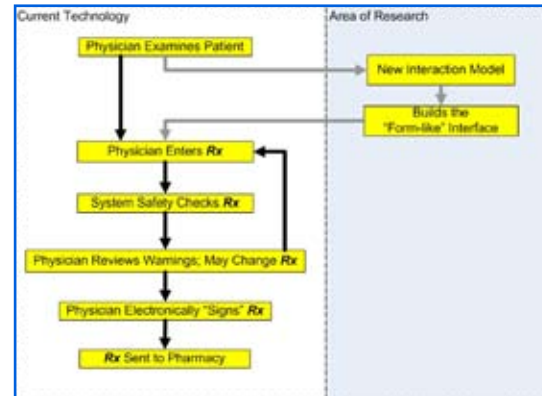
SwRI's research has shown that this new user interface concept is viable and provides an avenue to enhanced CPOE adoption. The new technology provides a foundation for innovative CPOE, natural language processing, and physician interface solutions.



The Information Systems Engineering Department (ISED) at SwRI is committed to reliably producing the highest quality work through a proven systems engineering process. Our commitment to excellence is evident through our appraised attainment of Level 5 within the Software Engineering Institute's (SEI) Capability Maturity Model Integration (CMMI®). This distinction is held by a limited number of American companies and even fewer applied research and development institutions.

©CMMI is registered in the U.S. Patent and Trademark Office by Carnegie Mellon University.

SwRI's research centered on providing an alternative to the traditional form-like CPOE interface. The resulting technology is meant to function as a module that would "plug in" to a complete CPOE solution.



# Automated Interpretation of Medical Prescription Text

**We welcome your inquiries.  
For additional information,  
please contact:**

Steven H. Rodgers  
Director

Information Systems Engineering Department  
(210) 522-3772 • Fax (210) 522-4227  
srodgers@swri.org

Sean Mitchem  
Manager

Application Framework Development Section  
(210) 522-2698 • Fax (210) 522-3396  
smitchem@swri.org

Automation and Data Systems Division  
Southwest Research Institute  
6220 Culebra Road (78228-5166)  
P.O. Drawer 28510 (78228-0510)  
San Antonio, Texas



Southwest Research Institute is an independent, nonprofit, applied engineering and physical sciences research and development organization using multi-disciplinary approaches to problem solving. The Institute occupies 1,200 acres in San Antonio, Texas, and provides more than 2 million square feet of laboratories, test facilities, workshops and offices for more than 3,100 employees who perform contract work for industry and government clients.



*Benefiting government,  
industry and the public  
through innovative science  
and technology*

An Equal Opportunity Employer M/F/D/V  
Committed to Diversity in the Workplace

[www.ised.swri.org](http://www.ised.swri.org)  
[www.swri.org](http://www.swri.org)

