



NEWS RELEASE

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Journal study evaluates success of automated machine learning system to prevent medication prescribing errors

Automated alerts estimated to have saved \$1.3 million

(OAKBROOK TERRACE, Illinois, Dec. 27, 2019) – Prescription drug errors are a leading source of harm in health care, resulting in substantial morbidity, mortality and health care costs estimated at more than \$20 billion annually in the United States.¹

Currently, clinical decision support (CDS) alerting tools – computerized alerts and reminders – are widely used to identify and reduce medication errors. However, CDS systems have a variety of limitations, including that they are rule based and can identify only medication errors that have been previously identified and programmed into the alerting logic.

A new study published in the January 2020 issue of [The Joint Commission Journal on Quality and Patient Safety](#) used retrospective data to evaluate the ability of a machine learning system – a platform that applies and automates advanced machine learning algorithms – to identify and prevent medication prescribing errors not previously identified by and programmed into the existing CDS system.

In the study, “[Using a Machine Learning System to Identify and Prevent Medication Prescribing Errors: A Clinical and Cost Analysis Evaluation](#),” alerts were generated retrospectively by a machine learning system using existing outpatient data from Brigham and Women’s Hospital and Massachusetts General Hospital in Boston from 2009 through 2013.

The study analyzed whether the system generated clinically valid alerts and its estimated cost savings associated with potentially prevented adverse events. These alerts were compared to alerts in the CDS system, using a random sample of 300 alerts selected for medical record review.

Findings showed a total of 10,668 alerts during the five-year period. Overall, 68.2% of the alerts would not have been generated by the existing CDS system. Ninety-two percent of a random sample of the chart-reviewed alerts were accurate based on structured data available in the

¹ National Priorities Partnership; National Quality Forum. 497 Preventing Medication Errors: A \$21 Billion Opportunity. 498 2010. Accessed Oct 22, 2019. <http://www.qualityforum.org/499WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=70388>.

record, and 80% were clinically valid. The estimated cost of adverse events potentially prevented in an outpatient setting was more than \$60 per drug alert and \$1.3 million when extrapolating the study's findings to the full patient population.

“The authors of this study successfully provide a glimpse into a new world of safety for medication ordering augmented by machine learning,” says David M. Liebovitz, MD, associate professor of Medicine, Division of General Internal Medicine and Geriatrics, Feinberg School of Medicine, Northwestern University, Chicago, in an [accompanying editorial](#). “Validation across different populations may reveal site-specific differences requiring unique models, and/or warrant identification and capture of new descriptive features.”

Also featured in the January issue:

- [“Using Electronic Health Records to Measure Quality Improvement Efforts: Findings from a Large Practice Facilitation Initiative”](#) (A study based on 107 practices across three Midwest states)
- [“Associations Between a New Disruptive Behaviors Scale and Teamwork, Patient Safety, Work-Life Balance, Burnout, and Depression”](#) (Duke University Health System, Durham, North Carolina)
- [“Medication Reconciliation Improvement Utilizing Process Redesign and Clinical Decision Support”](#) (Rady Children’s Hospital-San Diego)
- [“A Model for Improving Health Care Quality for Transgender and Gender Nonconforming Patients”](#) (Vanderbilt University Medical Center, Nashville)
- [“Closing the Loop with Ambulatory Staff on Safety Reports”](#) (Brigham and Women’s Hospital, Boston)
- [“Progress and Promise in Supporting Learning Health Systems”](#) (Agency for Healthcare Research and Quality, Rockville, Maryland)
- [“Time to Take Hearing Loss Seriously”](#) (New York University School of Medicine)

For more information, visit [The Joint Commission Journal on Quality and Patient Safety](#) website.

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Note for editors

The article is [“Using a Machine Learning System to Identify and Prevent Medication Prescribing Errors: A Clinical and Cost Analysis Evaluation”](#) by Ronen Rozenblum, PhD, MPH; Rosa Rodriguez-Monguio, PhD, MS; Lynn A. Volk, MHS; Katherine J. Forsythe; Sara Myers; Maria McGurrin; Deborah H. Williams, MHA; David W. Bates, MD, MSc; Gordon Schiff, MD; and Enrique Seoane-Vazquez, PhD. The article appears in *The Joint Commission Journal on Quality and Patient Safety*, volume 46, number 1 (January 2020), published by Elsevier.

The Joint Commission Journal on Quality and Patient Safety

[The Joint Commission Journal on Quality and Patient Safety](#) (JQPS) is a peer-reviewed journal providing health care professionals with innovative thinking, strategies and practices in improving quality and safety in health care. JQPS is the official journal of [The Joint Commission](#) and [Joint Commission Resources, Inc.](#) Original case studies, program or project reports, reports of new methodologies or the new application of methodologies, research studies, and commentaries on issues and practices are all considered.