



Exceptional Content. *Made Meaningful by Clinicians.*

Combating Alert Fatigue to Improve Clinician Adoption of and Satisfaction with CDS and CPOE

Clinician “alert fatigue” continues to be among the most vexing problems confronting health care organizations in their quest to encourage enthusiastic adoption of CPOE and clinical decision support (CDS) at the point of care. If too many alerts are triggered when medications or tests are being ordered, the likelihood is very high physicians will eventually tune out or actively override even high severity alerts.

Alert fatigue can also cause physicians to bypass or remain skeptical of CPOE, resulting in low adoption rates that impact outcomes and the hospital’s return on its technology investment. This is typically the end result when, as one hospital CMIO noted, alert fatigue drives clinicians to view CPOE as a “challenge to their autonomy or the flavor of the month.”ⁱ

While alert fatigue is problematic across all types of electronic clinical orders, it is particularly prevalent with

medication orders. In fact, medication alerts are so common that they have created a situation where “systems and the computers that are supposed to make physicians’ lives better are actually torturing them.”ⁱⁱ That is according to the author of a 2009 study of nearly 3,000 prescribers in three states which found that physicians ignored alerts more than 90% of the time, a rate that varied little based on severity.ⁱⁱⁱ

Indeed, nearly a decade of research has found that little has changed in terms of medication alert fatigue. For example, a study in 2004 found that prescribers overrode 80% of the medication alerts triggered in a hospital practice.^{iv}

A 2003 study found that prescribers overrode 91.2% of drug allergy alerts and 89.4% of the high-severity drug interaction alerts, leading the researchers to conclude that one-third of the alerts were inappropriate. The authors noted that

rejection of alerts “may reflect the skepticism of physicians with greater experience about some features of the CPOE system, such as out-of-date information, identification of interactions that were not clinically significant, failure to note patient tolerance of medication combinations, and the inability to balance the risks and benefits of therapy. It may also reflect a deeper-seated resistance among experienced practitioners to the perceived intrusion of information technology into the practice of clinical medicine.”^v

ALERT FATIGUE CAUSE AND EFFECT

Alert fatigue occurs when CPOE systems generate an excessive number of alerts that clinicians consider to be nuisances. These include overly sensitive drug-allergy or drug-drug interaction checks and dose limits that are neither

informative nor helpful in protecting the patient from an adverse event.

This is typically because the alert was not serious, was irrelevant or was shown repeatedly. In other cases, the alert may have been too long or difficult to interpret, or the clinical consequences were unclear. In some cases, the physician may have lacked a clear understanding about the importance of the warning, or the alerts were caused by technological problems or created unnecessary workflow interruptions.^{vi}

On the HIT side of the equation, alert fatigue can often be traced back to CPOE applications that contain inadequate tools for managing CDS features, including the ability to turn alerts on or off to achieve the level of functionality desired by clinicians. This is particularly true when CPOE systems contain medication-related CDS features based on a commercial knowledge base that generates an excessive number of nuisance alerts. In some cases, while the CPOE tools may allow specific alert features to be turned off, that may not be enough to satisfy clinicians. For example, it may be possible to turn off all class-based duplicate medication alerts. However, the tools within the CPOE system may not have the capability to turn off alerts for some medications, but not others within a particular class. Finally, in some cases, alert fatigue may simply be a side-effect of

the underestimation by CPOE and content providers of the cost of false positive alerts. In particular, they may underestimate “the human factors involved when an excessive number of alerts are generated.”

Regardless of their root cause, the impact of nuisance alerts goes beyond an individual clinician, patient or facility. Internally, they do not aid in the provision of quality care. This leads to diminished clinician confidence in the entire alert category. It can also decrease confidence in the alerting system and CDS as a whole, causing many clinicians to simply ignore or override what may be clinically relevant alerts.

Nuisance alerts may also lead a facility to turn off entire alert groups, including some that may be relevant. Finally, alert fatigue can ultimately generate dissatisfaction with the CPOE system as a whole, which slows health IT adoption within the facility and impacts progress at the national level.^{vii}

FINDING RESOLUTIONS

The burden of resolving the problem of alert fatigue is one shared by both providers and HIT and content vendors. It requires finding the right balance between the wants and needs of the clinician and the safety of the patient, and then deploying the CDS technologies that deliver the functionality necessary to address

those needs without diluting the positive aspects of medication alerts.

One promising solution is the practice of tiering alerts based on severity, which has been shown to increase compliance rates. In a study examining the impact on compliance of tiering drug-drug interactions by severity level, researchers found that about two-thirds of the Level 1 alerts at the non-tiered site were overridden. It also found a difference in compliance for alerts presented in the same way – hard stops that required an override or “non-hard stops” that were nonetheless interruptive – even though the underlying databases driving the alerts were the same.

The researchers concluded that the findings suggest that how alerts are prioritized and presented may be as important as which alerts are delivered, and that un-tiered alerts may present a higher risk because “even very serious alerts often are overridden when this is done. Failure to tier resulted in substantially less recommended provider behavior.”

Equally important, the study found that clinicians did not object to “hard stop” alerts at the tiered site because they occurred infrequently. This led the authors to conclude that “interrupting clinicians only for more serious interactions may make them more receptive to the alerts, and may be the reason why the compliance

rate for tiered Level 2 alerts was almost three times higher than for non-tiered Level 2 alerts, despite a relatively similar presentation.”^{viii}

Other resolutions include monitoring override rates and utilizing the resultant data to reclassify the severity of alerts that are frequently overridden. This was done successfully by one hospital, which utilized business intelligence software to monitor alert categories and determine alert triggers. After meeting with physicians to evaluate the findings, the decision was made to eliminate or adjust the severity level of certain alerts. The end result has been a significant reduction in the number of alerts triggered by orders submitted via CPOE.

More provider organizations are also seeking out medication-related CDS technologies that provide greater control over when and how alerts are

presented. These technologies are attractive to facilities and individual clinicians because they allow end users to customize alerts according to specialty, or to suppress certain alerts such as those for medications a patient has already received.

As a result, fewer nuisance alerts are triggered.

Finally, establishing a proactive feedback loop can provide a valuable learning channel for improving how and when alerts are triggered and presented. For example, vendors could provide feedback to the drug compendia, or enable hospitals to provide feedback through enhanced reporting capabilities, to identify alerts that are being consistently overridden. Doing so will provide valuable data that can be utilized to improve alert mechanisms within medication-related CDS tools and CPOE systems.

SYSTEM-WIDE BENEFITS

Alert fatigue, particularly as it relates to medications, is a very real and very serious problem that has national health IT implications. Too many low- or no-value alerts will negatively impact adoption of CPOE and CDS technologies, which will in turn impact the quality and safety of care provided.

Resolution is possible, however, if clinicians and vendors work together. Clinicians must be willing to provide meaningful input on their wants and needs. This will enable vendors to design technologies that address those needs in the form of CPOE and CDS solutions with the functionality necessary to customize or control alerts to ensure delivery of safe, quality patient care.

MEDI-SPAN® CLINICAL DELIVERS TRUSTED, ACTIONABLE DRUG INFORMATION DECISION SUPPORT DIRECTLY TO THE EHR WITH UNIQUE FUNCTIONALITY THAT HELPS REDUCE CLINICIAN “ALERT-FATIGUE” AND AIDS ORGANIZATIONS IN MEETING HEIGHTENED INDUSTRY EXPECTATIONS AND CHANGING REGULATORY REQUIREMENTS.

Comprised of a suite of Application Programming Interfaces (API) that allows system vendors to utilize Medi-Span content, terminology mappings and featured functionality. It integrates seamlessly into new and existing EHR applications, delivering CCHIT-compliant medication-related clinical decision support.

For clinicians, Medi-Span Clinical delivers a full slate of medication-related clinical decision support, including drug interactions, route contraindications and drug allergy alerts. It also provides links to supporting medical evidence, the ability to turn off individual interactions or allergic reactions and flexible screening capabilities.

The Medi-Span Clinical vision features a full range of APIs, including those that support dose screening and recommended drug orders, identification of therapeutic duplications, pregnancy, lactation and age and gender conflict checking, and drug to disease screening.

For application vendors, Medi-Span Clinical's architecture adapts easily to a continuously evolving certification environment with a flexible platform that can grow and expand to meet future criteria. Utilization of Medi-Span's APIs allows development efforts to focus on the application rather than the underlying data structure.

For more information on Medi-Span Clinical Decision Support, visit MediSpan.com.

- ⁱ Staff. "Avoiding Alert Fatigue." *Health Data Management*. Oct. 1, 2009. Available at http://www.healthdatamanagement.com/issues/2009_71/-39039-1.html.
- ⁱⁱ O'Reilly, K.B. "Doctors override most e-Rx safety alerts." *amednews.com*. March 9, 2009. Available at <http://www.ama-assn.org/amednews/2009/03/09/prsa0309.htm>.
- ⁱⁱⁱ Isaac, T., Weissman, J.S., et al. "Overrides of Medication Alerts in Ambulatory Care." *Archives of Internal Medicine*. Vol. 169 No. 3 pp 305-311. Feb. 9, 2009.
- ^{iv} Baker, D.E. "Medication Alert Fatigue: The Potential for Compromised Patient Safety." *Hospital Pharmacy*. Vol.44, No. 6 pp 460-462. June 2009.
- ^v Weingart, S, Toth M., et al. "Physicians' Decisions to Override Computerized Drug Alerts in Primary Care." *Archives of Internal Medicine*. Vol. 163 No. 21 pp 2625-2631. Nov. 2003. Available at <http://archinte.ama-assn.org/cgi/content/full/163/21/2625?maxtoshow=&hits=10&RESULTFORMAT=&fulltext=Saul+N.+Weingart&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>.
- ^{vi} Van der Sijs, H., Aarts, J. et al. "Overriding of Drug Safety Alerts in Computerized Physician Order Entry," *Journal of the American Medical Informatics Association*. Vol. 13 No. 2 pp 138-147. March/April 2006. Available at <http://jamia.bmj.com/content/13/2/138.long>.
- ^{vii} Kuperman, GJ, Reichley, RM and Bailey, TC. "Using Commercial Knowledge Bases for Clinical Decision Support: Opportunities, Hurdles, and Recommendations." *Journal of the American Medical Informatics Association*. Vol. 13 No. 4 pp 369-371. July/Aug. 2006.
- ^{viii} Paterno, M.D., Maviglia, S.M., et al. "Tiering Drug-Drug Interaction Alerts by Severity Increases Compliance Rates." *Journal of the American Medical Informatics Association*. Vol 16. No. 1 pp 40-46. Jan/Feb 2009. Available at <http://jamia.bmj.com/content/16/1/40.full>.