# Best Practice Alerts: A Poke in the Eye or an Efficient Method for Safer Prescribing?

Chad M. Brummett, M.D., Zachary Wagner, Ph.D., Jennifer F. Waljee, M.D., M.P.H., M.S.

Opioid-related morbidity and overdose continues to accelerate in the United States, with more than 80,000 opioid-related deaths reported in 2021. Whereas the increase in overdose in recent years is largely due to heroin and illicit fentanyl, most who develop opioid use disorder begin with an exposure to opioid pills.[1] One of the most common reasons for opioid prescribing is to manage acute postoperative pain, and postoperative opioid prescribing in the United States has been marked by excess and risky patterns given a lack of evidence-based prescribing guidelines. Furthermore, opioid disposal strategies remain widely underutilized due to a lack of convenience and fears that opioid medications may not be available for future need. Excessive prescribing is correlated with persistent opioid use,[2] which has been linked to increased hospital utilization, healthcare costs, development of opioid use disorder, and overdose.[3–6] Moreover, excess prescribing can lead to diversion and misuse, especially among children and adolescents. For example, more than two thirds of adolescents who report misusing opioids describe obtaining pills from leftover prescriptions provided to themselves, friends, or family members. Although guidelines to direct postoperative opioid prescribing have emerged in recent years, the extent to which these are adopted remains unknown. While some evidence suggests that the dissemination of evidence-based prescribing guidelines for surgical care has been associated with decreases in postsurgical prescribing and persistent use,[7] these effects are concentrated among areas where uptake may be higher. Moreover, a recent study examining prescribing practices among surgeons in the United States in 2019 demonstrates that high rates of risky prescribing practices persist. Despite the strong rationale for prescribing guidelines, implementation of evidence often takes many years, and there is an urgent need for novel ways to align postoperative prescribing with patient need and eliminate excessive prescribing. In this issue of Anesthesiology, Dr. Rolfzen *et al.* studied the use of a best practice alert in the electronic health record in a clinical trial entitled, "Best Practice Alerts Informed by Inpatient Opioid Intake to Reduce Opioid Prescribing after Surgery (PRIOR): A Cluster Randomized Multiple Crossover Trial."[8]

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The trial included more than 21,000 surgical patients across four hospitals in Colorado between July 2020 and June 2021, including three private practice hospitals and one academic medical center. The care team included 1,053 unique providers composed of 41% attending physicians, 29% residents or fellows, and 29% nonphysician advanced practice providers. The investigative team randomized hospitals in 8-week

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Chad M. Brummett, M.D.: Department of Anesthesiology and Opioid Prescribing Engagement Network, University of Michigan, Ann Arbor, Michigan.

Zachary Wagner, Ph.D.: RAND Corporation, Santa Monica, California.

Jennifer F. Waljee, M.D., M.P.H., M.S.: Opioid Prescribing Engagement Network and Department of Surgery, University of Michigan, Ann Arbor, Michigan.

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periods to an electronic decision support tool that used the data from the patient's inpatient opioid use to tailor their discharge opioid prescription. When the decision support tool was active, a best practice alert would notify the prescribing provider when the discharge prescription was in excess of the recommended amount based on guidelines and the patient's inpatient opioid consumption. During the control period, there were no alerts displayed. The authors report there was no significant difference in postdischarge opioid prescribing between the alert and control periods, and no differences in prescribed opioid and nonopioid combination medications or additional opioid prescriptions written after discharge (secondary outcomes). For the 11,003 patients managed during the period of the best practice alert, the median postdischarge opioid prescription was 75 mg [interquartile range, 0 to 225] oral morphine equivalents compared to 100 mg [0 to 225] oral morphine equivalents for the 10,686 patients in the control periods during which the alerts were not active, which was not statistically different. The authors conclude that the effect of intervention may have been blunted by in the context of broader education regarding safe opioid prescribing and that these alerts may have greater impact in settings in which awareness of the risks of excessive prescribing is limited.

While the alert intervention did not change opioid prescribing in this study, the findings highlight the importance of a multifaceted approach to encourage best practices in clinical care. Education campaigns to increase awareness of the evidence to support practice change are effective, and our group has found that most physicians and advanced practice providers are amenable to changing their prescribing practices when evidence is presented. However, busy clinical schedules, the rapid pace of an expanding evidence base, and the large number of providers who may care for patients during perioperative care can make it impractical to reach all providers through educational interventions alone. A best practice alert provides direction at the point of care to reduce excess prescribing tailored to patient need and provider behavior and does not alter care for patients in which the prescribing was consistent with guidelines. Best practice alerts do not necessarily require formal education of prescribers, leverage the data resources of electronic health record systems, and can be deployed more efficiently and iterated as evidence evolves. However, design features are critical to ensure adoption of the alert, including avoidance of alert fatigue. Best practice alerts should be designed in a way that allows for clear instructions for compliance or override and an efficient way to correct the order when appropriate.

In the current study, multiple factors may have contributed to the lack of observed effect of the alert intervention. One important factor noted by the authors was the higher than expected rate in which no opioids were prescribed at discharge, as well as patients for whom prescribing aligned with guidelines. The authors attributed these observations to extensive opioid education and adoption of new protocols by the surgical team between the time of study planning and initiation. Approximately 35% of the surgical cohort was discharged without an opioid prescription, and the alert was only triggered in approximately 25% of cases. For the cases in which discharge prescribing exceeded the recommendations, thereby triggering the alert, there was a modest reduction in postdischarge prescribing when compared to those not receiving the alert (median prescribing of 201 mg morphine equivalents in the alert group *vs.* 225 mg of oral morphine equivalents in the control, $p = 0.027$). These data suggest that the best practice alert could reduce prescribing in a setting with fewer previous efforts to address excessive prescribing, for surgical conditions in which opioid prescribing is consistently in excess of guidelines, or for surgical conditions for which new evidence has only recently emerged. Alternatively, best practice alerts may be most effective in settings in which opioid prescribing is particularly concentrated by procedure or provider. For example, a recent study from national IQVIA prescription data found that the top 5% of surgeons prescribing opioids after surgery constituted almost half of high-risk prescribing and one third of the total opioids prescribed.[9]

This study adds to the mixed evidence on the effectiveness of alerts, including best practice alerts, to curb excessive opioid prescribing. For example, a recent study examining the effect of an electronic health record alert informing surgeons they were required to check the prescription drug monitoring registry if prescribing more than 5 days' worth of pills reduced opioid prescription amounts.[10] In addition, monthly email alerts informing emergency department physicians of high pill quantities reduced the number of pills prescribed to future patients.[11] However, email alerts to primary care physicians about their recent risky opioid prescribing did not change prescribing.[11] The current study by Rolfzen and colleagues adds to this evidence and highlights that best practice alerts need to be well tailored and that their effectiveness is context dependent. For example, the effectiveness of feedback interventions may be influenced not only by alert fatigue but also the time in which a provider can cognitively absorb the information and decide to change their practice at the point of care. It is possible that interventions that require less cognitive effort or action from the provider, such as lowering default opioid order sets, might be more broadly effective than those in which a provider must weigh prescribing against data presented, such as patient opioid use, published guidelines, or peer norms.[13,14]

Notably, the authors used inpatient opioid consumption to tailor postoperative outpatient opioid prescribing, providing an important and innovative opportunity to tailor interventions based on patient need. These findings align with previous studies demonstrating that one of the strongest associations to the amount of opioid patients consume after inpatient surgeries is the amount consumed in the 24 h before discharge.[15] Rather than a one-size-fits-all approach, the use of the inpatient opioid consumption data from the electronic health record data may reduce excess prescribing while ensuring appropriate pain care. Although the alert

intervention did not change prescribing in the context of discharge prescribing from surgical care, leveraging electronic health record data to further tailor prescribing may be useful in other types of interventions, such as tailoring prescribing to those with risk factors for poor pain- and opioid-related outcomes (*i.e.*, respiratory depression or overdose), such as concurrent benzodiazepine use, a history of opioid use disorder, or individuals on long-term opioid therapy, or mitigating risk by encouraging naloxone coprescribing.

The persistent burden of opioid-related morbidity and mortality in the United States has prompted numerous strategies to curb this critical public health problem, including legislation around opioid prescribing for acute pain, provider-level education for licensing, and risk disclosure to patients for whom opioids are being prescribed. While the best practice alert tested in the trial by Rolfzen and colleagues did not change postdischarge opioid prescribing overall, the authors identified opportunities for future applications among settings with a higher rate of excessive prescribing. Going forward, it is critical to continue to study best practice alerts and other interventions in future, including default recommendations and provider feedback. Such interventions have the potential to address immediate needs to address the opioid epidemic and could inform future interventions for other issues in healthcare and public health.

## Competing Interests

Dr. Brummett is a consultant for Heron Therapeutics (San Diego, California), Vertex Pharmaceuticals (Boston, Massachusetts), Alosa Health (Boston, Massachusetts), and the Benter Foundation (Pittsburgh, Pennsylvania); he also provides medical expert testimony. The other authors are not supported by, nor maintain any financial interest in, any commercial activity that may be associated with the topic of this article.

## Correspondence

Address correspondence to Dr. Brummett: cbrummet@umich.edu

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