1-30-2018

Association between Electronic Medical Record Implementation of Default Opioid Prescription Quantities and Prescribing Behavior in Two Emergency Departments

M. Kit Delgado
University of Pennsylvania

Frances S. Shofer
University of Pennsylvania

Mitesh S. Patel
University of Pennsylvania

Scott Halpern
University of Pennsylvania

Christopher Edwards
University of Pennsylvania

See next page for additional authors

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Abstract
Setting a low quantity of opioid tablets as the default option in electronic medical record prescribing orders may "nudge" clinicians to prescribe fewer opioids. When two emergency departments implemented a 10-tablet default instead of a manual entry, the proportion of 10-tablet prescriptions written more than doubled, from 20.6% to 43.3%. Conversely, 20-tablet prescriptions decreased from 22.8% to 16.1%, and prescriptions for 11-19 tablets decreased from 33.5% to 20.1%.

Keywords
Opioids, opioid epidemic, prescribing, emergency department, electronic medical record, behavioral economics, nudge

Author(s)
M. Kit Delgado, Frances S. Shofer, Mitesh S. Patel, Scott Halpern, Christopher Edwards, Zachary F. Meisel, and Jeanmarie Perrone

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Research to Improve the Nation's Health System

2018 . No. 2

ASSOCIATION BETWEEN ELECTRONIC MEDICAL RECORD IMPLEMENTATION OF DEFAULT OPIOID PRESCRIPTION QUANTITIES AND PRESCRIBING BEHAVIOR IN TWO EMERGENCY DEPARTMENTS

M. Kit Delgado, Frances S. Shofer, Mitesh S. Patel, Scott Halpern, Christopher Edwards, Zachary F. Meisel, Jeanmarie Perrone

Journal of General Internal Medicine – first online January 16, 2018

KEY**FINDINGS**

Setting a low quantity of opioid tablets as the default option in electronic medical record prescribing orders may "nudge" clinicians to prescribe fewer opioids. When two emergency departments implemented a 10-tablet default instead of a manual entry, the proportion of 10-tablet prescriptions written more than doubled, from 20.6% to 43.3%. Conversely, 20-tablet prescriptions decreased from 22.8% to 16.1%, and prescriptions for 11-19 tablets decreased from 33.5% to 20.1%.

THE QUESTION

The epidemic of opioid overdose deaths in the US has its roots in prescription opioids. Patients who receive a prescription for a large quantity of opioids, especially those new to opioids, are at risk for long-term use or for having leftover tablets that are later misused or abused. Patients often receive 30 or more opioid tablets for acute pain, despite current opioid prescribing guidelines recommending only a fraction of that quantity (10-12 tablets). Default options, or pre-set selections, in electronic medical records (EMRs) can influence behavior in other contexts, and may be a way to guide clinicians toward prescribing smaller quantities of opioid tablets.

In 2015, two Penn Medicine emergency departments (EDs) implemented a new EMR that featured a default setting of 10 opioid tablets, replacing one that required the clinician to enter the number of tablets manually. The authors compared weekly prescribing patterns before and after the 10-tablet default by tracking the quantity of tablets supplied at discharge for the most commonly prescribed opioid, oxycodone with acetaminophen (Oxy/APAP).

THE FINDINGS

During a 41-week period, patients received 3,264 prescriptions for Oxy/APAP across the two EDs. The average number of tablets prescribed remained the same after the default option was implemented, but the median number per prescription decreased slightly from a low baseline of 11.3 to 10 in one ED and from 12.6 to 10.9 in the other.

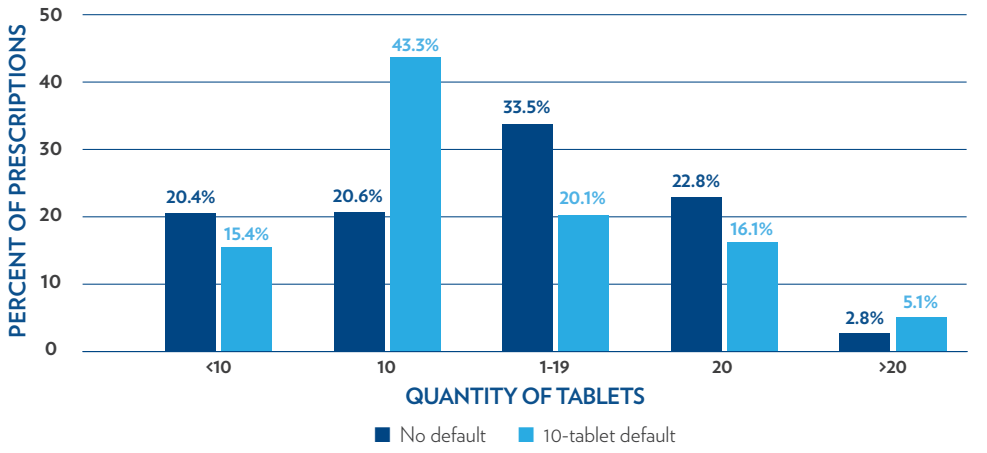
However, the proportion of prescriptions written for the default option of 10 tablets more than doubled from 20.6% pre-default to 43.3% post-default (**Figure 1**). Conversely, the proportion of prescriptions written for 20 tablets (displayed second in the EMR) decreased from 22.8% to 16.1%, and prescriptions for 11-19 tablets decreased from 33.5% to 20.1%.

An unintended consequence of the default option was that the proportion of prescriptions written for fewer than 10 tablets decreased from 20.4% to 15.4%. Additionally, the proportion of prescriptions written for more than 20 tablets increased slightly, from 2.8% to 5.1%, half of which were for 28 tablets (the health system-wide default if the clinician clicked on "Database Lookup" in the new EMR).

THE IMPLICATIONS

This study suggests that default options in the EMR are a powerful, low-cost tool to nudge clinicians to prescribe fewer opioids. Because baseline prescription quantities were already low in the two EDs, the overall number of

FIGURE 1. QUANTITY OF OXY/APAP TABLETS DISPENSED BEFORE AND AFTER IMPLEMENTATION OF ED EMR DISCHARGE ORDER DEFAULT OF 10 TABLETS



opioid tablets prescribed did not change. But the significant shift to the default quantity, consistent with ED prescribing guidelines, suggests that this is a simple and scalable approach to change prescribing behavior while preserving clinician autonomy. This approach could have a significant impact in "right-sizing" post-operative opioid prescriptions for acute pain, for which quantities prescribed are significantly higher and 50-70% of tablets are never taken.

This study also suggests that default options must be implemented cautiously to avoid unintended consequences. A default option should be set at the lowest baseline quantity being prescribed to avoid inadvertently encouraging some clinicians to prescribe more than before the default was set. Second, beyond setting default quantities for specific departments and indications, health system level defaults should also be set low. This study found that opting out of the 10-tablet default led some to select the health system default of 28 tablets, which led to a small, unintended increase of prescriptions for more than 20 tablets.

Changing defaults in EMRs have been useful in changing clinician behavior in other contexts, such as increasing the rates of prescribing generic rather than brand-name drugs in primary care.

Further research is needed to evaluate the effects of implementing an opioid default option in EMRs on a larger scale, in systems with higher baseline prescription quantities, and over a longer timeframe. This research is ongoing in a newly-funded trial called REDUCE.

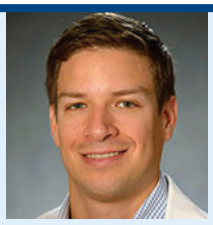
THE STUDY

The authors used EMR data from the emergency departments of the Hospital of the University of Pennsylvania (HUP) and Penn Presbyterian Medical Center (PMC) between October 1, 2014 and June 29, 2015.

This 41-week period included data from the old EMR system that required physicians to manually enter opioid pill quantity (weeks 1-22 for HUP and 1-26 for PMC) and the new EMR system that included a preference list with the default quantity of 10 tablets displayed first (weeks 23-41 for HUP and 27-41 for PMC). In the new EMR, the clinician could "opt out" of the default by selecting a quantity of 20 tablets, which is displayed second, by modifying either of these orders, or by choosing "Database Lookup," where a health system default of 28 tablets is displayed, as well as manual entry options.

Delgado, M.K, F.S. Shofer, M.S. Patel, S. Halpern S., E. Christopher, Z.M. Meisel, J. Perrone. Association between Electronic Medical Record Implementation of Default Opioid Prescription Quantities and Prescribing Behavior in Two Emergency Departments. *Journal of General Internal Medicine*. 2018. doi: 10.1007/s11606-017-4286-5

LDI Research Briefs are produced by LDI's policy team. For more information please contact Janet Weiner at weinerja@pennmedicine.upenn.edu.



LEAD AUTHOR

DR. M. KIT DELGADO

M. Kit Delgado, MD, MS, is an Assistant Professor of Emergency Medicine and Epidemiology at Penn and a practicing trauma center emergency physician. He leads the Behavioral Science & Analytics For Injury Reduction (BeSAFIR) lab, which applies data science and behavioral economics for preventing injuries and improving trauma and emergency care. He has developed a novel line of research leveraging smartphone technology and behavioral economic interventions for injury prevention with a focus on reducing motor vehicle crashes due to distracted and alcohol-impaired driving. He is also testing behavioral economic interventions to promote opioid stewardship for acute and post-operative pain management. Finally, he conducts health services research to optimize trauma and emergency care systems. His work is funded by the National Institutes of Health, the U.S. Department of Transportation, and the Agency for Health Care Research and Quality. In addition to being an LDI Senior Fellow, he is a faculty member in the Center for Emergency Care Policy and Research, the Center for Health Incentives and Behavioral Economics, the Penn Injury Science Center, and the Children's Hospital of Philadelphia Center for Injury Research and Prevention. He is also a member of the National Academies of Sciences, Engineering, and Medicine Committee on Accelerating Progress to Reduce Alcohol-Impaired Driving Fatalities.