Commentary

Dramatic Reduction in Hydrocodone Prescriptions in an Urban Safety Net Health Care System: Has It Improved Patient Safety or Led to Increased Patient Suffering?

Pain management, chronic use of opioids for non-cancer pain, and opioid overdose have become nationwide public health challenges. According to a recent Institute of Medicine report, up to one-third of U.S. adults report chronic pain [1]. Following nationwide policy changes, updated practice guidelines, and the loosening of opioid prescribing restrictions in the 1990s, a dramatic increase was seen in the prescriptions of opioids for non-cancer chronic pain [2].

In addition, over the last 20 years there has been a dramatic increase in opioid-related accidental overdoses and deaths, with 16,651 deaths attributed to prescription opioids in 2010 [3,4]. The majority of these deaths are attributable to long-acting opioids and methadone [5]. The increased mortality rate is due not simply to the overall increase in prescriptions but also to prescriber knowledge deficits, patient behaviors and comorbidities, and payor and system policies [5,6]. In addition to the risk of accidental overdose and death, chronic use of opioids creates other risks to patient safety including abuse, addiction, transition to heroin use, diversion, and accidents [7]. Lastly, opioids can be associated with numerous adverse effects, such as constipation, sedation, hormonal imbalance, and hyperalgesia [8–10].

At the same time, opioids are necessary to meet a critical need for adequate control of both acute and chronic pain in certain patient populations. Withholding and restricting necessary medical treatment may cause undue patient suffering [11]. In addition, prescriber bias and societal stigmas may result in unintended and problematic barriers to improved quality of life for certain groups [12].

In response to increases in opioid-related morbidity and mortality, various recommendations have been made for safe opioid prescribing, including urine drug monitoring, state prescription monitoring databases, and treatment agreements [13,14]. Going one step further, on October 1, 2014, the U.S. Drug Enforcement Administration (DEA) reclassified hydrocodone as a Schedule II drug [15]. As a consequence, hydrocodone requires prescriptions to be written on state-specific, secured prescription paper, and no refills are allowed. Prior to the hydrocodone reclassification, the DEA reclassified tramadol as a Schedule III drug in August 2015. These additional barriers, along with the negative publicity surrounding opioids, have caused many providers to rethink how they prescribe all opioids.

Harris Health System is the safety net health care system for Harris County, Texas. The Houston, Texas, metropolitan area has the largest number of uninsured or underinsured patients in the United States at approximately 1 million, and a large portion of these patients receive care in Harris Health System. In its network of 3 hospitals, 18 community health centers, 5 school-based clinics, and 13 homeless clinics, Harris Health cares for over 300,000 unduplicated patients with over one million visits per year at their outpatient locations. Patients receive their prescription drugs from Harris Health pharmacies within their community health center or hospitals. Harris Health facilities are staffed primarily by medical staff and faculty from the medical schools in Houston, Texas, namely, University of Texas Health Science Center at Houston and Baylor College of Medicine.

The Harris Health System provides very limited access to pain management by specialists, with only one small clinic caring for approximately 50 patients. Medicaid has not been expanded in Texas, and currently Texas has the nation’s highest uninsured rate (above 20%). In addition to the lack of Medicaid expansion, there have been reductions in the county tax rates for the Harris Health System for the last 3 years. Consequently, hiring additional specialists and providing adequate access to pain management clinics is not possible in this safety net system.

As part of a system-wide quality-improvement project for pain management, Harris Health created a database
for the three most frequently prescribed opioids (hydrocodone-acetaminophen, acetaminophen-codeine [T3], and tramadol) from April 2014 through March 2015. The database contains over 120,000 prescriptions dispensed within Harris Health pharmacies. We have expanded the quality improvement project to an Institutional Review Board approved retrospective chart review study; however, initial analyses of the quality-improvement project data are striking.

Compared to the 6-month period before hydrocodone rescheduling, there has been a 9% reduction in the overall number of opioids prescribed and prescriptions for hydrocodone have dropped by 71% (Figure 1). In contrast, prescriptions for T3 and tramadol have risen by 265% and 30%, respectively. Interestingly, tramadol prescriptions have increased despite its reclassification. Thus, providers are substituting T3 and tramadol for hydrocodone to some extent, but overall, the total number of opioid prescriptions has dropped.

These trends are seen across specialties, but with differing degrees of reduction. For example, the number of total opioid prescriptions written by family physicians within Harris Health System has decreased by only 11%, but hydrocodone prescriptions have dropped by 62%. In the emergency centers, overall opioid prescriptions have decreased by 22%, while hydrocodone prescriptions have decreased by 89%.

The prescribing habits among the surgical specialties vary. Otorhinolaryngology (Otolaryngology) physicians have decreased their overall opioid prescriptions by 42% and hydrocodone prescriptions have dropped by 73%. General surgeons have decreased their overall opioid prescriptions by 31% and hydrocodone by 92%. Orthopedic surgeons have decreased their overall opioid prescriptions by 18% and hydrocodone by 98%.

In medical specialties, there is wide variation. Infectious disease/HIV providers have demonstrated only a 25% reduction overall but a 61% reduction in hydrocodone prescriptions, whereas rheumatology has seen a 23% reduction overall and a 99% reduction in hydrocodone. Surprising, oncologists have also reduced their number of prescriptions of the three opioids by 36% and hydrocodone by 50%.

There are two primary ways to view this dramatic shift in opioid prescribing habits in this large urban safety net system. The first is to view these trends as positive. For the first 6 months after hydrocodone reclassification, there were 23,822 fewer hydrocodone prescriptions available in communities surrounding Houston, Texas. Presumably the decreased number of opioids in circulation may have a positive impact on public health in Houston. Time will tell whether there will be decreased rates of opioid dependence and abuse, unintentional overdose, and death. As the efficacy of opioids in chronic, non-cancer pain remains controversial, this trend may indicate that health care providers are using safer opioid prescribing practices and are being more careful in patient selection [2].

However, concerns about the adequacy of pain control for patients who suffer from severe pain should not be minimized. Reductions in opioid prescribing have been seen even in departments that treat acute pain or cancer-related pain (e.g., emergency department, orthopedics, and oncology). Acute pain and cancer-related pain can both be treated effectively with opioids, and patients suffering from severe pain need access to adequate pain control [16]. Thus, the unintended consequences and overall net benefit of restricting hydrocodone access have yet to be determined.

Further, increased burden might be placed on primary care physicians as patients who fail to receive adequate

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**Figure 1** Opioid prescriptions written 6 months before and after the reclassification of hydrocodone. The percentages above each opioid type represent the percentage change in the number of prescriptions written.
pain relief from emergency centers or specialty settings may turn to primary care clinics. Also, patients of minority or lower socioeconomic status may be less able to access adequate pain control due in part to physician biases, leading to pain management–related health disparities. Indeed, there are documented historical disparities in racial and ethnic minority populations’ access to adequate pain management [17].

Patients served in a safety net system are particularly complex. Due to limited system resources and patient factors, such as obesity and co-morbid medical illness, many patients do not have access to surgical interventions that may alleviate orthopedic or other sources of their chronic pain. Hence, these patients living with chronic pain rely on their primary care doctor for medical management. On the other hand, owing to the high proportion of psychiatric diagnoses in this underserved patient population, chronic use of opioids can be problematic. Psychiatric problems, such as anxiety, depression, bipolar disorder, and history of sexual abuse and substance abuse, may place patients at risk for misuse of prescription opioids [18]. Psychosocial stressors are commonly experienced by Harris Health System patients and are also associated with increased aberrant behaviors [18]. Thus, caution and care must be exercised to balance patient safety and need for pain management.

The rescheduling of hydrocodone has had widespread effects, and these effects will be long lasting. In the end, it is up to the individual health care provider to assess risk and determine the most appropriate pain treatment. Validated risk assessment measures like the Opioid Risk Tool should be implemented to help providers make decisions in a non-biased fashion [19]. Patient treatment agreements describing the risks and responsibilities of chronic opioid use may also benefit patients and physicians. Lastly, patient monitoring through regular urine drug screens may help identify those at risk for harmful consequences (e.g., unintentional overdose). Increased resources for non-pharmacological treatments of pain are clearly needed. Only time will tell whether the positive public health benefits of the rescheduling of hydrocodone will outweigh the possible barriers to adequate pain control.

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References
8 Angst MS, Clark JD. Opioid-induced hyperalgesia. Anesthesiology 2006;104(3):570–87.
12 National Institutes of Health: The Interagency Pain Research Coordinating Committee. National Pain Strategy: A comprehensive population health-level


