



Review

Postoperative opioid prescribing: Getting it RIGHTT

Brian K. Yorkgitis, PA-C, DO, FACS^{a,*}, Gabriel A. Brat, MD, MPH^b^a University of Florida College of Medicine- Jacksonville Division of Acute Care Surgery, 655 W. 8th Street, Jacksonville, FL 32209, USA^b Harvard Medical School, Division of Acute Care Surgery, Beth Israel Deaconess Medical Center, 330 Brookline Avenue, Boston, MA 02215, USA

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ABSTRACT

Background: Prescription opioid medications account for a large number of fatal and non-fatal overdoses. Many opioid prescription medications after surgery go unused, with the potential for diversion and misuse. As surgeons become increasingly aware of their role in opioid misuse, better tools are needed to guide behavior.

Data sources: There has recently been a plethora of research into opioid prescribing after surgery. A review of this literature was performed using a search for manuscripts written in the English language. Our goal was to develop an easily recalled approach to postoperative opioid prescribing.

Results: Based on an extensive review of recent literature, we developed the acronym RIGHTT: **R**isk for adverse event, **I**nsight into pain, **G**oing over pain plan, **H**alting opioids, **T**ossing unused opioids and **T**rouble identification.

It is important that surgeons recognize the potential for opioid misuse in their patients. Strategies have been developed to decrease the risk of prescribing opioids. RIGHTT provides a simple acronym for surgeons to integrate best-practice strategies into their management of post-surgical opioids.

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1. Background

Opioid use and misuse has risen dramatically in the last 20 years. An estimated 2 million Americans over 12 years old suffer from a substance abuse disorder related to opioid pain medications.¹ Death rates have followed increases in misuse from 15,000 in 2005 to over 33,000 in 2015.² In that year, almost as many patients died from opioid overdose as from motor vehicle accidents.³ We are seeing this effect in the nation's emergency departments: each day close to 1000 people are treated for prescription opioid misuse.⁴

Opioid prescription sales quadrupled from 1999 to 2014 while the rate of opioid prescribing steadily rose among medical specialists. Prescribing rates are highest among pain medicine, surgery, and physical medicine/rehabilitation.⁵ Given this fact, the surgical community has a responsibility to engage with efforts to mitigate opioid misuse.

1.1. Surgeons approach

Over the last several years, a growing literature has focused on the interaction between opioids and surgery. Lessons learned from this work should be incorporated into surgical practice. There is a role for translating these multiple research findings into a form easily adopted to improve opioid prescribing among surgeons. To accomplish this aim, a comprehensive algorithm, “Getting it RIGHTT” can assist surgeons with opioid prescribing. RIGHTT stands for **R**isk for adverse event, **I**nsight into pain, **G**oing over pain plan, **H**alting opioids, **T**ossing unused opioids and **T**rouble identification.⁶

2. Risk for adverse event

Because one out of every three post-surgical opioid prescription places patients at risk for abuse, it is important to identify susceptible patients and reduce unnecessary exposure.⁷ Patient surgical risk is evaluated prior to surgery, and this should also include individual risk and benefit from opioids. The first step can be a risk assessment through an easy to use validated tool, the Webster Risk Tool (Table 1).^{8,9} This allows a prescriber to identify patients at high risk and may initiate a conversation about post-operative pain along with personalizing the peri-operative pain medication plan.⁸

* Corresponding author.

E-mail addresses: Brian.yorkgitis2@jax.ufl.edu (B.K. Yorkgitis), gbrat@bidmc.harvard.edu (G.A. Brat).

Table 1
Webster Opioid Risk Calculator.⁸

	Male	Female
Family history of substance abuse		
Alcohol	3	1
Illegal Drugs	3	2
Prescription Drugs	4	4
Personal history of substance abuse		
Alcohol	3	3
Illegal Drugs	4	4
Prescription Drugs	5	5
Age 16–45	1	1
History of preadolescent sexual abuse	0	3
Psychological Disease		
ADD, OCD, bipolar, schizophrenia	2	2
Depression	1	1
SCORING TOTALS		
Score Interpretation for Opioid Abuse		
Low risk		≤3
Moderate risk		4–7
High risk		≥8

ADD-attention deficit disorder, OCD-obsessive compulsive disorder.

Substance abuse, including previous opioid misuse is one of the greatest risks factors for postoperative opioid adverse events and prolonged opioid use.^{10,11} Additionally, the use of benzodiazepines has been shown to increase adverse events and increase the risk of chronic post-operative opioid use.^{11–13} Caution should be exercised when these risk factors are present.

Another tool for risk assessment is the prescription drug monitoring program (PDMP) for each state. These statewide electronic databases track all prescriptions and dispensation of controlled substances. Prescribers can examine past and concurrent controlled substance prescriptions filled by the patient. This may provide insight into possible opioid misuse, particularly if the patient has multiple prescriptions from multiple prescribers.^{14,15} About 20% of misusers obtain prescriptions from multiple sources.¹⁴ PDMPs have been successfully used in various parts of the country to decrease this practice.¹⁶ After Tennessee required prescribers to check the state's PDMP, they saw a 36% reduction in patients seeing multiple prescribers to obtain the same drug. The same held true in New York with a 75% decrease in this behavior.¹⁷ Studies have shown that examining the PDMP when prescribing opioids alters the prescribers' decision up to 42% of the time.¹⁴

3. Insight into pain

Each procedure has a varying amount of discomfort and each patient has a different perception of pain. Surgery often causes short-term increase in pain. Achieving postoperative pain scores at or below the patient's baseline is often not possible or safe.¹⁸ It is important to set expectations prior to surgery that a degree of discomfort is expected. Education on the potential causes of pain and expected length of discomfort will let patients better manage their symptoms as well as prepare them for recovery.¹⁹

It is important to counsel patients to expect pain control that allows function rather than pain clearance. The use of functional pain scores over a pain rating number system may be beneficial to assess pain and relief after medication administration. The goal is restoration of function, where providers and patients work as a team to establish a safe level of pain relief to allow meaningful participation in recovery activities.^{18,20}

As Atul Gwande explained, "Pain is a symphony - a complex response that includes not just a distinct sensation but also motor activity, a change in emotion, a focusing of attention, a brand-new

memory."²¹ Recognition of the importance of this multidimensional process provides insight into approaching pain. Anxiety, depression, anger and fear may also contribute to the subjective pain perception.^{19,22}

Previous experience with pain is an important part of the preoperative assessment. This includes any medications the patients has taken or takes for pain. Clinicians should ascertain what relief they achieved with specific agents and any adverse events. A patient that has chronic pain and is currently taking pain medications requires an in-depth review of their current regimen and needs.²³

4. Going over a pain plan

The pain plan starts with preoperative education by obtaining a patient's experience of pain. To assist with recovery and minimize opioids, it is important to describe therapies available to assist with pain management. This education will often decrease anxiety regarding anticipated pain and may reduce postoperative pain scores.²³ Recent work has even suggested that, in some cases, non-opioids can replace and be as effective as opioids after surgery.²⁴ Emphasis on a multimodal approach to pain is important to treat the many etiologies of discomfort.^{23,25–27}

Pre-operative consideration for local and regional anesthesia is paramount. These modalities work at the site of pain and may lead to decreased intraoperative and postoperative opioid use. These include use of anesthetic agents via local wound infiltration, neuraxial anesthetic, and peripheral/regional (transverse abdominis plane block, paravertebral block, brachial plexus, sciatic/femoral nerve block). Additionally, intravenous lidocaine has been shown to reduce postoperative opioid consumption.^{25,26} Administration of lidocaine intravenously may be limited to monitored settings due to cardiac concerns. It may be also administered via a transdermal patch but efficacy is uncertain.²⁵

The use of non-opioid medications is often enough to for functional relief of pain. Using nonsteroidal anti-inflammatory drugs (NSAIDs) in patients with normal renal function is one method. Their use has been shown to decrease opioid use post-operatively.^{25,27} Pre-operative celecoxib was shown in a systematic review and meta-analysis to reduce postoperative morphine use among non-cardiac surgery patients.²⁸ Although some surgeons hesitate to use these agents because of the risk of bleeding, a meta-analysis of surgical procedures with the use of ketorolac did not show an increase in postoperative bleeding.²⁹ Caution should be exercised in high risk cardiovascular patients.³⁰ Acetaminophen is another agent that has shown efficacy in reducing postoperative opioid use. It can be given in conjunction with NSAIDs. Both agents should be scheduled rather than given on an as needed basis to improve their benefit.²⁵

Gabapentanoids (gabapentin and pregabalin) can be used as part of a multimodal approach. These agents have shown efficacy to improve postoperative pain in a variety of procedures, often given preoperatively as well as in the postoperative period.^{31–36} Renal excretion is the mode of elimination and caution should be used in the setting of renal impairment.³¹

Muscle relaxants have been explored as an option to reduce postoperative pain. Tizanidine, a muscle relaxant with alpha-2 agonist properties, was shown to reduce postoperative pain after inguinal hernia repair when administered preoperatively and postoperatively. Other muscle relaxants such as methocarbamol and cyclobenzaprine have been used with sparse data on opioid-sparing outcomes.²⁶

N-methyl-D-aspartate (NMDA) receptor antagonist medications have been shown to reduce postoperative pain. In a review of 39 randomized control trials, low-dose intravenous ketamine administration provided a 40% opioid-sparing effect.²⁶

Table 2
Non-opioid adjuncts to perioperative pain control.^{25,38}

Non-opioid Therapy	Examples
Acetaminophen	
Nonsteroidal Anti-inflammatory Drugs	
Propionic acids	ibuprofen, naproxen
COX-2 Inhibitors	celecoxib
Acetic acids	ketorolac, etodolac
Oxicams	meloxicam, piroxicam
Gabapentanoids	gabapentin, pregabalin
Muscle relaxants	
	methocarbamol
	cyclobenzaprine
	metaxalone
	baclofen
	tizanidine
N-methyl-D-aspartate receptor antagonist	
	ketamine
	dextromethorphan
Nonpharmacologic	
	transcutaneous electric nerve stimulation
	cold/heat therapy
	acupuncture
	relaxation therapy/reiki therapy
	massage
	osteopathic manipulation
	cognitive behavioral therapy

Dextromethorphan, although commonly used as an antitussive, has been shown to reduce pain scores and morphine consumption after a variety of procedures in a meta-analysis of 21 studies.³⁷

Nonpharmacologic modalities may assist with postoperative pain. These include transcutaneous electric nerve stimulation (TENS), thermal therapies (heat or ice), acupuncture, relaxation therapy, cognitive behavior therapy, massage, physical therapy and chiropractic or osteopathic manipulation.^{23,38} Some of these therapies may also address other etiologies of perceived pain such as anxiety or depression.²³

If opioids are required, starting with the lowest dose and shortest course of opioids to achieve a desirable functional level is paramount. They should not be used as monotherapy for postoperative pain.³⁸ Among opioids, tramadol is a weak mu-opioid receptor activator that has a lower risk of addiction. Caution in prescribing tramadol in patients taking serotonin reuptake inhibitors or with a history of seizures should be exercised.²⁵ Educating patients on the negative effects of opioid medications is necessary. These include respiratory depression, dizziness, nausea, vomiting, ileus, constipation, sedation, delirium, falls, aspiration, cognitive impairment, sexual dysfunction, depression, sleep disturbances and opioid dependence.³⁸ Among heroin users, 50%–85% were introduced to opioid use by abusing prescription opioids.²⁴ Table 2 summarizes non-opioid modalities.

5. Halting opioids

When prescribing of opioids is required, efforts should be made to minimize duration.³⁹ Several authors have examined optimal opioid prescribing duration after common surgery.^{23,40,41} These resources can help guide surgeons when prescribing opioids for these procedures (Table 3).

With increased opioid duration comes an increased risk of misuse, dependency or long-term use. Shah et al. examined characteristics of initial opioid prescriptions and the likelihood of opioid discontinuation. The days of opioid medications supplied for the first opioid prescription was the strongest predictor of continued opioid use. The risk of long-term use (over 1 year) if the initial prescription was written for ≥ 8 or ≥ 31 days was 13.5% and

Table 3
Summary of recommended postoperative opioid prescription recommendations.^{24,40,41}

Procedure	Scully	Hill	OPEN
Appendectomy	4 days		10–15 pills
Cholecystectomy	4 days	15 pills	10–15 pills
Inguinal hernia repair	5 days	15 pills	10–15 pills
Mastectomy	5 days		
Partial Mastectomy		5 pills	10–15 pills
PM + SLNB		10 pills	10–15 pills

PM- Partial Mastectomy, SLNB- Sentinel Lymph Node Biopsy, OPEN- Opioid Prescribing Engagement Network.

29.9%, respectively. Among those given a single refill, 1 in 7 were still using opioids after 1 year.³⁹ Brat and colleagues retrospectively analyzed a commercial insurance database and found that for each additional week of exposure, the HR was 20.0% (CI 18.5–21.1%, $p < 0.001$) for misuse.¹³

One concern clinicians cite for liberal prescribing of opioid quantities is the need for refills, as hard-copy refills place an increased burden on patients and prescribers.²⁴ Sekhri et al. examined opioid-naïve surgical patients refill patterns. Refills did not change with increasing initial oral morphine milliequivalent (MME) dose. Patient factors were correlated with the probability of refill including tobacco use (OR 1.42, 95% CI 1.23–1.57), anxiety (OR 1.30, 95% CI 1.15–1.47), mood disorders (OR 1.28, 95% CI 1.13–1.44), alcohol or substance abuse disorders (OR 1.43, 95% CI 1.12–1.84), and arthritis (OR 1.21, 95% CI 1.10–1.34).⁴² Many of these factors correlate with risk factors of misuse previously listed.

6. Tossing unused medications

In a recent evidence review, Bicket and colleagues found that 67–92% of patients reported unused opioids after surgery.⁴³ Several authors have reported that opioid medications are often easily accessible to others as a result of storage in unsecure locations.^{43,44}

Proper storage and disposal is important to prevent diversion—transfer of a legally prescribed controlled substance from the prescribed individual to another person. The majority of prescription drug abusers obtain drugs from diversion, and more than half obtain drugs from friends or family.²⁴ Several steps can be taken by patients to prevent diversion. One option is to deliver unused opioids to a prescription take-back program. It is important that surgeons locate available resources in their area to inform patients where to dispose of these drugs.^{45,46} The Drug Enforcement Agency maintains a listing of medication disposal locations on their website (<https://apps.deadiversion.usdoj.gov/pubdispsearch/>).⁴⁶

If there is no nearby take-back program, other steps to dispose of opioids include removing the label from the bottle and disposing unused pills in household trash with undesirable substances such as kitty litter, used coffee grounds, or spoiled food. Place the mixture into a disposable container or sealable bag and place in the trash. Flushing down the toilet should be avoided as the drugs can leach into ground or pass through water treatment systems and eventually end up in the water supply. Water treatment facilities are generally not routinely equipped to remove medications.^{45,47}

7. Trouble identification

Using the Webster Opioid Risk Tool or other similar tool along with possible information gained using the PDMP, a surgeon can better identify high-risk patients and misuse potential. Awareness upon receiving a refill request beyond what is normally expected

for opioid prescribing for a given procedure by a high-risk individual should prompt consideration of potential for opioid troubles. These patients should be referred promptly to pain specialists. Chronic opioid use is often defined as lasting beyond 90 days.⁴⁸ Patients with chronic use should transition to a management of their opioids by a pain management professional.²³

8. Making your practice RIGHTT

Incorporating RIGHTT into a surgeon's practice may seem time-consuming. Several steps can be used to hone the process. Administration of the opioid risk tool can be done by office or nursing staff. Alternatively, patient can be asked to self-administer the tool. Search of the PDMP can be done by office/nursing staff or affiliated hospital pharmacists. Engaging pharmacists in the opioid exit plan has been shown to be effective.⁴⁹ Helping patients acquire insight into the expected pain from a procedure can become part of a surgeon's workflow. Describing what pain patients may experience along with duration and goals of pain relief after a procedure can be reviewed during consent for the procedure. Current pain medications a patient is taking should be captured during the captured history. Non-opioid adjuncts can be systematically incorporated into the physician's electronic medical record preference list or post-surgical protocol. This serves as a reminder along with a template of options outside the opioid family. Additionally, information regarding the use of adjunct medications, dangers of opioids along with proper disposal can be given to the patient as a part of a patient education handout received when scheduling a surgery. The time spent addressing this important topic can lead to a return on investment through decreased prolonged opioid use, complications and diversion.^{10,11,24}

9. Conclusion

Adverse events associated with opioid use include increased hospital length of stay, readmission, gastrointestinal effects, drug events such as respiratory depression and delirium, and potential for misuse and diversion. Accordingly, surgeons must confront the risks of opioid prescribing as they do with any pre-operative risk factor. Proper surgical opioid management requires careful counseling, planning and risk mitigation. A partnership with the patient to get it RIGHTT addresses various needs for the surgeon and patient to identify risk for misuse, manage pain perception, encourage multimodal analgesic therapy, and promote proper disposal. The RIGHTT acronym can assist our embattled colleagues to approach the complex and important task of opioid prescribing in an organized manner that minimizes adverse events related to opioids and maximizes patient recovery.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.amjsurg.2018.02.001>.

References

- American Society of Addiction Medicine. Opioid Addiction 2016 Facts and Figures. Available at: <https://www.asam.org/docs/default-source/advocacy/opioid-addiction-disease-facts-figures.pdf>. Accessed October 17, 2017.
- National Institute of Health, National Institute on Drug Abuse. Overdose Death Rates. Available at: <https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates>. Accessed October 17, 2017.
- National Highway Traffic Safety Administration. 2015 motor vehicle crashes: overview. Available at: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318>; August 2016. Accessed October 17, 2017.
- Centers for Disease Control and Prevention. Prescription Opioid Overdose Data. Available at: CDC <https://www.cdc.gov/drugoverdose/data/overdose.html>.

- Accessed October 17, 2017.
- Centers for Disease Control and Prevention. Prescribing Data. Available at: <https://www.cdc.gov/drugoverdose/data/prescribing.html>. Accessed October 17, 2017.
 - Yorkgitis BK. Opioids and practice: Getting it RIGHTT. Musings Blog of the JAAPA editorial board. Available at: <http://journals.lww.com/jaapa/blog/musings/pages/post.aspx?PostID=136>. Accessed October 1, 2017.
 - Thiels CA, Anderson SS, Ubl DS, et al. Wide variation and over prescription of opioids after elective surgery. *Ann Surg.* 2017;266(4):564–573.
 - National Institute on Drug Abuse. Opioid Risk Tool. Available at: <https://www.drugabuse.gov/sites/default/files/files/OpioidRiskTool.pdf>. Accessed November 15, 2017.
 - Webster LR, Webster R. Predicting aberrant behaviors in Opioid-treated patients: preliminary validation of the Opioid risk tool. *Pain Med.* 2005;6(6):432–442.
 - Cauley CE, Anderson G, Haynes AB, et al. Predictors of in-hospital postoperative opioid overdose after major elective operations. *Ann Surg.* 2017;265(4):702–708.
 - Clarke H, Soneji N, Ko DT, et al. Pates and risk factors for prolonged opioid use after major surgery: population based cohort study. *BMJ.* 2014;348:g1251.
 - Sun EC, Darnall BD, Baker LC, Mackey S. Incidence of and risk factors for chronic opioid use among opioid-naïve patients in the postoperative period. *JAMA Intern Med.* 2016;176(9):1286–1293.
 - Brat G, Angiel D, Beam A, et al. Post-surgical opioid prescription duration and the association with overdose and abuse. *J Am Coll Surg.* 2017;225(4). S2:e29.
 - Griggs CA, Weiner SG, Feldman JA. Prescription drug monitoring programs: examining limitations and future approaches. *West J Emerg Med.* 2015;16(1):67–70.
 - National Institute on Drug Abuse. Prescription Drug Monitoring Programs Linked to Reduction in Opioid Overdose Deaths. Available at: <https://www.drugabuse.gov/news-events/news-releases/2016/06/prescription-drug-monitoring-programs-linked-to-reductions-in-opioid-overdose-deaths>. Accessed October 17, 2017.
 - Patrick SW, Fry CE, Jones TF, Buntin MB. Implementation of prescription drug monitoring programs associated with reduction in opioid-related Death rates. *Health Aff.* 2016;35(7):1324–1332.
 - Centers for Disease Control and Prevention. State Successes. Available at: <https://www.cdc.gov/drugoverdose/policy/successes.html>. Accessed October 17, 2017.
 - Stiles P, Hillard P. Perioperative Pain Management: Setting Appropriate Expectations. Available at: https://anes-conf.med.umich.edu/opioidtaper/docs/setting_expectations.pdf. Accessed October 21, 2017.
 - Ansari A, Rizk D, Whinney C. The Society of Hospital Medicine's (SHM's) Multimodal Pain Strategies Guide for Postoperative Pain Management. Available at: https://www.hospitalmedicine.org/web/clinical_topics/Multi_Model_Pain_Project_reader_v3.pdf. Accessed October 30, 2017.
 - Peponis T, Kaafarani HMA. What is the proper use of opioids in the post-operative patient? *Adv Surg.* 2017;51:77–87.
 - Gawande A. *Complications: A Surgeon's Notes on an Imperfect Science*. Henry Holt and Company; 2003:126.
 - Sipila RM, Haasio L, Meretoja TJ, et al. Does expecting more pain make it more intense? Factors associated with the first week pain trajectories after breast cancer surgery. *Pain.* 2017;158(5):922–930.
 - Chou R, Gordon DB, de Leon-Casasola OA, et al. Management of postoperative pain: a clinical practice guideline from the American pain society, the American society of regional anesthesia and pain medicine, and the American society of Anesthesiologists' committee on regional anesthesia, executive committee and administrative council. *J Pain.* 2016;17(2):131–157.
 - Hill MV, McMahon ML, Stucke RS, Barth RJ. Wide variation and excessive dosage of opioid prescriptions for common general surgery procedures. *Ann Surg.* 2017;265:709–714.
 - Wick EC, Grant MC, Wu CL. Postoperative multimodal analgesia pain management with nonopioid analgesics and techniques. *JAMA Surg.* 2017;152(7):691–697.
 - Kumar K, Kirksey MA, Duong D, Wu CL. A review of opioid-sparing modalities in perioperative pain management: methods to decrease opioid use post-operatively. *Anesth Analg.* 2017;125(5):1749–1760.
 - Helander EM, Webb MP, Bias M, et al. A comparison of multimodal analgesic approaches in institutional enhanced recovery after surgery protocols for colorectal surgery: pharmacologic agents. *J Laparoendosc Adv Surg Tech A.* 2017;27(9):903–908.
 - Khan JS, Margarido C, Devereaux PK, et al. Preoperative celecoxib in noncardiac surgery: a systematic review and meta-analysis of randomized controlled trials. *Eur J Anaesthesiol.* 2016;33(3):201–214.
 - Gobble RM, Hoang HL, Kachniarz B, Orgill DP. Ketorolac does not increase perioperative bleeding: a meta-analysis of randomized controlled trials. *Plast Reconstr Surg.* 2014;133(3):741–755.
 - Joshi GP, Gertler R, Fricker R. Cardiovascular thromboembolic adverse effects associated with Cyclooxygenase-2 selective inhibitors and nonselective anti-inflammatory drugs. *Anesth Analg.* 2007;105(6):1793–1804.
 - Schmidt PC, Ruchelli G, Mackey SC, Carroll IR. Perioperative gabapentinoids. *Anesthesiology.* 2013;119(5):1251–1221.
 - Straube S, Derry S, Moore RA, Wiffen PJ, McQuay HJ. Single dose oral gabapentin for established acute postoperative pain in adults. *Cochrane Database Syst Rev.* 2010;12(5). <https://doi.org/10.1002/14651858.CD008183>.
 - Warren JA, Stoddard C, Hunter AL, et al. Effect of multimodal analgesia on

- opioid use after open ventral hernia repair. *J Gastrointest Surg.* 2017;21:1692–1699.
34. Eidy M, Fazel MR, Abdolrahimzadeh H, et al. Effects of pregabalin and gabapentin on postoperative pain and opioid consumption after laparoscopic cholecystectomy. *Korean J Anesthesiol.* 2017;70(4):434–438.
 35. Wang L, Dong Y, Zhang J, Tan H. The efficacy of gabapentin in reducing pain intensity and postoperative nausea and vomiting following laparoscopic cholecystectomy: a meta-analysis. *Medicine.* 2017;96(37).
 36. Alayed N, Alghanaim N, Tan X, Tulandi T. Preemptive use of gabapentin in abdominal hysterectomy: a systematic review and meta-analysis. *Obstet Gynecol.* 2014;123(6):1221–1229.
 37. King MR, Ladha KS, Gelineau AM, Anderson TA. Perioperative dextromethorphan as an adjunct for postoperative pain: a meta-analysis of randomized controlled trials. *Anesthesiology.* 2016;124(3):696–705.
 38. Savarese JJ, Rabler NG. Multimodal analgesia as an alternative to the risks of opioid monotherapy in surgical pain management. *J Healthc Risk Manag.* 2017;37(1):24–30.
 39. Shah A, Hayes CJ, Martin BC. Characteristics of initial prescription episodes and likelihood of long-term opioid use- United States, 2006-2015. *Morbidity and Mortality Weekly Report.* 2017;66(10):265–269.
 40. Scully RE, Schoenfeld AJ, Jiang W, et al. Defining optimal length of opioid pain medication prescription after common surgical procedures. *JAMA Surg.* 2017. <https://doi.org/10.1001/jamasurg.2017.3132>.
 41. Opioid Prescribing Engagement Network. Opioid Prescribing Recommendations for Surgery. Available at: <https://opioidprescribing.info/>. Accessed October 27, 2017.
 42. Sekhri S, Arora NS, Cottrell H, et al. Probability of opioid prescription refilling after surgery does initial prescription matter? *Ann Surg.* 2017. <https://doi.org/10.1097/SLA.0000000000002308>.
 43. Bicket MC, Long JJ, Pronovost PJ, et al. Prescription opioid analgesics commonly unused after surgery. *JAMA Surg.* 2017. <https://doi.org/10.1001/jamasurg.2017.0831>.
 44. Bartels K, Mayes LM, Dingmann C, et al. Opioid use and storage patterns by patients after hospital discharge following surgery. *PLoS One.* 2016. <https://doi.org/10.1371/journal.pone.0147972>.
 45. Food and Drug Administration. Disposal of Unused Medicines: What You Need to Know. Available at: <https://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/EnsuringSafeUseofMedicine/SafeDisposalofMedicines/ucm186187.htm>. Accessed October 21, 2017.
 46. Drug Enforcement Agency. Controlled Substance Public Disposal Locations-Search Utility. Available at: <https://apps.deadiversion.usdoj.gov/pubdispsearch/spring/main?execution=e1s1>. Accessed November 12, 2017.
 47. Environment Protection Agency. How to Dispose of Medicines Properly. Available at: <https://archive.epa.gov/region02/capp/web/pdf/ppcpflyer.pdf>. Accessed November 11, 2017.
 48. Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain- untied states, 2016. *MMWR.* 2016;65(1):1–49.
 49. Genord C, Frost T, Eid D. Opioid exit plan: a pharmacist's role in managing acute postoperative pain. *J Am Pharmaceut Assoc.* 2017;57(S2):S92–S98.